The Impact Of Instructors' Case Methods Of Instruction On Students' Learning Experiences With Cases

Sara Dexter
Pamela D. Tucker
Curry School of Education, University of Virginia
David Stuit
Arroyo Research Services

Contact Information:
Sara Dexter
405 Emmet Street
P.O. Box 400265
Charlottesville, VA 22904-4265
Phone: (434) 924-7131
Email: sdexter@virginia.edu

DRAFT April 11, 2009

Paper Presented at the Annual Meeting of the
American Educational Research Association (AERA),
San Diego, CA 2009

Abstract

Case methods of instruction have been advocated as a signature pedagogy for the preparation of school leaders that would provide more authentic learning environments for developing future leaders' ability to apply theory into practice. Our field testing during the past year with a test-bed of faculty members using newly created cases shows (1) that case-based methods of instruction are a demanding pedagogy, and (2) that positive student experiences with cases mainly stem from their instructor's during- and after-case methods of instruction. These data suggest that discussion and feedback strategies are both key, but are not always utilized. Implications for design of case-based learning environments are to build discussion and feedback both into the online student experience, and to promote these strategies through faculty professional development on case methods of instruction.

The Impact Of Instructors' Case Methods Of Instruction On Students' Learning Experiences With Cases

Over the past two decades, numerous studies have called upon K-12 administrator preparation programs to improve their curricular coherence and application of theory to practice (Bottoms & O'Neil, 2001; Davis, Darling-Hammond, LaPointe, & Meyerson, 2005; Hale & Moorman, 2003; Levine, 2005; SREB, 2003, 2006; UCEA, 1987. Case methods of instruction have been advocated as a signature pedagogy for the preparation of leaders that would effectively provide authentic assessments of future leaders' ability to apply theories in context (Firestone & Riehl, 2005; Shulman, 2005a, 2005b).

We describe here newly created and field-tested cases that use an innovative context-based approach with embedded assessments of student learning. Educational Theory into Practice Software (ETIPS) has been designed to provide learners with a case-based online learning environment offering multiple opportunities to practice applying theory in their decision making within virtual yet realistic school settings and to receive feedback on their critical thinking. The digital ETIPS cases offer not only the advantages of text-based cases but also several others fundamental to a research-based understanding of how people learn. Our field testing during the 2007-08 academic year with a test-bed of faculty members using newly created online cases shows that (1) case-based methods of instruction are a demanding, yet flexible, pedagogy; (2) aspects of a positive student experience may stem from the case itself or from their instructor's case methods of instruction. These data suggest several implications for promoting case methods of instruction as a signature pedagogy in education.

Theoretical framework

Cases and case instructional methods have been long used in such fields as business and law, and this highly effective method of instruction has increasingly found its way into the field of education (Merseth, 1991; Sykes & Bird, 1992). Traditional text-based cases (i.e., those read in a linear fashion that emphasize the multiplicity of perspectives inherent in an event and are often told in chronological fashion) have been used most often in the preparation of teachers, although their use in preparation programs for administrators is growing, as evidenced by the formation of UCEA's *Journal of Cases in Educational Leadership* and a number of textbooks of cases and notes about their use (e.g., Honan & Rule, 2002; Kowalski, 2001; Snowden & Gordon, 2002).

Case method proponents argue that a case's problematic situation requires analytical skills and fosters deep understanding of specific concepts by bridging theory and practice (Diamantes & Ovington, 2003; Griffith & Taraban, 2002; McAninch, 1993; Merseth, 1994; Zuelke& Willerman, 1995). Advocates report that when properly used, cases can help educators practice how to think professionally about classroom and school-based problems, solutions, and alternatives (Lacey & Merseth, 1993; Merseth & Lacey, 1993; Masingila & Doerr, 2002).

According to the literature (Lacey & Merseth, 1993; McAninch, 1993; Spiro, 1987; Tally, Shulman, Redmond, & Perry, 2002), there are three core steps involved in the ideal implementation of case methods: First, analysis of ill-defined dilemmas. Second, action planning or decision making that applies knowledge to a unique situation or context. Third, evaluation of the decision making actions and reflection on how theoretical frameworks apply within the specific context. Effective case methods draw upon multiple perspectives through interaction and

group discussion (Merseth, 1990, 1994; Spiro, 1987; Tally, et al., 2002). The literature also indicates that evaluation and reflection involving analysis and feedback are important aspects of case methods of instruction (Bransford, Brown & Cocking 1999; McAninch, 1993; Merseth & Lacey 1993).

Teaching in the ETIPS Environment

These research findings serve as a foundation for the following recommended case methods of instruction with ETIPS cases (see tables 2, 3, 4). Before the case use begins, we recommend that faculty discuss with students the purpose of the case and its relation to the course, national standards, and their preparation as school leaders.

During the time period that students are completing the cases we recommend that faculty allow time to discuss both the aspects of each step in the decision making process, and the students' actual responses for each step given the specific school context the instructor selected for the students' assignment.

After the students submit their decision to the issue presented in the case introduction we recommend to faculty that they review basic aspects of decision making; solicit students' case decisions; who they thought should have been involved in the decision making process; the required declarative knowledge needed for decision; and what information was most key in a decision such as that called for in the case.

While a few steps of the recommended case methods of instruction are specific to ETIPS' online environment and functions, most are in keeping with the recommended three core steps of case-based instruction in the literature: to focus on analysis of the problem; to follow a decision making process but attend to context; and to consider the decision in terms of theoretical frameworks and probable outcomes within the specific context. Yet the case design within the ETIPS application also encourages these same steps. This raises questions about how case design and in-class case methods of instruction each influence and work together to impact students' overall learning experiences with cases.

The following data from ETIPS cases' first year and a half of use in educational administration courses addresses the questions: Does the quality of the case methods of instruction impact students' learning? If so, what value does faculty implementation add? The answers hold implications for whether efforts to ensure high quality learner support be programmed into the case design, conveyed through faculty professional development, or both approaches.

Methods and Analysis

Nineteen faculty members were recruited into our test-bed from 11 of the 16 institutions of higher education in the state of Virginia that offer educational administration programs. All of the participating universities are publicly funded except for two. These programs vary across a number of dimensions including location (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. Each of the schools offer administrative licensure and master degrees in educational administration, with an average of nearly 1,400 students, 350 full time graduate students, and 55 full time faculty members. Six of these schools offer Doctor of Education (Ed.D.) programs, while an overlapping but not identical five schools offer Doctor of Philosophy (Ph.D.) programs. Students at these institutions spend an average of

two years earning either a master's degree or administrative license. Expectations of the doctoral candidates were more than two years greater than the other programs, with Ed.D candidates spending 4.3 years at the school and Ph.D candidates averaging 5.1 years.

At multiple workshops, the ETIPS case methods of instruction were presented as well as other technical aspects of the software operation. This included one all-day workshop in Summer 2007; a half-day meeting in Fall 2007; and an all-day meeting in January 2008. All faculty members received the same information about implementation, and had access to written and online documentation as well as to project staff for troubleshooting or follow-up questions. All faculty members implemented at least two cases as an integral component of an educational administration course during a semester. All but one of these 19 test-bed members had implemented case-based methods in their teaching prior to using the ETIPS cases.

During the first year and a half of implementation (Fall 2007, Spring 2008, and Fall 2008 semesters) reported on here a total of 19 different faculty members participated. Five faculty members used cases in two semesters and one person used them all three semesters. Across all faculty members during these semesters there were a total of 32 case implementations, but ten of these classes were eliminated from the data reported upon here for different reasons. Three times the participating instructor was unavailable at the end of the semester for an interview, due to illness, schedule conflicts, or non-response. Seven times the number of students in that class who provided informed consent and participated in the study were either none, or too few to include as a cluster in our hierarchical linear modeling. Thus, we report here on a total of 22 classroom implementations.

Following each semester they used ETIPS cases in a course, each test-bed member was interviewed via telephone using a structured protocol. The project's external evaluator conducted these approximately 40-minute long interviews. During the call, the evaluator asked a series of questions about the instructional role the cases played in their course that semester and their case methods of instruction. Detailed notes were taken including noting which of the specific steps we recommended they employ before, during and after the students' work on the cases were actually used that semester (see tables 1, 2, 3, respectively). After the call, the interviewer returned to the tape of the call, as necessary, and added any missing detail. The resulting checklist of implementation strategies used in each of the class implementations served as an indication of the fidelity to the recommended approach, and what we consider the overall quality of the case methods of instruction. From the checklist three sub-scores were created: one called "Before" which quantified which of nine before-case instructional strategies were used (0-9 points); a second called "During" to indicate if discussion ensued during the time period of the assignment (0 for none, or 9 if present); and one called "After," to indicate how many of the nine after-case instructional strategies were used (0-9). The "total faculty implementation" score was created by adding these three sub-scores, for a total score out of 27 points.

Students in these 22 classes taught by the test-bed faculty members (n=167) were asked to participate in the study and complete on-line pre- and post-surveys to indicate the degree to which different aspects of their work within cases and their instructor's case methods of instruction contributed to their learning experience.

These faculty and student data were entered into STATA and analyzed for relationships between and among faculty implementation strategies and students' reports of the impact on their learning. To address the question of how instructors' use of various case methods of instruction strategies before, during, or after the cases impact students' learning experiences we employed hierarchical linear modeling (HLM). Hierarchical linear modeling accounts for the

hierarchical structure of the educational setting –with students nested within faculty classes and avoids the problem typically associated with using ordinary least squares regression with nested data – violation of the assumption that subjects are independent of one another. In the present case, where case methods of instruction of the ETIPS cases varies considerably, the use of hierarchical linear models is more appropriate and has the advantage of explicitly modeling classroom-level effects rather than assuming they are uniform across classrooms.

We hypothesized that the students' learning experience within ETIPS was mediated by their faculty member's use of the recommended before, during, and after-case implementation strategies (see figure 1). When these strategies were employed students would gain self-efficacy and confidence about making leadership decisions, and have a positive impression that the cases contributed to their learning and were worth the time spent on them.

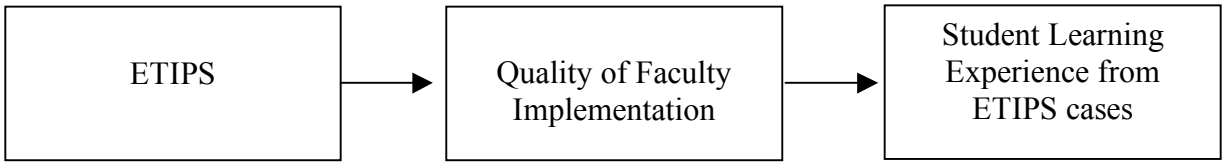

Figure 1: Conceptual model guiding the hierarchical linear modelilng of data, positing that students' learning experience with the ETIPS cases is mediated by the quality of the faculty member's implementation.

This conceptual approach is represented in mathematical terms for a two-level hierarchical model in the following manner:

Level 1: Students

$$Y_{ij} = \beta_{0j} + r_{ij}$$

Level 2: Faculty Classes

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(Before_j) + \gamma_{02}(During_j) + \gamma_{03}(After_j) + \gamma_{04}(FacultyContribution) + u_{0j}$$

Where in the student-level model Y is a vector of four related outcomes of the learning experience of student *i* in classroom *j*: (1) Change in pre-post scores of self-efficacy for making leadership decisions, (2) increase in self-reported confidence about making leadership decisions, (3) self-reported level of agreement that the ETIPS case materials contributed to learning about leadership and decision making, (4) self-reported level of agreement that ETIPS cases was worthwhile as a learning activity. B_{0j} is the mean outcome for students in class *j*, with no adjustments for student level factors. R_{ij} is a random student effect –the deviation of the outcome for student i in classroom j from the class mean.[1]

Four measures of the fidelity of implementation of ETIPS by faculty are entered at level 2 to test the hypothesis that the quality of the implementation of ETIPS by faculty will affect the mean outcome (B_{0j}) of students in the class. The "Before" (9 point), "During" (the 0 or 9 point score changed to a 0,1 dichotomous indicator) and "After" (9 point) scales indicating how many of the pre-, during-, and post-case instructional strategies, respectively, were used. "Faculty Contribution" is the mean response of students in class *j* to the two survey items that asked students to indicate how much the discussion and scoring and feedback activities that faculty

[1] Level 1 residuals are assumed to be homoskedastic (i.e. normally distributed with an expected mean of zero and equal variance σ^2 ; however, tests of heteroskedasticity are presented in the results

members led contributed to their learning. All level 2 variables were centered on the grand mean of the sample.

Findings

Of the 22 implementations across 16 different instructors during three semesters, the "total faculty implementation" mean score was 19.18 out of 27 points, with a standard deviation of 5.25 (see table 1). Of the 13 different faculty with classroom implementations scoring above the mean (scores ranging from 21 to 27, so essentially the top 50th percentile with a median of 21.25 points), they all discussed the cases during the time period students were assigned to work on them, and used half to all of the recommended implementation strategies before and after the students worked on the cases. All faculty members scoring below the mean entirely skipped the during case discussion, as well as many of the after-case strategies, resulting in implementation scores of 0 to 19. Of the three sub-scores, the during-case score had the lowest mean; because it was treated as a dichotomous indicator of during-case discussion or not, it also had the largest standard deviation. Considering the use of just pre- and post-case strategies the majority of test-bed faculty members' implementation scores were within three points of one another.

Table 1
Descriptive Statistics for Implementation Measures

	Minimum	Maximum	Mean	Std. Deviation
Total Implementation Score	8.50	27.00	19.18	5.25
Before-Case Score	3.50	9.00	7.36	1.55
During-Case Score	.00	9.00	5.73	4.43
After-Case Score	2.00	9.00	6.09	1.45

The percentage of implementations that utilized each Before, During, and After instructional strategy shows further detail about the degree to which faculty incorporated which implementation steps into their case methods of instruction, or not. Before students started the case about two-thirds of the faculty modeled a quality answer but more often they did discuss the scoring criteria in the rubric. Nearly all were also inclined to talk about how the case topic related to the course and show students how to use the ETIPS online space, and everyone discussed the benefits of using cases for learning as well as the decision making model/ steps inherent in the ETIPS case. The least frequently included strategy, included just over half of the time, was to discuss the case in terms of the national ISLLC standards for school principals, which are also adopted as licensure standards in Virginia. (See table 2.)

Table 2
Percentage of Recommended Before-Case Methods of Instruction Used in Implementations

Specific Before-Case Strategy	**%**
1. Discussed or modeled a quality answer (detail, length, content)	68
2. Related a quality answer to the scoring criteria (i.e., rubric)	82
3. Related a quality answer to the development of decision-making skills and self-	73

efficacy?	
4. Explained/ elaborated upon the ETIPS decision-making model?	100
5. Explained/ elaborated upon first case's topic and key question	86
6. Related case's core topic /question to your course's topic(s)	91
7. Related case's core topic /question to national standards	59
8. Discuss the learning benefits of using cases	100
9. Demonstrate to students how to use and navigate inside ETIPS.	95

During the time period that students were completing the case assignment as homework, which was typically a one to two week time period, about two-thirds of the faculty reported debriefing students about their work-to-date by discussing the case information or the decision making process with them (see table 3.)

Table 3
Percentage of Recommended During-Case Methods of Instruction Used in Implementations

Specific During-Case Strategy	**%**
1. Aspects of case information and/or decision-making steps discussed in class, before students submit answers	64

After the case nearly all of the faculty members reported debriefing students about their decision making exercise, usually by discussing the case decision explicitly and the "players" in the case, and also explicitly reviewed the decision making process. Less than two-thirds of faculty implementations included scoring the cases and providing students with feedback; less than a quarter of the class uses involved following the case with an instructional intervention because of students' performance. (See table 4.)

Table 4
Percentage of Recommended After-Case Methods of Instruction Used in Implementations

Specific After-Case Strategy	**%**
1. Case decisions (and/or decision making steps) discussed	91
2. Players (who should be involved in the decision making process) discussed	95
3. Required declarative knowledge needed for decision discussed	82
4. Decision making steps/process discussed	95
5. Contextual knowledge (influence of different school sites) discussed	73
6. Data Maps used to support class discussion or submitted to support answer	45
7. Scoring criteria/ scores (on rubric) were used to generate feedback/ scores to students	59
8. Open ended remarks in ETIPS feedback were used to provide guidance to students	59
9. Did the instructor make any educational interventions (lecture, discussion, etc.) because of what the data showed?	23

To be able to relate how the faculty members' implementation strategies might matter for students' learning experiences with cases, we utilized five measures of students' learning

experiences with cases. On a post-survey students were asked their (1) opinions of how worthwhile the cases were, and provide self-estimates of their (2) confidence to make leadership decisions. Using a pre-post test we measured (3) their gain in self-efficacy about their current ability to complete 12 specific decision making tasks. We also asked them about (4) how three components of their ETIPS case experience contributed to their learning and (5) the degree to which their instructors' use of discussion and scoring cases and providing feedback contributed to their learning about leadership and decision making. Scales were constructed from the first, fourth and fifth outcome measures. Next we briefly describe these five indicators of students' learning experiences with ETIPS cases; they are summarized in table 5 and are reported upon in more detail in Tucker and Dexter (2008).

Table 5.
Measures of Student Learning Experience from ETIPS Cases

Measure	Number and Nature of Items in Scale	Chronbach's Alpha	Points in scale	Mean	Standard Deviation
(1) Worthiness	• understood what to learn • what was learned worth time spent • recommend cases for other courses	.912	15	9.39	3.37
(2) Confidence	• increased confidence in making leadership decisions	-	5	3.08	1.23
(3) Self-efficacy Change	• self-report of current ability to successfully complete 12 actions associated with decision making, such as "Seek a sufficient amount of data for understanding the problem"	.9	72 total	3.24 change	9.33 change
(4) Cases Contribute	• completion of case itself • school case information • DataMap, visual display of case information search	.743	12	5.98	3
(5) Faculty Contribute	• in class or on-line discussion • faculty scoring of the case and feedback	.88	8	3.61	1.68

On a survey following their completion of the cases students were asked what they gained from case assignment experience, which they indicated on a 5-point Likert scale ranging from 1, "strongly disagree," to 5 "strongly agree." On this Likert scale students' responses about if they understood what they were expected to learn, if what they learned was worth their time spent, and if they would recommend the cases be used in other leadership courses was combined into a 15-point "Worthiness" of case experience score (α= .912). The students self-reported about their "Confidence" in making leadership decisions increasing as a result of their ETIPS case assignment. The mean for all students was just above neutral and agree, at 3.08. Before and again after the cases students were asked to indicate their Self-Efficacy (SE) about their current ability to successfully complete 12 actions associated with decision making, such as "Seek a sufficient amount of data for understanding the problem" and "Generate multiple options to address problem or goal," by marking a 6-point Likert scale ranging from 1, "no confidence at all," to 6, "complete confidence." On the pre-test the SE scores ranged from 25 to 72, with a

mean of 50.7. On the post-test, scores ranged from 24-72,with a mean of 54.2. The average change from pre- to post-test scores was a gain of 3.24 points, and the standard deviation for pre-post SE score change was 9.93.

Students also indicated on the post-survey, using a 5-point Likert scale ranging from 0, "not at all" to 4, "substantially," the degree to which different elements of the ETIPS case experience, independent from any instructor-initiated implementation strategies, contributed to their learning about educational leadership and decision making. Students were also able to indicate the value to their learning added by the DataMap feature that that shows a visual display of the case information they searched and is integral to the case assignment but outside of searching in the case information and answering the case question. These three elements' (case itself, school information, and DataMap were combined into a 12-point "case contribution" score (α=.743) for use in the further analysis. The mean score was 5.98, with a standard deviation of 3.

To represent students' overall ratings of faculty led contributions to their learning, these two elements (in class or on-line discussion, and faculty scoring of the case and feedback) were combined into a 8-point "faculty contribution" score (α=.88) for use in further analysis. Including the not applicable responses as a zero rating, the mean for all respondents was 3.61, with a standard deviation of 1.68.

To investigate the relationships between instructors' case methods of instruction strategies used before, during, or after the cases and how they associate with measures of students' learning experiences we employed hierarchical linear modeling (HLM) analysis on the sample of 167 students in the 22 class implementations. The results of the HLM analysis are shown in table 6, with the standard errors appearing in parentheses below the coefficients. These models test the hypothesis that an individual's learning experience with the ETIPS cases is dependent upon the quality of the faculty case methods of instruction, which we define as level of fidelity with which they implemented the recommended ETIPS instructional strategies as well as students' valuing of faculty-led discussion and feedback. The HLM models offer two kinds of evidence with which to test this hypothesis: (1) the statistical significance of the effects of the measures of faculty implementation on the student learning experience outcomes, and (2) a statistical test to determine if the addition of the faculty implementation measures leads to significantly better fit of the data than which is provided by a null model that includes no level 1 or level 2 predictors.

Model 1 in table 6 presents the estimated effect of implementation on the change in students' leadership decision making self-efficacy. It displays an estimated intercept of 2.93, indicating that the average student in the sample is predicted to have experienced a 2.93 point increase in measured self-efficacy from pre- to post-test. Only one of the coefficients for the four measures of faculty implementation was statistically significant at the $p < 0.05$ level. The *during* case implementation score coefficient indicates that, for this dichotomous variable, when during case discussion was present it is associated with a 3.68 increase in self-efficacy scores from pre- to post-test. This points to a moderate effect of faculty discussion during the ETIPS case on change in leadership self-efficacy. A 3.68 point increase in self-efficacy equates to a standardized effect size of 0.37, which means that the average self-efficacy change among those that used during-class discussion was 37 percent of a standard deviation higher than the mean of those classes that did not.

Model 2 of table 6 shows the test results of the effect of faculty implementation on students' self-reported level of confidence in decision-making. The predicted mean level of self-confidence in the sample (as shown by the coefficient on the intercept) is 3.06, indicating that the

average student in the sample was neutral in their opinion about ETIPS' effect on their decision-making confidence. Two significant effects of implementation were found in model 2, although the directions of their respective effects were at odds. The first is revealed by the coefficient for faculty *before* implementation score, which indicates that a one unit increase in faculty *before* implementation score associates with a 0.16 increase in self-confidence. This effect suggests a positive effect of following the ETIPS instructional strategies. However, the estimated association of the faculty contribution to students' learning and gaining confidence in making leadership decisions as a result of completing ETIPS cases is negative. An increase in the contribution of the faculty member to the ETIPS experience associates with a -0.22 point decline in student self-confidence. This suggests that those classes of students who felt their instructor contributed, through discussion and feedback, to their ETIPS learning experience were also those that reported lower levels of self-confidence about making leadership decisions.

Model 3 in table 6 shows the test results of the extent to which students' opinion faculty implementation impact students' opinions of their learning interactions with the cases, as measured by the 12-point scale of the cases' features (e.g. the DataMap, the case's task to complete, and case/school information) contributed to their learning experience about educational leadership and decision making. The coefficient on the intercept shows the mean response to cases contribution in the sample is 5.87. Like the findings in model 1, this model finds a significant estimated effect of faculty's *during* implementation score on the average class outcome. A one point increase above the sample's mean *during* implementation score associates with an increase of 0.54 points on the measure of cases contribution to learning. In contrast to the finding in model 2, model 3 finds that an increase in the student's opinion that the faculty member's discussing and providing feedback on cases contributed to their learning leads to an increase in their opinion that attributes of the cases contributed to their learning. Specifically, a one point increase in faculty contribution associates with 1.30 point increase in the class average of cases contribution to learning. Note that in model 3, the result of the chi-square model comparison test indicates that the inclusion of the four faculty member variables improves the statistical fit of the model from that found in an unconditional means model.

Finally, model 4 shown in table 6 examines the relationship of implementation to students' responses as to how worthwhile ETIPS was as a learning experience, as measured on a 15-point scale. The reported average response in this sample was 9.30, indicating that most students indicated between neutral and agree that the ETIPS cases activity was worth the time spent, they'd recommend the cases for use in other classes, and they understood what they were supposed to learn. Like in model 2, the student's viewpoint that the faculty member's leading discussion and providing feedback as contributing to their learning was negatively associated with their view of the worthiness of the ETIPS cases. A one unit increase above the grand mean of the sample in the faculty contribution to learning score corresponds to a -0.66 point change in the mean reported "worthiness" of the learning activity.

Table 6
Effects of Faculty ETIPS Implementation on Student Learning Experience

Variable	*Leadership Self-Efficacy* (Model 1)	*Leadership Confidence* (Model 2)	*Cases Contribution to Learning* (Model 3)	*Worthiness* (Model 4)
Intercept (B0j)	2.93*** (0.80)	3.06*** (0.11)	5.87*** (0.19)	9.30*** (0.39)
Before-Case Implementation Score (γ_{01})	0.49 (.80)	0.16* (0.09)	-0.23 (0.27)	0.50 (0.33)
During -Case Implementation Score (γ_{02})	3.68** (1.79)	-0.15 (0.20)	0.54* (0.62)	-0.24 (0.80)
After-Case Implementation Score (γ_{03})	0.24 (0.70)	-0.06 (0.09)	-0.10 (0.25)	-0.44 (0.31)
Faculty Contribution to Learning (γ_{04})	0.26 (0.93)	-0.22** (0.09)	1.30*** (0.22)	-0.66* (0.36)
ICC	0.03	0.07	0.28	0.233
Chi-Square Model Comparison Test (vs. Null)	2.65	3.81	36.17***	3.1

*p< .10. **p< .05. *** p< .01.
NOTE: All models include 167 student observations and 22 faculty class observations; Level 2 variables are centered on the grand mean of the sample; HLM run using full maximum likelihood

Discussion

According to the literature, there are three core steps involved in the ideal implementation of case methods: the analysis of ill-defined dilemmas; action planning or decision making that applies knowledge to a specific context; and evaluation of the decision making actions and reflection on how theoretical frameworks apply within the specific context. All three of these steps take place during and after the student's work on the case. They can both be built into the case experience itself, especially in an online learning environment through interface design and sequenced interactive features, and fostered by faculty led activities.

The features of the ETIPS learning environment that incorporate these three case methods include the completion of case's decision making steps, the specific contextual information provided for each school, and a visual display, called a DataMap, of how they searched for case information. Together these elements comprised our dependant measure named *cases contribution to learning*. Students complete the decision-making steps in a case by filling in answers that require students to break down in step-by-step detail their analysis of a problem, while relating their answer to the school's mission, and how its context presents enablers and constraints. For example, during step one students are asked to identify the issue that needs to be addressed by generating possible explanations for what is going on at the school, including selecting one at the heart of the issue. They are then asked to indicate what specific sub-topics of information in the case led them to this conclusion. They are also to indicate the overall goal they would be trying to achieve in addressing the issue they identified. In step three of ETIPS decision making process students are to identify alternatives with associated opportunities and constraints and analyze their merits. Step three asks them to generate two distinctly different alternatives they could identify for addressing the problem/issue. Then, for each alternative, they indicate which of the criteria they identified in Step 2 align with that alternative. Third, they are to consider school characteristics (such as programs, practices, tools, routines, structures, procedures, personnel, policies, systems) and for each alternative indicate how they might serve as enablers, and which are constraints. Thus, the case step structures students' thinking so that they focus on analyzing a problem, and follow a decision making process while attending to context, both of which are recommendations from the literature for case methods of instruction.

Any recommended case methods that are inherent in the design of the case-based learning environment are available to students for as long as and how and when they want; in contrast, students are dependent upon their instructor's case methods of instruction to receive learning supports that require interactions and expert opinion, like discussion and scoring. Our results show that such faculty case methods of instruction does matter.

When these test-bed faculty members did provide during-case discussion students reported increased self-efficacy about their decision-making skills. About two-thirds of these 22 implementations did discuss the case during students' work on it (i.e. before submitting their decision), thereby providing students with opportunities to check their dilemma analysis skills and knowledge application abilities and revise their work. The literature emphasizes discussion as a key instructional step to help students to deconstruct the "ill-defined dilemma," and to consider actions in context. We attribute the increase in the self-efficacy measure with during – case discussion to the insights the novices gained from peers and their instructors about how to tease apart the issue and separate symptoms from their potential causes, how to identify enablers and constraints within the school context, and how to leverage those to select and formulate a solution. The self-efficacy measure allowed for students to indicate gradual growth by marking

incremental increases in confidence about their ability to successfully complete 12 distinct decision making tasks. During-case discussion was also associated with students' indicating that the cases contributed to their learning. This suggests that when students benefit from during-case discussion they also benefit more from the scaffolding and case methods inherent in the case materials themselves, as described above.

One measure of implementation we used was based upon students' opinion that faculty-led discussion and scoring and feedback on the case contributed to their learning. The faculty-led discussion students referred to could have been during or after the case's work. While less than two-thirds of the faculty implementations included discussions during the case, nearly all the faculty members led discussions after the cases (see tables 3 and 4). Less than two-thirds of the faculty implementations included scoring and providing feedback to students on their case decisions (see table 4). Feedback from instructors is purported to be important because it provides students with an opportunity to learn of expert opinion about the case dilemma or how the context influences leaders' key considerations and actions. Feedback would also help students complete the third recommendation from the literature regarding cases, which is to evaluate and reflect upon the actions the case implies are needed. With scoring and feedback some of the least often included post-case strategies, their utilization would likely be the cause of higher after-case implementation scores. Yet the after-case score was the one implementation measure with no significant effects at all. It is important to note that the faculty contribution to learning measure was different in that it did not just indicate the presence of faculty-led discussion scoring and feedback, but rather students' valuing of those strategies for their learning about educational leadership and decision making. It was also the one implementation measure associated with both increases and decreases in the indicators of students' learning experiences with the cases.

As with during-case discussion, students' higher ratings of the faculty members' contribution was associated with higher ratings that the cases contributed to their learning, reinforcing that what faculty do helps students see more value in the case materials. But, interestingly, an increase in students' valuing of the instructor's contribution to their learning was associated with less agreement that their confidence in their making leadership decisions had increased through the use of ETIPS cases and their sense of the worthiness of the ETIPS cases (i.e., that they understood what they were supposed to learn and feel the learning gained from participation was worth the time spent). We speculate that these more summative indicators of confidence and understanding represent more expert-like levels of outcomes and that discussion and feedback perhaps illustrated to a student what she or he did not know about leading and decision making in organizations. This is in contrast to the more more formative skill development captured in the self-efficacy pre-post test.

In conclusion, our findings support assertions in the literature that students' learning from cases will be related to the case methods of instruction. These data also support our conceptual model (see figure 1) that faculty implementation mediates students' case experiences. That not all faculty members include critical implication steps raises several implications.

Implications

Designs of online case-based learning environments could be further enhanced to provide during- and after-case strategies, such as through asynchronous discussion and automated feedback, so as to address ways that faculty-led implementations might get constrained, reducing students' ability to learn to learn from their instructors and classmates and to receive feedback on

their thinking. While the case assignment and environment could be further enhanced to provide ideal case methods, these features are most useful when faculty adopt the cases into their course and implement with strong case methods of instruction.

The fact that leading case discussions and providing feedback to students were the least often used implementation strategies but those with the most impact on students learning experiences with cases implies these two strategies deserve particular attention. Designs for faculty professional development on case methods of instruction should emphasize the importance of these during-case and after-case strategies. Such in-class strategies are even more vulnerable to faculty variations. Further research on how faculty implementation matters and in what ways and to what degree might also draw greater attention to the critical aspects of discussion and feedback.

These experiences with the ETIPS test-bed members illustrates how cases can be challenge to implement in a way that improves professional thinking. Having students make their thinking visible for the kinds of complex tasks leaders engage in takes a lot of time, effort, and skill, as does allowing students to compare ideas and providing them feedback. Perhaps the most overarching implication is that designs of cases and faculty professional development should address what we see in these data: implementations might get constrained in ways that reduce students' ability to learn to learn from their instructors and classmates, and to receive feedback on their thinking. This emphasizes that it isn't just the use of cases that is the desired end, but rather specific pedagogical steps faculty take in order to improve students' ability to make leadership decisions. It will help if the case-based learning environment also emphasizes strong case methods of instruction, but faculty implementation is a critical variable in students' learning experiences with cases.

References Cited

Bottoms, G. & O'Neil, K. (2001). *Preparing a new breed of school principals: It's time for action*. Atlanta, GA: Southern Regional Education Board. Retrieved May 15, 2006, from http://www.sreb.org/main/Leadership/pubs/01V17_Time_for_Action.pdf

Bransford, J. D., Brown, A. L., & Cocking, R. R. (1999). *How people learn: Brain, mind, experience, and school*. Committee on Developments in the Science of Learning with additional material from the Committee on Learning Research and Educational Practice, National Research Council. Washington, DC: National Academy Press. Retrieved on May 24, 2002 from http://www.nap.edu/html/howpeople1/.

Davis, S. Darling-Hammond, L., LaPointe, M. & Meyerson, D. (2005). *School leadership study: Developing successful principals (Review of research)*. Stanford, CA: Stanford University, Stanford Educational Leadership Institute. Retrieved May 15, 2006, from http://seli.stanford.edu/research/documents/SELI_sls_research_review.pdf

Diamantes, T., & Ovington, J. (2003). Storytelling: Using a case method in administrator preparation programs. *Education, 123*, 451-469.

Firestone, W. & Riehl, C. (2005*). A new agenda for research in educational leadership*. New York: Teachers College Press.

Griffith, A. I., & Taraban, S. (2002). Mentoring narratives ON-LINE: Teaching the principalship. *Educational Policy Analysis Archives, 10 (*27). Retrieved May 20, 2006, from http://epaa.asu.edu/epaa/v10n27.html

Hale, E. K. & Moorman, H. N. (2003). *Preparing school principals: A national perspective on policy and program innovations*. Washington, DC: Institute for Educational Leadership. Retrieved May 15, 2006, from http://www.iel.org/pubs/PreparingSchoolPrincipals.html

Honan, J. P., & Rule, C. S. (2002). *Using cases in higher education: A guide for faculty and administrators*. San Francisco, CA: Jossey-Bass.

Kowalski, T. J. (2001). *Case studies on educational administration* (3rd ed.). Needham Heights, MA: Allyn & Bacon/Longman Publishing.

Lacey, C.A., & Merseth, K.K. (1993). Cases, hypermedia and computer networks: three curricular innovations for teacher education. *Journal of Curriculum Studies, 25*(6), 543-551.

Levine, A. (2005). *Educating school leaders*. Washington, DC: The Education Schools Project. Retrieved April 27, 2006, from http://www.edschools.org/pdf/Final313.pdf

Masingila, J. O., & Doerr, H. M. (2002). Understanding pre-service teachers' emerging practices through their analyses of a multimedia case study of practice. *Journal of Mathematics Teacher Education, 5*(3)

McAninch, Amy. (1993). *Teacher thinking and the case method.* New York: Teachers College Press.

Merseth, K. K. (1990). *Beginning teachers and computer networks: A new form of induction suppor*t. East Lansing, MI: National Center for Research on Teacher Education.

Merseth, K. K. (1991). The early history of case-based instruction: Insights for teacher education today. *Journal of Teacher Education, 42*(4), 243-249.

Merseth, K. K. (1994). Instructional methods and conceptual orientations in the design of teacher education programs: The example of simulations, hypermedia, and cases. In K. R. Howey (Ed.), *The professional development of teacher educators* (pp.139-174). Cincinnati, OH: Ablex Publishing Corporation.

Merseth, K.K., & Lacey, C.A. (1993). Weaving stronger fabric: the pedagogical promise of hypermedia and case methods in teacher education. Tea*cher and Teacher Education, 9*(3), 283-299.

Shulman, L. S. (February, 2005a). The Signature Pedagogies of the Professions of Law, Medicine, Engineering and Clergy: Potential Lessons for the Education of Teachers. Paper presented at the MSP Workshop "Teacher Education for Effective Teaching and Learning", Irvine, CA. Hosted by the National Research Council's Center for Education.

Shulman, L. S. (2005b). Signature pedagogies in the professions. *Daedalus, 134* (3), 52-59.

Snowden, P. E. & Gordon, R. A., (2002) *School leadership and administration: Important concepts, case studies, & simulations* (6th ed.). New York, NY: McGraw-Hill.

Southern Regional Education Board (SREB), (2003). *Good principals are the key to successful schools: Six strategies to prepare more good principals*. Atlanta, GA: Author. Retrieved May 15, 2006, from http://www.sreb.org/programs/hstw/publications/pubs/03V03_GoodPrincipals.pdf

Southern Regional Education Board (SREB). (2006). *Schools can't wait: Accelerating the redesign of university principal preparation programs*. Atlanta, GA: Author. Retrieved May 15, 2006, from http://www.sreb.org/programs/hstw/publications/special/06V04_Schools_Cant_Wait.pdf

Spiro, R.J., et al. (1987). *Knowledge acquisition for application: cognitive flexibility and transfer in complex content domains.* Arlington, VA: Army Research Institute for the Behavioral and Social Sciences.

Sykes, G., & Bird, T. (1992). Teacher education and the case idea. *Review of Research in Education, 18*, 457-521.

Tally, S., Shulman, J., Redmond, P., Perry, G. (2002). *The Effective Use of On-line Video Case Studies*. AACTE Conference Presentation, February 2002 in New York, New York.

Tucker, P.T. & Dexter, S. (2008). ETIPS leadership cases: Instructional tool for developing administrative decision making. Paper proposed to the annual meeting of the American Educational Research Association, San Diego, CA.

University Council for Educational Administration. (1987). *Leaders for America's schools: The report of the National Commission on Excellence in Education*. Tempe, AZ: Author. (ERIC Document Reproduction Service No. ED346082)

Zuelke, D. C. & Willerman, M. (1995). The case study approach to teaching in education administration and supervision preparation programs. *Education, 115,* 604-608.