Pre-Service Administrators' Problem-Framing Ability:

Seeing the Elephant as Part or Whole

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Purpose

A review of the literature on administrator preparation programs and administrators' problem-framing ability suggests that greater investigation is needed in understanding how pre-service administrators identify and frame problems (Copland, 2000; Hallinger, Leithwood, & Murphy, 1993; Smiley & Bennett, 2005). In fact, Smiley and Bennett (2005) state that "it is almost impossible to find studies that use direct measures of preservice leaders' knowledge, skills, dispositions, or behaviors before or after completion" (p. 146) of a preparation program. Yet, we know that administrators constantly face complex situations and need to be able to interpret the situation in order to arrive at an appropriate course of action (Copland, 1999; Copland, 2003; Leithwood & Steinbach, 1995). Furthermore, research has shown that administrators, once in the field, show a range of expertise in their ability to frame problems and formulate alternatives and solutions (Leithwood & Steinbach, 1995). Thus, if education administration and leadership preparatory programs can intervene by providing exposure to the problems in-service administrators encounter and creating environments in which the pre-service students can have experience framing the "messy" (Dombroski, 1999) problems of school leadership, then our future education leaders will be more prepared to resolve the challenges they encounter once they become leaders themselves. Consequently, this study seeks to understand pre-service administrators' problem-framing ability. Specifically, the central questions of this study are:

1. How fluent, accurate, and detailed are pre-service administrators' responses at the problem-identification stage?

2. What is the overall explanatory quality of pre-service administrators' problem framing?
3. Can case methods of instruction improve the fluency, accuracy, and detail of pre-service administrators' responses at the problem-identification stage?

Theoretical Framework

John Godfrey Saxe, in 1873, wrote a poem called, "The Blind Men and the Elephant," which tells of six blind men who all touched parts of an elephant and reached different conclusions about the animal they had encountered. The story in this poem is analogous to the experiences administrators have as they attempt to frame problems; they may be presented with the same situation, but whether they can holistically evaluate the situation and determine if there is a systemic explanation of the underlying dynamic or only identify factual elements is dependent upon their problem-framing skills.

Leithwood and Steinbach (1995) identify five components of problem solving, the first being interpretation. They define interpretation as the understanding of the specific nature of the problem, where administrators "extract a focus for their action from the buzzing confusion or mess in which they often find themselves" (Leithwood & Steinbach, 1995, p. 150). Copland (2003) declares that this initial framing of the problem determines whether "a predetermined solution will quickly follow or whether alternative solutions will be considered" (p. 544). All three authors assert that administrators possess a range of ability with regard to interpreting problems. For example, Leithwood and Steinbach (1995) distinguish among novice, effective, and expert ability levels with individuals progressing through these stages based on various skills that include application of preconceived ideas applied to the situation at hand and their ability to synthesize multiple data points in an integrated, connected manner. Copland (2003) draws on the

research in the medical field (e.g., Elstein, Shulman, & Sprafka, 1978; Kauffman et al., 1989) and his own research with prospective principals to illustrate that problem-based learning environments can result in significantly more sophisticated problem-framing. He found that "repeated exposure to, and practice with, a problem-solving process, such as that which is incorporated in problem-based learning, is associated with greater student ability in framing administrative problems" (Copland, 2003, p. 544). Likewise, other scholars have noted that educational administrators who have more experience framing problems are able to quickly, comprehensively, and accurately assess the situation (Davis & Davis, 2003; Snowden & Gorton, 2002).

Furthermore, Leithwood and Steinbach (1995) assert that progression from novice problem solver to expert problem solver requires an investment of time, meta-cognitive reflection on the decision-making process, and exposure to multiple experiences of well-structured and ill-structured problems. This enhanced ability is a skill that can be developed over time, particularly when attention is given to transferring theory and prior experiences to applied settings and novel experiences. Leithwood and Steinbach (1995) suggest that this transfer is fostered and progression along the novice to expert continuum occurs when individuals have multiple opportunities to interact with problems of practice, receive feedback tailored to their individual responses to problem solving, are given opportunities to decontextualize and generalize the experience, and obtain "direct instruction in the key components of effective problem-solving practices and coaching in the application of such components to specific cases" (p. 294).

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 that is embedded in the user interface. Figure 1 provides a more detailed description of each step and the guidance that is provided within the ETIPS environment.

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

Methods and Data Sources

Recognizing that experience with problem-framing enhances one's ability to lead and make decisions, this study utilized an online case environment that enables pre-service administrators to experience multiple school contexts in virtual settings and progress through the steps of problem-framing and action plan formulation.

During the 2008-2009 academic year, nine faculty members were recruited from eight institutions of higher education in the state of Virginia that offer administrative licensure and master degree programs in educational administration. A convenience sample of students, who were instructed by the participating faculty members, was asked to participate in the study and complete the online cases. Students completed one case as a pre-test. Subsequently, instructors implemented two additional cases as an integral component of an educational administration course such as organizational leadership, school and community relations, or instructional supervision. Case responses were collected from students in these administration programs. The responses to the first and third cases were scored using a refined rubric based on the decision making model embedded in the design of the cases.

The decision making process in each case is organized into four steps to which students provide narrative responses to multiple prompts and open-ended questions during the case experience. The question prompt investigated in this study is displayed in Figure 2.

Figure 2. Question Prompt Analyzed in This Study

Decision Making Step 1: Identify the issue that needs to be addressed

In identifying the issue that needs to be addressed, effective decision makers carry out the following steps to ensure that they are getting at the heart of the issue.

- Consider many possible explanations of what is going on, including inherent assumptions within each
- Deduce the fundamental underlying nature of problem
- Seek an appropriate amount and nature of data in order to make 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

Question 1: Consider what is going on at the school. Generate 3-5 explanations that you think could account for this. Check the one that you believe is at the heart of the issue.

The research team scored each of the answer parts 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). The indicators matched key performance aspects for each sub-step of decision making. Student responses were assessed for fluency, accuracy, and detail. Fluency signified students' ability to generate multiple explanatory statements that fit the evidence from the case with particular attention given to students being able to explain and describe the situation instead of just identifying facts from the case. To measure accuracy, the research team examined the single item students selected as the core issue to ascertain whether the student-selected issue was an accurate, overarching issue at the school. To assess explanatory detail, the research team again looked at the single, student-selected item and evaluated responses based on whether students described a relevant issue using a rationale that was based on multiple data points. Cases were scored by multiple researchers until the inter-rater reliability was .77; remaining cases were then scored by one of the three researchers. The rubric used in this study is shown in Table 1.

Table 1

Step 1, Question 1 Rubric Utilized in This Study

Step 1: All statements, explanatory fluency			
0 Points	1 Point	2 Points	3 Points
Student lists facts or empirical evidence from the case.	Student provides one explanation that fits the given facts and evidence from the case.	Student provides two explanations that fit the given facts and evidence from the case.	Student provides three explanations that fit the given facts and evidence from the case.
Step 1: Bulleted statement, explanatory accuracy			
0 Points	1 Point	2 Points	3 Points
Student lists facts or empirical evidence from the case.	Student describes one explanation that fits the facts and evidence from the case, but it is not a relevant issue.	Student describes one explanation that is a relevant issue.	Student describes one explanation that uses given facts and evidence as a rationale from the case, and it is a relevant issue.
Step 1: Bulleted statement, explanatory detail			
0 Points	1 Point	2 Points	3 Points
Student identifies an irrelevant issue or a relevant issue but without any rationale.	Student describes a relevant issue with a rationale that draws upon one factual detail.	Student describes a relevant issue using a rationale that draws upon two factual details.	Student describes a relevant issue using a rationale that draws upon three or more factual details.

The second analysis assessed the overall sophistication of students' problem-framing ability. Drawing on the work of other scholars who delineate between novice and expert ability

(King & Kitchener, 1994; Leithwood & Steinbach, 1995; National Research Council; 2000) and the research team's detailed analysis of students' responses, the research team used emic and etic approaches to create a taxonomy shown in Table 2. Emic refers to the abstractions, categories, and meaning that emerge from the data; whereas, etic describes the categories of meaning drawn from prior literature reviews and research studies that are imposed on the data (Smith, 1987). For example, previous literature informed the authors that novice problem solvers tend to focus on individual facts of a case and generate solutions prematurely while an expert tends to look at the situation from an integrative perspective by examining patterns in the data holistically (Copland, 2003; Leithwood & Steinbach, 1995). However, from a detailed review of the data, several intermediary levels emerged between the factual and integrative levels, which suggested that a taxonomy could be applied to how participants framed the problems and issues in the cases. The data were reviewed as a collective set by two researchers and coded according to the taxonomy using consensus, blind to whether the responses were from Case 1 or Case 3.

Table 2

Continuum of Problem-framing Quality in Student Responses

Taxonomy Level	**Definition**
Suggestive	Suggests a solution to the problem instead of describing the problem itself
Factual	Lists a fact or empirical evidence from the case; restates isolated data
Relational	Connects 2 facts and is relational in nature; simplistic understanding of case
Inferential	Offers a meager explanation by stating an inference from 1 or more facts; may be a premature judgment or causal in nature
Thematic	Pertains to 1 or more issues from a single domain (category) that may contribute to part of a relevant problem; narrow in focus
Integrative	Integrates issues from multiple domains and suggests a systemic interaction

	among those issues that contributes to a multi-faceted problem; recognition of patterns; complex understanding of issue

To discern whether the case methods of instruction improved student thinking about a problem and how it was framed, paired samples t-tests of case one responses and case three responses were conducted for each of the sub-steps (i.e., fluency, accuracy, and detail) of step one in the decision making process. Additionally, a paired samples t-test was conducted for the composite score of step one.

Results

Analysis of pre-intervention and post-intervention student performance on the cases, as shown in Table 3, revealed that students vary in their problem-framing fluency, accuracy, and explanatory detail. Students scored highest in fluency, their ability to generate multiple explanations for what was occurring at the school in a holistic and systematic manner ($\bar{x}_{\text{FluencyCase1}}$=1.13, $\bar{x}_{\text{FluencyCase3}}$=1.61). Students typically were able to offer one to two plausible explanations for the dynamics within the school. However, students were weaker at generating accurate explanations for the dynamics within the school ($\bar{x}_{\text{AccuracyCase1}}$ = 0.59, $\bar{x}_{\text{AccuracyCase3}}$=0.97) and providing the rationale for why their identified responses were relevant ($\bar{x}_{\text{DetailCase1}}$=0.15, $\bar{x}_{\text{DetailCase3}}$=0.19). Students' responses typically did not identify relevant issues, were not accurate reflections of the data presented in the cases, and rarely provided evidence for their identified issues. Even though there were within group variations in scores for the sub-steps, mean scores were low overall considering the score range was zero to three.

Table 3

Mean Scores for Narrative Responses to Individual Question Prompts (N=68)

Question Prompt	Mean Case 1	SD Case 1	Mean Case 3	SD Case 3
Step 1: Identify the Issue				
Explanatory Fluency	1.13	1.09	1.61	1.10
Explanatory Accuracy	0.59	0.88	0.97	1.02
Explanatory Detail	0.15	0.43	0.19	0.55

A larger, collective set of both case one and case three responses (N=521) was used to examine the overall explanatory quality of students' responses. Responses varied in focus, quality, and detail. They included factual information about the school, relevant and irrelevant issues that were both simplistic and complex in nature, and solutions. Examination of the overall explanatory quality of students' responses revealed that students were more likely to list facts or empirical evidence from the case instead of providing an explanation of what was occurring at the school. Students listed facts from the case 67.56% of the time and more holistic issues in only 32.44% of the responses. In other words, students framed the problem in terms of facts from the case, such as low reading achievement, instead of looking at a broader explanation of the central issue, such as instructional coherence of the language arts program within the school. Regarding breadth of responses, students framed the school problem using a variety of lenses such as school vision, class size, and professional development. Table 4 provides an overview of the frequency of occurrence of facts and issues in Case 1, Case 3, and the composite of both cases. Table 4 also demonstrates that there was a proportional shift in responses identified as facts versus issues from Case 1 to Case 3. For example, the percentage of responses identified as

facts decreased from Case 1 to Case 3, while the percentage of responses identified as issues increased from Case 1 to Case 3.

Table 4

Frequencies of Responses Identified as Facts or Issues

Identification of Responses	Frequency of Occurrence Case 1 (n=236) (%)	Frequency of Occurrence Case 3 (n=285) (%)	Frequency of Occurrence Composite: Case 1 and Case 3 (N= 521) (%)
Facts	72.46	63.51	67.56
Issues	27.54	36.49	32.44

Analysis of students' responses using the preliminary taxonomy revealed a continuum of sophistication as reported in Table 5. Of the 521 responses, students stated factual evidence from the case 55.09% of the time and generated a complex and integrative understanding of the problem in only 8.64% of the responses. Although the question prompt asked participants to state three to five explanations that could account for what was transpiring at the school, 7.87% of the responses were suggestions on how to improve the school instead of explanations describing the problems or issues at the school.

Table 5

Occurrence of Student Responses Using the Continuum of Problem-framing Quality

Taxonomy Level	Example	Frequency of Occurrence (%)
Suggestive	"Increase academic performance requirements from only basic and minimal levels of literacy"	7.87
Factual	"Average class size is 33 students when the goal is 22"	55.09
Relational	"The school schedule limits the number of classes during the day which creates large class sizes"	4.22
Inferential	"Teachers feel that they cannot be effective due to lack of prep time"	5.37
Thematic	"There is a lack of school standards in the area of teaching and learning for the members of the faculty to use to construct objectives and lessons."	18.81
Integrative	"Leadership does not seem able to facilitate, articulate, or implement the vision and mission at Stromburg. Again the number of discipline infractions, and the disparity in scores - even in the same subjects and grade levels."	8.64

Disaggregating the data between Case 1 and Case 3 responses showed that the frequency of the first four levels of the taxonomy decreased from Case 1 to Case 3, but the frequency of the most sophisticated levels of the taxonomy increased from Case 1 to Case 3. This finding suggests that participants progressed along the continuum of novice to expert in their ability to articulate the issues and frame the central problems within the cases. Table 6 illustrates the changes from Case 1 to Case 3 in frequency of responses by taxonomy level.

Table 6

Frequency of Responses by Taxonomy Level for Case 1 and Case 3

Taxonomy Level	Frequency of Occurrence Case 1 (n = 236) (%)	Frequency of Occurrence Case 3 (n = 285) (%)
Suggestive	8.47	7.37
Factual	58.47	52.28
Relational	5.51	3.16
Inferential	5.51	5.26
Thematic	13.98	22.81
Integrative	8.05	9.12

The research team conducted paired samples t-tests on each sub-step of step one and the composite step one scores. Results summarized in Table 7 revealed significant differences between case one and case three in students' explanatory fluency and accuracy. Moreover, the total score for step one showed a significant difference between case one and case three. Thus, these findings indicate that the case method of instruction significantly improved students' problem-framing ability.

Table 7

Results of Paired Samples T-tests

Component	Mean Difference
Step 1: Explanatory Fluency	0.478*
Step 1: Explanatory Accuracy	0.382*
Step 1: Explanatory Detail	0.044
Step 1 Composite	1.426*

*p < .05.

Conclusion

The analysis of the online case responses revealed significant growth in students' problem-framing performance based on the implementation of two cases within a leadership preparation program. Students' problem-identifying ability did increase in fluency, accuracy, and detail after working with the online cases. Improvements were statistically significant for explanatory fluency, explanatory accuracy, and overall explanatory performance. Despite the improvement in students' problem-framing ability, their performance was weak overall with scores at the low end of the three-point range.

Based on the more detailed analysis of response quality in the aggregate, students were able to generate a number of factual explanations for the school's situation, but their responses tended to be simplistic and narrow in focus instead of holistic and systemic. Students tended to identify one or two key facts about the school as an explanation for all the dynamics within the school and lacked more sophisticated and multi-dimensional understandings of how various aspects of professional development, curriculum, teacher quality and leadership might interact to compromise student achievement. Disaggregated analysis of responses from Case 1 to Case 3,

however, showed that there was progression from a more novice-oriented framing of the problems to a more thematic and integrated explanation of the issues.

Together the quantitative findings regarding explanatory fluency, detail, and accuracy and the qualitative findings on the predominantly factually-restricted formulations of school problems clearly demonstrate that aspiring school leaders need more scaffolding in identifying and framing the ill-defined problems found in schools. Because schools are complex organizations, processes and outcomes can seldom be attributed to single variables (Leithwood & Steinbach, 1995). To understand the dynamics within a particular school, school leaders need an ability to recognize patterns of events and cause-effect relations based on contextual elements. One way in which leadership preparation programs can develop problem solving skills in students is to use cases more strategically. Moreover, Leithwood and Steinbach (1995) state that "Development of increasingly skilled performances, based on increasingly sophisticated cognitive schemata, depend on opportunities for repeated practice and the quality of the feedback provided as a result of practice" (p. 288); thus, it is imperative for administration preparation programs to provide students with multiple opportunities to explore issues, frame problems, and articulate alternatives and plans of actions to address the identified issues. Thoughtful integration of cases into course experiences will not only enable students to interact with the "messy" (Dombroski, 1999) problems of practice, but through interactive discussions about the cases and the decision making processes, to enhance their problem solving ability individually and collectively.

The findings of this study suggest the potential benefits of offering students problem-framing experiences, with particular attention given to formulating more complex and integrative conceptualizations of school problems. If leadership preparatory programs are to equip future

administrators for the work they will do in schools, then it is essential that programs address the work of problem framing that is central to school leadership. Symbolically, public schools need administrators who are not only able to identify the discrete parts of the elephant but to recognize the creature in its entirety with an appreciation of how the elements of the system work together.

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