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Examining Preservice Teachers' Classroom Management Decisions in Three Case-based Teaching Approaches*

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Abstract

This study was aimed at comparing the impact of three types of case-based approaches (worked example, faded work example, and case-based reasoning) on preservice teachers' decision making and reasoning skills related to realistic classroom management situations. Participants in this study received a short-term implementation of one of these three major approaches to case-based instruction. Specifically, this study focused on analyzing students' open-ended responses to classroom management problems presented before and after instruction using one of these methods. The treatment groups did not differ significantly on the number of the alternatives they created and selected in decision tasks or the number of reasons students used to justify their decisions. Additionally, in each group, the majority of the classroom management strategies generated on all three assessments focused on suppressing inappropriate behavior, rather than promoting appropriate behavior or helping students develop self-regulation.

Key words: Case-based method, Decision making, Classroom management, Preservice teachers

Introduction

In the field of education, understanding complex cognitive processes underlying teachers' thinking and decision making, has received considerable interest. An important area of research that has provided valuable insights regarding teachers' cognitive processes in decision making constitutes studies of teaching expertise, which "mostly took the form of expert-novice comparisons" (Tsui, 20003, p. 22). A broad literature on expert-novice teacher differences and the development of teaching expertise suggests that the process of becoming an expert involves the development of extensive cognitive structures of domain knowledge, classroom knowledge, and problem-solving and decision strategies including automated fast and frugal strategies (Berliner, 1986; Shavelson & Stern, 1981; Westerman, 1991).

A number of research studies have shown evidence that expert teachers apply more complex and elaborated knowledge structures, derived from their prior experiences, to interpret or make decisions about different teaching and learning events. Novices, with limited experience, practical, or pedagogical content knowledge, focus more on the surface characteristics of classroom events (Berliner, 1986, 1994, 2001; Westerman, 1991). According to Shavelson and Stern (1981) experience allows expert teachers develop complex mental schemas and routines to predict classroom events more precisely and to make fluid and contextual choices in unusual situations. With less experience, for Berliner (1986), preservice teachers lack the knowledge and developed routines to interpret pupils' behavior and to deal with unexpected classroom situations. Similarly, Calderhead (1979) found when faced with a management problem in the class, experienced teachers were able to identify typical strategies to deal with the situation, whereas preservice teachers often provided generic responses to a number of classroom management issues (cited in Calderhead, 1981). Comparable results regarding the differences between expert and novice teachers' classroom management decisions have been reported in current studies (Martin, 2004; Vancı Osam & Balbay, 2004).

The research on expert-novice differences suggested preservice teachers be empowered to make reasoned decisions about critical teaching situations in different teaching contexts. Case method has been widely used in

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teacher education to help preservice teachers learn how to teach and experiment in making teaching decisions. Several researchers have suggested that cases representing a variety of classroom conditions be included in teacher education curricula in order to better prepare students for teaching (Merseth, 1996; Shulman, 1992; Sykes & Bird, 1992). There is an extensive body of research evidence demonstrating positive impact of case methods on preservice teachers' understanding of complex classroom situations, their ability to analyze these situations from multiple perspectives, their competence in using evidence to support their interpretations and decisions, and their skills to reflect on what they learned from cases (e.g., Bruning et al., 2008; Choi & Lee, 2009; Rich & Hannafin, 2008; Santagata & Angelici, 2010; Schrader et al., 2003). On the other hand, in a number of studies in which expert and novice teachers' analysis and solving of problem cases related to a variety of teaching issues were compared, researchers found while expert teachers were able to analyze and solve problems in a sophisticated way and provided justifications for their decisions, preservice teachers were unable to notice significant features of classroom practices, analyzed problems in a superficial manner, and provided little justification for their decisions (Berliner, 1986, 1994; Peterson & Comeaux, 1987). Others further have contended that preservice teachers, particularly those early in their teacher education program, often use their beliefs they bring to their preservice preparation as a lens to interpret new knowledge and experiences, and to justify their decisions (Calderhead & Robson, 1991; Munby, 1982). These well-established beliefs, if not challenged, can hinder preservice teachers' acceptance and assimilation of new knowledge or perspectives about teaching and learning, thus leading to less effective teaching decisions.

Consequently, developing a solid understanding of the extent to which case-based approach helps preservice teachers improve in solving or making decisions about teaching issues seems problematic. One possible reason is that there is little consensus among researchers regarding how best to use cases to promote learning and development of preservice teachers. Different forms of case use have been described in the literature. For instance, Merseth (1996) described three categories of cases based on their functions: cases as exemplars of effective teaching practices, cases for analysis of problematic teaching situations, and cases for personal reflection. Each case method has been used to help preservice teachers gain specific sets of skills and knowledge regarding learning how to teach. Despite the considerable amount of interest in the use of cases in teacher education, no study has compared how different case methods affect preservice teachers' learning and decision making and what factors influence the effectiveness of each case method. The comparison of case uses would provide valuable information "to determine which use of cases best supports different kinds of learning" (Jonassen, 2006, p. 15).

The purpose of this study, therefore, is to compare three general approaches to using cases to help preservice teachers advance in complex decision making or problem solving skills. These three approaches include (a) worked examples, (b) faded worked examples which is a variant of worked examples approach, and (c) case-based reasoning. Each approach has empirical studies demonstrating that it can lead to student learning (Jonassen, 1999). However, case-based reasoning and the other two approaches emerged from different traditions that imply different principles for the design of learning environments. Furthermore, no study has yet compared these approaches in terms of their relative effectiveness in improving preservice teachers' reasoning and decision making related to teaching issues, including classroom management. To that end, this study is aimed at comparing the impact of these three case-based approaches on preservice teachers' reasoning and decision making related to classroom management.

In the following sections of the paper, we first present theory and research related to each case approach. Next, we provide a comparative description of these three approaches in terms of their implications for the design of learning environments. Then we present a research study in which we compared these three approaches to determine their relative impact on preservice teachers' reasoning and decision making about classroom management.

Cases as exemplars - worked examples and faded worked examples

Worked examples refers to an instructional method based on the cognitive load theory (CLT) as developed by Sweller (1988). In CLT, human cognitive architecture is characterized as having a limited working memory capacity and an unlimited long-term memory capacity. New learning is processed through working memory to create new structures in long-term memory. Because of limits on working memory capacity, it can become overloaded leading to less efficient learning. The basic assumption of the CLT is that learning activities should be designed in a way that minimize cognitive load that is not relevant for learning to avoid straining the limited capacity of working memory (Sweller, van Merriënboer, & Paas, 1998). One major instructional method based on CLT is worked examples. The worked example effect occurs when novice students learn more from studying

worked examples than from trying to solve the same problems by themselves. To explain the worked example effect, Sweller (1988) argues that novices generally do not have necessary experience and cognitive structures needed to function in complex situations; as a result, complex situations produce high cognitive load (working memory demands). Thus, learners need maximal guidance during initial stages of learning. Guidance in the form of worked examples reduces working memory demands and cognitive load and helps learners develop initial cognitive structures for problemsolving in the complex situation (e.g. ultimately to reach better transfer performance) (Atkinson, Derry, Renkl, & Wortham, 2000; Paas & van Merriënboer, 1994). As learners gain more expertise, trying to solve problems becomes superior to studying worked examples; this latter finding is called the expertise-reversal effect (Kalyuga, Chandler, Tuovinen, & Sweller, 2001).

The initial approach to using worked examples for instruction assumed that novices should receive a number of worked examples before solving problems by themselves. In controlled laboratory experiments, researchers found that students performed better when each worked example was paired with a practice problem than when a series of worked examples were followed by a series of practice problems. In addition, researchers proposed that presenting at least two worked examples for each problem would enhance transfer. Recently, Renkl and his colleagues (2002, 2004) suggested a fading approach in which there is a smooth transition from a worked example to an incomplete example and then to a problem solving task. Renkl, Atkinson, Maier, and Staley (2002) described two forms of fading; backward fading which starts with omitting the last solution step and forward fading which starts with omitting the first solution step. Across three controlled experiments with high school and college students, Renkl et al. (2002) compared the fading and the original worked examples approaches. Compared to the traditional worked example approach, both backward fading, in the first experiment with high school students, and forward fading, in the second experiment with college students, yielded better results in terms of the fewer number of errors generated during learning and better performance on near-transfer items. The third experiment, with college students, showed that the two fading conditions were superior to example-problem pairs. Backward and forward fading did not differ significantly with respect to students' performances on near transfer items and amount of error during learning. However, performances on far transfer items were higher and time spent on learning was lower in the backward condition. Studies by Atkinson, Renkl, and Merrill (2003) and Renkl, Atkinson, and Große (2004) replicated the significant effects of backward fading.

Recent studies have also focused on the design of learning activities to facilitate students' engagement during the study of worked examples. For instance, in order to increase students' interaction with worked examples, some researchers have suggested including self-explanation prompts that ask students to explain the solution steps of a complete worked example or to provide a justification for their reasoning when studying an incomplete worked example or solving a problem. Their research indicated that asking students to self-explain while studying worked examples improved conceptual understanding as compared to traditional worked examples and problem solving approaches (Atkinson et al., 2003; Hilbert & Renkl, 2009; Hilbert, Schworm, & Renkl, 2004; Renkl, 2002).

Cases as analogues – case-based reasoning

Kolodner (1991) defines case-based reasoning (CBR) as “reasoning from old cases or experiences in an effort to solve problems, critique solutions, explain anomalous situations, or interpret situations” (p. 53). The theory underlying CBR is Schank's (1999) theory of dynamic memory. Schank (1999) argued that human reasoning and learning is case-based, that is, humans solve problems by reusing or modifying previous experiences stored in an evolving memory structure in which cases having similar properties are dynamically organized around a more general structure. The goal of CBR approach thus is to provide learners with real world cases, similar to the current problem situation they are engaged in, to facilitate their understanding of how similar problems were solved before and to help them apply previously utilized case solutions or experiences to the current problem. A number of researchers have claimed that cases describing previously used solutions, the contexts in which those solutions were used, the circumstances under which those solutions were successful, and the lessons learned from previous experiences can be used as cognitive scaffolds to help students to identify critical issues on which to focus in problem analysis, generate solution alternatives, and make reasoned judgments and decisions about selecting the most appropriate solution/s to the problem (Cannon-Bowers & Bowers, 2008; Jonassen & Hernandez-Serrano, 2002; Kolodner, 1991, 2006; Kolodner et al., 2003).

CBR's theoretical principles about human memory, reasoning, and learning have been put into practice in classrooms by integrating CBR with problem-based learning (PBL) methodology (Kolodner et al., 2003). Kolodner, Hmelo, and Narayanan (1996) suggested that combining PBL and CBR would “provide a powerful

foundation for educational practice in the constructivist tradition, one that at once combines lessons learned from classroom practice with sound cognitive theory” (p. 2). Kolodner and her project team (2003) used CBR and problem-based learning (PBL) together in order to implement their Learning by Design (LBD) approach, a project-based inquiry approach to science learning, in middle school science classrooms. Under the foundations of CBR and PBL, they designed curriculum units which were then implemented in earth science and life science classrooms involving about 3500 students and 24 teachers. Using a pre-posttest design, the results of several studies showed that the LBD classes consistently outperformed the non-LBD classes on multiple-choice tests of content knowledge. In addition, compared to non-LBD, LBD students were consistently better on assessments of science process skills (e.g., collecting data, running an experiment, analyzing data etc.) and general process skills (e.g., collaboration, metacognition, communication etc.). Based on this and other research conducted by the LBD research team, the researchers concluded that the students’ reflections on their understanding and challenges, the teacher’s role as the coach or model, and the creation of a collaborative and iterative classroom culture were the key success factors in the implementation of learning environments based on CBR and PBL under the broad approach of Learning by Design (Holbrook, Gray, Fasse, Camp, & Kolodner, 2001; Kolodner et al., 2003; Kolodner, Gray, & Fasse, 2003).

Comparison of worked examples and case-based reasoning

Both the worked examples and case-based reasoning research traditions have yielded successful results on improving learners’, especially novices’, problem solving performances. Additionally, studies in cognitive psychology and education have indicated the benefits of using the case-based reasoning method to facilitate decision making process (Hernandez-Serrano & Jonassen, 2003; Wang, Moore, & Wedman, 2003). However, the theories underlying each method imply different principles for the design of learning environments. We highlight some of the key differences as well as similarities between the two methods in terms of the ways they imply that instruction should support learners.

These methods have similarity in that each presents students with descriptions of realistic exemplars of some complex problem solving or decision making domain and solutions or courses of reasoning and actions followed by an expert. Evidence suggests that from such descriptions, students sometimes can develop the conceptual and procedural knowledge and ability needed to solve problems or make more expert-like decisions in new related situations and to transfer that knowledge to new situations. Similarly, Clark (2009) argues that both CBR and worked example advocates agree on the use of instructional support called scaffolding. He further explains that both groups recommend the modeling of experts’ solutions of the task, assessing learners’ transfer skills, providing feedback on learning tasks, and gradually fading or eliminating practice and feedback as students gain more experience.

These methods, however, differ in some important ways. First, as research and literature show, CBR’s implications to designing instruction are similar to those entailed by constructivist approaches to teaching and learning (Jonassen, 1999; Kolodner, 2006). Accordingly, CBR implies that for effective learning, learners should be asked to problem-solve and make decisions about complex cases drawn from authentic situations. Cases in CBR often include detailed and rich descriptions of real-life situations to help students experience the complexity of the learning domain. On the other hand, instructional design principles of the CLT, underlying worked example approaches, are based on information-processing descriptions of human cognitive architecture. The theory proposes that providing learners with worked examples during initial stages of learning minimizes distracting load on working memory, thus learners can devote their limited working memory capacity to task-related processes such as schema construction and proceduralization that are considered to be essential for skill acquisition. As a result, worked examples typically include a well-structured problem specification and a description of the solution to this problem (Atkinson et al., 2000); details are purposefully eliminated to allow learners more focus on relevant task features rather than details.

Second, CBR has often been applied in ill-structured domains while most of the research on worked example approaches has involved well-structured domains. Only recently, have a few studies applied worked examples in ill-structured domains including language, art education, and music. These studies showed college students’ superior performances on general argumentation skills when studying worked examples with self-explanation prompts (Schworm & Renkl, 2006, 2007) and their learning about designers’ styles in a design history course when studying worked examples compared to problem solving (Rourke & Sweller, 2009). However, more research evidence is needed on the design and implementation of worked examples in ill-structured domains. Spiro and DeSchryver (2009) argue that worked examples may be useful for well-structured domains, but are not effective in ill-structured domains in which problems have vaguely defined goals, multiple solutions, and

multiple criteria for evaluating solutions. They claim that ill-structured domains, such as teaching, do not have a pre-specified set of rules and essential information that can be fully presented to learners. Therefore, they suggest that preservice teachers develop better understanding of different teaching methods through the exposure to multiple contexts and perspectives, not by providing them with full explanations or exemplars related to the application of methods. As a result, it seems that the arguments and research results about whether worked examples can be applied in ill-structured domains are not conclusive. Utilizing a fading strategy and prompting learners' self-explanations in worked example research are some of the instructional strategies that may allow the worked example research to be applied effectively in ill-structured domains. However, the fading strategy and self-explanations approaches are fairly new and the results of studies examining these strategies are not conclusive. Therefore, more studies need to be conducted to provide empirical results on the effectiveness of these strategies on students' learning. The present study compares the traditional and faded worked examples methods in an ill-structured domain.

In summary, this study compares worked example, faded worked example, and CBR in terms of their impact on preservice teachers' learning and decision making about classroom management. We argue, on the basis of underlying assumptions of each approach, worked examples can be particularly beneficial in preservice teachers' early skill acquisition about teaching because preservice teachers early in their teacher education program often do not have necessary experiences and cognitive structures that can help them solve complex real-life teaching problems. Guidance in the form of worked examples can allow preservice teachers develop initial cognitive structures for solving and making decisions about teaching problems. As preservice teachers gain more expertise, CBR can be used to help them experience in solving real-life teaching problems. By comparing the three case-based approaches in this study, we seek to understand the extent to which each approach impacts reasoning and decision making of preservice teachers early in their program.

The present study was part of a larger project in which these three approaches were compared. Participants were students in educational psychology class; students completed one of the three treatments above and were assessed subsequent to completing the treatment. This study focuses on analyzing students open-ended responses to classroom management problems presented before and after instruction using one of these methods. Students read classroom management problems and generated, then selected alternative approaches to dealing with the problems, and provided reasons for their choices before and after the treatment (pre and posttests). In addition, students analyzed four cases and solved two problem cases during the treatment. We compared the three case-based approaches in terms of three major criteria that are described below:

1. Number of alternatives and reasons: Identifying a range of alternatives is an important part of effective decision making. We, therefore, argue that it is valuable to examine whether working with real-life teaching cases helped students generate more diverse alternatives regarding a number of classroom management situations and the extent to which each case-based approach facilitated this process. Similarly, we seek to examine how each case method impacted students' ability to develop reasons to justify their classroom management decisions.
2. Type of classroom management strategies: An overall goal of contemporary classroom management approaches is to move the focus from remediation of inappropriate behavior (Control Strategies) to preventing inappropriate behavior and encouraging appropriate behavior (Prevention Strategies), to developing self-regulation in students (Guidance Strategies). When designing the cases, we emphasized how a variety of guidance and prevention strategies could be applied to different classroom management situations and why these strategies were more effective to dealing with problems as compared to control strategies. Thus we aimed to examine the degree to which each case-based approach impacted students' selection of strategies that were consistent with classroom management goals of encouraging appropriate behavior and developing self-control and self-regulation.

The major research questions guiding this study are:

1. Do students' performances, as measured based on the quantity of the alternatives they created and selected in decision tasks related to classroom management, change from pre to posttest and did treatment group interact with any changes from pre to posttest?
2. Do students' performances, as measured based on the quantity of the reasons they generated to support their classroom management decisions, change from pre to posttest and did treatment group interact with any changes from pre to posttest?
3. What is the nature of strategies/alternatives students report on the pre and posttests? Are there differences across the conditions or from pre to posttest?

Method

Context

The study took place in 'Educational Psychology of Young Learners', a 3-credit hours course open only to majors in Early Childhood Education (ECE) or Elementary Education (ELED) offered in a large university in the midwestern United States. This class focuses on theories, research, and classroom practice implications about learner differences, learning and cognition, motivation, effective learning environments and teaching, including classroom management, and classroom and standardized assessment techniques and practices. The research study discussed in this paper was woven into computer-based activities designed to improve students' understanding of classroom management. Students had been assigned text on and had lectures and class activities on classroom management before completing the experimental materials. All students in the class were expected to complete these activities; students who completed the activities received class participation points as a normal part of the course.

Participants

The initial potential sample included 95 students who completed the demographics and educational background questionnaires during the second week of the semester. Complete data were available for 71 students; students were lost through course drops (10), failure to complete an experimental activity (11), or because they did not give consent for their data to be used for research (3). The gender composition of the sample closely approximated that of the population of majors. Males represented a smaller proportion of the sample (14.1%; $n=10$) than females (85.9%; $n=61$). Similarly, the sample strongly represented the population of the ELED and ECE majors in the institution; 78.9% of the students ($n=56$) indicated their major as ELED and 21.1% of students ($n=15$) indicated it as ECE. Students completed two human development courses prior to this class, and most typically were sophomores (50.7%; $n=36$) or juniors (43.7%; $n=31$). In addition, the compositions of the samples within each of the two majors closely matched in terms of gender, age, GPA, ACT scores, number of previously taken psychology and education credits, total credit hours taken in the semester, and hours of study students expected to spend on the course.

Study Design

A one factor, three group, between-subjects experimental study was conducted to investigate the effects of three instructional treatments on students' decision making. Students were randomly assigned into one of three conditions: (a) Traditional Worked Examples, (b) Faded Worked Examples, and (c) Case-based Reasoning. In each condition, students used an instructional computing system that presented cases or worked examples, dealing with conflict and classroom rules, to teach classroom management. Condition constituted the independent experimental variable in the study.

Instructional Materials

In each condition, students studied cases or worked examples related to classroom management issues such as dealing with conflict and classroom rules. The cases used in instruction consisted of six cases involving typical classroom management issues selected or adapted from instructional materials designed for preservice teachers. Each case was examined by two faculty experienced in classroom management and teaching methods in elementary level. Four cases were used as cases to be studied in the case based reasoning condition and as worked examples in the worked examples conditions. The remaining two cases were used as problem cases about which participants made decisions. Based on the principles and assumptions derived from each instructional method, different versions of the learning environment were designed and prepared as online learning environment using the tool called Drupal, an open-source content management system used to design and develop online learning environments (<http://drupal.org/>). For the cases in the CBR condition, we kept the contextual details and irrelevant information; for the worked and faded example conditions we omitted any irrelevant information and highlighted critical points in the cases in both worked example and faded worked example conditions. Additionally, we employed backward fading in the faded worked example condition; omitted the last solution step in the first case and last two solution steps in the second case. We also adapted Owensby and Kolodner's (2002) Case Interpretation and Case Application tools to scaffold students' reasoning

and analysis as they use expert cases or worked examples to reason and help them develop their ability to justify their decisions. For instance, Case Interpretation tool for the first case included four question prompts (i.e., What were the problems the teacher faced?) and Case Application tool for the two problem cases incorporated five question prompts (i.e., Provide a description of your solutions. How did you select these solutions?).

Measures

Academic and demographic background questionnaire

Students were asked to provide information about their age, gender, class level, major, GPA range (1=less than 1.6, 6=3.6-4.00), ACT score range (1=less than 17, 10=more than 24), and number of credit hours completed in psychology and education.

Pre and posttests

A pretest including 11 questions (8 multiple-choice and 3 open-ended questions) related to classroom management was used to assess students' prior knowledge. A posttest, similar to the pretest, was used to measure the changes, if any, in students' performances. This paper focuses on the analysis of three open-ended questions in both pre and posttests. In each question students were asked to generate solution alternatives for the classroom management issue described in the question, choose one or more alternatives from those they generated, and explain the reasons for their decisions. Two questions were parallel (Q1 and Q2) and one question (Q3) was the same in pre and posttests.

Procedure

The computer experimental materials were integrated into the unit on the classroom management and were administered in March. Students completed the pretest during 45 minutes of a normal 1.25 hour class period in the third week of March. On the day of intervention, one week after the students received the pretest, all participants across all groups participated at the same time, but each group was assigned to a different computer laboratory. According to their assigned condition, each student received an instruction sheet for the first session which guided them through the specific tasks required for their condition. Students followed similar procedures during the second session of the intervention. Then students completed the posttest at the end of the second session. The activity steps students in each treatment group followed during the intervention are described below.

Case-based reasoning condition

In the first session, students were provided with a problem case to solve. Two similar related cases were associated with each problem case. The students were asked to review these related cases before solving the problem case. After each related case, students were asked to answer a set of questions presented in the Case Interpretation tool. After reviewing and analyzing the two related cases, the students were referred back to the problem case and asked to solve it following the prompts provided in the Case Application tool. Students followed the same steps in the second session.

Traditional worked example condition

In the first session, students first received two complete worked examples including explicit solution steps and annotations of the relevant principles for each step. After each worked example, students used the same Case Interpretation tool to answer a set of questions about teachers' decisions and the reasons for those decisions. Then the students solved the first problem and explained and justified their decisions using the Case Application tool. In the second session, they received fully worked examples 3 and 4 and analyzed them using the Case Interpretation tool. Next, they completed the second problem case and explained and justified their decisions using the Case Application tool.

Faded worked example condition

The first two worked-examples in the faded worked example condition and the procedures followed were the same as those in the first session of the traditional worked example condition. Students in the faded condition then received two partially worked examples in the first session. These third and fourth worked examples included incomplete sections and students were to fill in the incomplete information and provide justifications for their choices. In the second session, students received two problem cases in which they were asked to provide alternative solutions to the problem, evaluate the alternatives, make a decision, and provide an explanation justifying their decision by using the same Case Application tool.

Data Analysis

Analysis 1: Changes in the number of alternatives students generated or selected could indicate changes in problem solving or decision making performance. Therefore, the number of alternatives students listed for each open-ended question in pretest (PreQ1-Q3List) and posttest (PostQ1-Q3List), and the number of alternatives they selected to use on each question (PreQ1-Q3Select for the pretest questions and PostQ1-Q3Select for the posttest questions) were counted for each treatment group. The data were used to examine if students generated and selected a differential number of solution alternatives from the pretest to the posttest and if there were differences across the conditions. Similarly, the number of reasons students created to support their decisions was counted (PreQ1-Q3Reason for the pretest questions and PostQ1-Q3Reason for the posttest questions) to examine if students generated a differential number of reasons from the pretest to the posttest and if these differences were related to treatment condition.

Analysis 2: Students' responses to each open-ended question in pre and posttests were coded to explore the extent to which students applied experts' strategies, illustrated in the cases, to solve or make decisions about classroom management issues. First, we carefully analyzed each case to extract and create a coding list out of the general classroom management strategies/ideas used or suggested by experts. As a result of ongoing discussion, we finally agreed upon the list of general ideas grouped under five categories: (a) classroom management style (1 general idea), (b) positive approaches (11 general ideas), (c) dealing with inappropriate behavior (10 general ideas), (d) preventing inappropriate behavior (3 general ideas), and (e) methods that do not work (3 general ideas). After finalizing the list of general ideas, we individually applied the list to the analysis of data from ten students in group 2. The initial percentage of agreement between our coding results was 67% (95 agreements and 47 disagreements on the coding). Following the comparison of our coding, discussion on the reasons for the disagreements and the revision of the coding rules, the percentage of agreement increased to 88% (125 agreements and 17 disagreements on the coding). Using the final coding guidelines that emerged, the first author completed coding the data from the remaining 62 students in the three groups. The results of this coding were then used to examine whether students' responses to three open-ended questions changed from pre to posttest within each group and whether the groups differed in terms of their responses.

Analysis 3: The purpose of this coding was to identify the type of classroom management strategies students selected when responding to three open-ended questions in pre and posttests. Using the idea list described above, we created three categories of classroom management strategies and labeled them as B: Control strategies, C: Guidance strategies, and D: Prevention strategies. The ideas related to classroom management style were listed under 'Classroom management style' and was labeled as A. To test the category list, we individually applied it to analyze the same data from ten students in group 2. Since we were more interested in the type of strategies students tended to choose, we coded the alternatives students selected to apply the classroom management situations described in each question. The percentage of agreement between our individually carried out coding was 69% (93 certain agreements on the coding). After discussing the reasons underlying our selections and revising the coding rules, the agreement increased to 96% (130 agreements and 5 disagreements). The first author completed the remaining coding for the data from the 62 students in three groups. The results of this coding were then used to examine whether the type of classroom management strategies students generated in each open-ended question changed from pre to posttest and whether there was a difference across the three groups.

Analysis 4: This analysis was designed to assess whether students selected strategies that were consistent with classroom management goals of encouraging appropriate behavior and developing self-control and self-regulation. Students' responses were coded to identify whether students focused only on suppression strategies (e.g., punishment, rule reminding) or included more than suppression strategies (e.g., helping student learn self-control, making changes in the classroom environment, planning on transitions, reinforcing appropriate

behavior) when choosing among the alternatives they generated for each open-ended question in pre and posttests. If students only chose alternatives for suppressing inappropriate behavior, then we coded the data as 0, otherwise coded it as 1. Using the same data set from group 2, we separately coded the alternatives students generated and the ones they actually selected to use as either 0 or 1. The percentage of agreement between our coding was 73% (64 certain agreements on the coding). The agreement increased to 100% after discussing the reasons underlying our selections and revising the coding rules. Next, the first author completed coding the data from the remaining 62 students in three groups. The results of this coding were then used to examine if the probability of the selection of more than suppression strategies for each open-ended question in posttest was predicted by the strategy selection in pretest and the treatment group.

Results

Research Question 1

Research Question 1 asked if students generated and selected a differential number of solution alternatives from the pre to posttest and across treatment conditions. The Cronbach alphas for the number of alternatives created on three pretest questions and three posttest questions were $\alpha = .43$ and $\alpha = .43$ respectively. Additionally, the Cronbach alphas for the number of alternatives selected on three pretest questions was $\alpha = .52$ and on three posttest questions was $\alpha = .41$. These results indicate that the items on pre and posttest did not make up very reliable scales. Therefore, the analyses were conducted based on individual item pairs.

To answer research question 1, we conducted a two-way mixed-design ANOVA on the number of alternatives students created and selected on each pair of open-ended questions with time as the within-subjects variable and group as the between-subjects variable. The results revealed a significant time main effect for the first pair of questions (PreQ1_List and PostQ2_List), $F(1,68) = 51.89$, $p < .001$, $\eta_p^2 = 0.43$. Students generated more alternatives on the pretest ($M = 2.72$, $SD = 0.90$) than the posttest ($M = 1.86$, $SD = 0.78$). However, neither the group main effect nor the time and group interaction effect was significant, $F(2,68) = 0.12$, $p > .05$, $\eta_p^2 = 0.00$; $F(2,68) = 2.15$, $p > .05$, $\eta_p^2 = 0.06$ respectively.

The results of the repeated measures ANOVA on the number of alternatives students created on the second pair (PreQ2_List and PostQ1_List) and third pair (PreQ3_List and PostQ3_List) of questions did not reveal any significant time main effect ($F(1,68) = 0.61$, $p > .05$, $\eta_p^2 = 0.01$ for the second pair; $F(1,68) = 3.48$, $p > .05$, $\eta_p^2 = 0.05$ for the third pair), group main effect ($F(2,68) = 0.95$, $p > .05$, $\eta_p^2 = 0.03$ for the second pair; $F(1,68) = 1.32$, $p > .05$, $\eta_p^2 = 0.04$ for the third pair), and time and group interaction effect ($F(2,68) = 2.20$, $p > .05$, $\eta_p^2 = 0.06$ for the second pair; $F(1,68) = 0.65$, $p > .05$, $\eta_p^2 = 0.02$ for the third pair). Table 1 displays mean and standard deviations for the two pairs of questions by each group.

Table 1. Means and standard deviations (in parentheses) on the number of solution alternatives created for the three pairs of questions by each group

		Case-based Reasoning ($n=25$)	Worked ($n=23$)	Example	Faded Example ($n=23$)	Worked
		M	M			M
Pair 1	PreQ1_List	2.52 (0.65)	2.78 (1.04)		2.87 (0.97)	
	PostQ2_List	2.00 (0.91)	1.74 (0.81)		1.82 (0.78)	
Pair 2	PreQ2_List	2.12 (0.83)	2.57 (0.66)		2.30 (1.02)	
	PostQ1_List	2.60 (0.96)	2.52 (0.99)		2.17 (1.07)	
Pair 3	PreQ3_List	2.52 (1.26)	2.22 (1.00)		2.91 (1.00)	
	PostQ3_List	2.92 (1.15)	2.65 (1.07)		2.91 (1.31)	

The results of the repeated measures ANOVA on the number of alternatives students selected on the first pair (PreQ1_Select and PostQ2_Select) and second pair (PreQ2_Select and PostQ1_Select) of questions indicated no significant time main effect ($F(1,68) = 2.02$, $p > .05$, $\eta_p^2 = 0.03$ for the first pair; $F(1,68) = 0.17$, $p > .05$, $\eta_p^2 = 0.00$ for the second pair), no significant group main effect ($F(2,68) = 0.03$, $p > .001$, $\eta_p^2 = 0.03$ for the first pair; $F(1,68) = 0.07$, $p > .05$, $\eta_p^2 = 0.00$ for the second pair), and no time and group interaction effect ($F(2,68) = 2.24$, $p > .05$, $\eta_p^2 = 0.06$ for the first pair; $F(1,68) = 1.90$, $p > .05$, $\eta_p^2 = 0.05$ for the second pair). The results of the repeated measures ANOVA on the number of alternatives students selected on the third pair of questions

(PreQ3_Select and PostQ3_Select) revealed a significant time main effect, $F(1,68)= 4.83, p < .05, \eta_p^2= 0.07$. Students selected more alternatives on the posttest ($M= 2.75, SD= 1.20$) than the pretest ($M= 2.37, SD= 1.12$). However, the result was not significant when Bonferroni correction was applied to adjust the significance level ($\alpha= 0.05/3=0.016$). In addition, neither the group main effect nor the time and group interaction effect were significant, $F(2,68)= 1.05, p > .05, \eta_p^2= 0.03$; $F(2,68)= 0.37, p > .05, \eta_p^2= 0.01$ respectively. Table 2 displays mean and standard deviations for three pairs of questions by each group.

Table 2. Means and standard deviations (in parentheses) on the number of solution alternatives selected for the three pairs of questions by each group

		Case-based Reasoning ($n=25$)	Worked Example ($n=23$)	Faded Example ($n=23$)
		M	M	M
Pair 1	PreQ1_Select	1.48 (0.65)	1.78 (1.04)	1.74 (0.92)
	PostQ2_Select	2.00 (0.91)	1.70 (0.76)	1.83 (0.78)
Pair 2	PreQ2_Select	1.36 (0.76)	1.66 (0.78)	1.66 (0.88)
	PostQ1_Select	1.72 (0.98)	1.57 (0.73)	1.52 (0.85)
Pair 3	PreQ3_Select	2.32 (1.18)	2.13 (1.06)	2.70 (1.11)
	PostQ3_Select	2.84 (1.14)	2.57 (1.12)	2.83 (1.37)

Research Question 2

Research Question 2 asked if the number of reasons students generated for each open-ended question changed from pre to posttest and among the groups. To answer research question 2, we conducted a two-way mixed-design ANOVA on the number of reasons students created on each pair of open-ended questions with time as the within-subjects variable and group as the between-subjects variable. The results showed a significant time main effect ($F(1,68)= 8.75, p < .01, \eta_p^2= 0.11$) and a group main effect ($F(2,68)= 3.31, p < .05, \eta_p^2= 0.89$) for the third pair of questions (PreQ3Reason and PostQ3Reason). Students created more reasons on the posttest ($M= 1.49, SD= 0.77$) than on the pretest ($M= 1.18, SD= 0.72$). Tukey post-hoc comparisons of the three groups showed significant differences between case-based reasoning and faded worked example groups. Students in the faded worked example group created fewer reasons compared to students in the case-based reasoning group. However, it should be noted that if the significance levels are adjusted using the Bonferroni procedures, the group main effect would not be significant ($\alpha=0.05/3=0.016$).

The results of the repeated measures ANOVA on the number of reasons students created on the first (PreQ1Reason and PostQ2Reason) and second pairs (PreQ2Reason and PostQ1Reason) of questions revealed no significant time main effect ($F(1,68)= 2.17, p > .05, \eta_p^2= 0.03$ for the first pair; $F(1,68)= 3.54, p > .05, \eta_p^2= 0.05$ for the second pair), no significant group main effect ($F(2,68)= 0.31, p > .05, \eta_p^2= 0.01$ for the first pair; $F(2,68)= 2.17, p > .05, \eta_p^2= 0.06$ for the second pair), and no significant time and group interaction effect ($F(2,68)= 0.03, p > .05, \eta_p^2= 0.00$ for the first pair; $F(2,68)= 1.61, p > .05, \eta_p^2= 0.05$ for the second pair). Table 3 displays mean and standard deviations for the three pairs of questions by each group.

Research Question 3

Research Question 3 included three parts that asked if the type of decision alternatives students reported differed from the pre and posttest and among the groups. The first part asked to what extent students applied experts' strategies, illustrated in the cases, to solve or make decisions about classroom management issues and if there was a difference across the conditions and from pre to posttest. To answer the first part of the research question 3, the frequencies and percentages of the students' responses to the three open-ended questions on the pre and posttests were calculated for the six categories representing the type of strategies students generated. These six categories included (a) classroom management style, (b) positive approaches, (c) dealing with inappropriate behavior, (d) preventing inappropriate behavior, (e) methods that do not work, and (f) student generated ideas.

Table 3. Means and standard deviations (in parentheses) on the number of reasons generated on the three pairs of questions by each group

		Case-based Reasoning (n=25)	Worked (n=23)	Example	Faded Example (n=23)	Worked
		M		M		M
Pair 1	PreQ1_Reason	1.36 (0.64)		1.43 (0.79)		1.30 (0.70)
	PostQ2_Reason	1.24 (0.60)		1.26 (0.54)		1.17 (0.39)
Pair 2	PreQ2_Reason	0.88 (0.67)		1.22 (0.60)		0.87 (0.63)
	PostQ1_Reason	1.28 (0.61)		1.22 (0.60)		1.00 (0.52)
Pair 3	PreQ3_Reason	1.44 (0.77)		1.04 (0.64)		1.04 (0.71)
	PostQ3_Reason	1.68 (0.75)		1.57 (0.79)		1.22 (0.74)

The results showed similar patterns across the three groups in terms of the type of classroom management strategies students created for the three open-ended questions on both the pre and posttest. A chi-square test of independence did not show any significant relationship between the group and the three types of classroom management strategies (positive approaches, dealing with inappropriate behavior, and student generated ideas) students generated on the posttest, $\chi^2(4, N=71) = 4.92, p > .05$. The other three categories (classroom management style, preventing inappropriate behavior, and methods that do not work) were not included in the chi-square test due to small cell frequencies. In addition, the relationship between the group and the three types of classroom management strategies students created on the pretest was not significant, $\chi^2(4, N=71) = 1.35, p > .05$.

Descriptively, strategies related to dealing with inappropriate behavior constituted the highest percentage among the total number of strategies on both the pre and posttests. In addition, the percentages for this category increased from the pre to posttest for all three groups. The next highest percentage was for the category of 'student generated ideas', which included strategies that were not presented in the cases. The strategies in this category most probably represented students' prior knowledge or experiences about the topic. The percentage of this category decreased from pre to posttest in each group, but still remained as the category that included the second highest number of strategies students created. The percentages of the strategies related to positive approaches were similar across the groups on both the pre and posttests. The strategies about preventing inappropriate behavior constituted a small percentage among the total number of strategies. In addition, the percentages for this category decreased from pre to posttest in each group. The lowest percentages across the groups on both pre and posttest were for the remaining two categories: classroom management style and methods that do not work. The latter category included the strategies that the experts in the cases or worked examples described as the strategies that did not work to solve a classroom management situation. Only five students across the three groups included strategies related to this category on the posttest. Table 4 shows the number and percentages of strategies students generated on the pre and posttest.

The two most common strategies under the positive approaches category included 'establishing classroom rules, routines, and consequences' and 'providing verbal or token reinforcement for appropriate behavior'. The highest number of strategies about dealing with inappropriate behavior included 'providing verbal reminder of rules or appropriate behavior' and 'having group and individual negative consequences'. Although the frequencies were low, the two more common strategies about preventing inappropriate behavior included 'making lessons well planned, with motivating aspects' and 'accomplishing transitions smoothly'.

The second part of the research question 3 asked what type of classroom management strategies students chose to use and if there were differences across the conditions and from pre to posttest. To answer the research question, frequencies and percentages of the alternatives/strategies students chose to apply to the classroom management situations described on the pre and posttests were calculated using the four categories: (a) Classroom management style, (b) Control strategies, (c) Guidance strategies, and (d) Prevention strategies. The strategies that were not clear were coded as 'unclear'. The number of strategies that were marked as 'unclear' changed between 3 and 8 across the groups. A chi-square test of independence showed a significant relationship between the group and the type of classroom management strategies students chose to apply to the questions on the posttest, $\chi^2(4, N=71) = 11.51, p < .05$. In addition, group was related to the type of classroom management strategies students chose to apply to the questions on the pretest, $\chi^2(4, N=71) = 12.12, p < .01$.

Table 4. Frequencies and percentages for the type of classroom management strategies students created for the three open-ended questions in the pre and posttest by group

	Case-based Reasoning		Worked Example		Faded Worked Example	
	Pre	Post	Pre	Post	Pre	Post
Classroom management style	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Positive approaches	18 (10.06%)	17 (9.04%)	23 (13.22%)	16 (10.06%)	22 (11.83%)	22 (13.84%)
Dealing with inappropriate behavior	96 (53.63%)	119 (63.30%)	94 (54.02%)	97 (61.01%)	99 (53.23%)	103 (64.78%)
Preventing inappropriate behavior	6 (3.35%)	3 (1.60%)	7 (4.02%)	1 (0.63%)	11 (5.91%)	4 (2.52%)
Methods that do not work	0 (0%)	1 (0.53%)	0 (0%)	3 (1.89%)	0 (0%)	1 (0.63%)
Student generated ideas	59 (32.96%)	48 (25.53%)	50 (28.74%)	42 (26.42%)	54 (29.03%)	29 (18.24%)
Total	179	188	174	159	186	159

Accordingly, results showed control strategies constituted the highest percentages across the three groups on both pre and posttest. The percentage of the category increased from pre to posttest for the case-based reasoning (Group 1) and faded worked example (Group 3) groups, and slightly decreased for the worked example group (Group 2). Additionally, on the pretest, the faded worked example group selected more control strategies compared to the other two groups. On the posttest, the case-based reasoning and faded worked example groups selected more control strategies compared to the worked example group. The second highest percentage in group 1 and 2 was for guidance strategies on the posttest. In group 3, guidance and prevention strategies constituted a small percentage among the total number of strategies on the posttest. In all groups, while the number of guidance strategies slightly increased from pre to posttest, the number of prevention strategies decreased from pre to posttest. The decrease on the number of prevention strategies was highest in the group 3. The percentages for the classroom management style were very low across the groups. Table 5 shows the number and percentages of strategies students selected on the pre and posttest.

Table 5. Frequencies and percentages for the type of classroom management strategies students selected to apply to the three open-ended questions on the pre and posttest by group

	Case-based Reasoning		Worked Example		Faded Worked Example	
	Pre	Post	Pre	Post	Pre	Post
A: Classroom management style	3 (2.33%)	2 (1.21%)	0 (0%)	1 (0.76%)	2 (1.43%)	1 (0.70%)
B: Control strategies	97 (75.19%)	131 (79.39%)	100 (78.74%)	101 (76.52%)	106 (75.71%)	126 (88.73%)
C: Guidance strategies	15 (11.63%)	25 (15.15%)	12 (9.45%)	25 (18.94%)	4 (2.86%)	8 (5.63%)
D: Prevention strategies	14 (10.85%)	7 (4.24%)	15 (11.81%)	5 (3.79%)	28 (20.00%)	7 (4.93%)
Total	129	165	127	132	140	142

The third part of the research question 3 asked if treatment and students' responses on the pretest predict the probability that students select more than suppression strategies on the paired posttest question. A set of logistic regression analyses was employed to examine if the probability of the selection of more than suppression strategies for each open ended question on the posttest was predicted by the strategy selection on the pretest and the treatment group.

For the first open-ended posttest question (PostQ1), results of the goodness of fit of the model showed that the paired pretest question (PreQ2) and group were not significant predictors of PostQ1 ($\chi^2(3) = 3.15, p = .369$). A classification analysis revealed that 53 of the 68 cases who selected suppression strategies on the posttest question were correctly classified with an overall hit rate of 77.9%. Similarly, for the second open-ended posttest question (PostQ2), results of the goodness of fit of the model showed that the paired pretest question (PreQ1) and group were not significant predictors of PostQ2 ($\chi^2(3) = 2.30, p = .513$). A classification analysis revealed that 46 of the 71 cases who selected more than suppression strategies on posttest question were correctly classified with an overall hit rate of 64.8%. For the third open-ended posttest question (PostQ3), results of the goodness of fit of the model showed that the paired pretest question (PreQ3) and group also were not significant predictors of PostQ3 ($\chi^2(3) = 4.77, p = .190$). A classification analysis revealed that the model correctly classified 50% of those who selected suppression strategies on the posttest question and 63.4% who were did not, for an overall success rate of 57.7%.

Conclusion

This study compared the impact of three types of case-based methods (worked example, faded worked example, and case-based reasoning) on preservice teachers' learning and decision making about classroom management. Specifically, this study focused on analyzing students open-ended responses to classroom management problems presented before and after instruction using one of these methods.

The results indicated no treatment effect on students' performances, as measured based on the quantity of the alternatives they created and selected in decision tasks related to classroom management. Despite some minor changes in the number of alternatives from pre to posttest, students in all three groups generated a relatively small number of alternatives (2 to 3 alternatives) for each open-ended question on both pre and posttests. One reason for students may have generated small number of alternatives is their limited experiences about dealing with real-life classroom management situations. It has been shown that people are able to generate more decision alternatives on the familiar content than less familiar content (Bettman & Park, 1980; De Neys, 2006). Another possible reason is that identifying a range of alternatives for a decision situation requires time and effort (Shafir, Simonson, & Tversky, 1993). Therefore, as Keeney (1994) argues, people "often quickly identify some viable alternatives and proceed to evaluating them without making the effort to broaden the search for alternatives (p.38). He continues, "the first alternatives that come to mind in a given situation are the obvious ones, that have been used before in similar situations, and those that are available" (p.38). We suspect, on the basis of Keeney's (1994) argument, students in this study relied heavily on their limited prior knowledge and experiences in generating alternatives and did not engage in deep thinking to search for new alternatives or to apply alternatives described in the cases to the problem situations they faced with on the posttest.

In regard to the reasons students generated on the pre and posttest to support their decisions about classroom management alternatives, the results showed no significant differences from pre to posttest. The majority of the students in each group generated only one reason for each question on both pre and posttest. One possible explanation of this finding may be provided by the decision making models suggested by Gigerenzer and his colleagues (1996, 1999). According to these researchers, humans tend to employ heuristics or fast-and-frugal reasoning strategies as cognitive shortcuts in many real-life situations in which decisions must be made quickly and with limited information. These researchers argue that if people identify information that discriminates the best choice option among others and if searching for additional information is effortful, people will use that discriminating information to make a decision instead of searching for new evidence to support their decisions. Considering students' limited teaching experiences and skills about classroom management, and the findings related to the number of reasons students provided to support their decisions, we speculate that students in this study followed a similar fast-and-frugal strategy in their decision making. That is, they might identify one compelling reason for their chosen alternative and used it instead of seeking for more reasons to justify their decisions.

Even though we did not examine the quality and sources of students' reasons for the questions on the pre and posttest in a detailed way, our first interpretation is that students generated a reason or reasons to primarily support the decision alternative they *selected* to apply to the classroom management situations described in the questions. The comparison between the results regarding the number of alternatives students chose and the number of reasons they provided suggests that students selected at least one solution alternative and a reason to support their choice. This is in line with the argument that, due to their need to justify their decisions both to themselves and the others, people tend to create reasons or arguments that support their own positions (Baron,

1991; Simonson & Nye, 1992). However, it is interesting that five students across the three treatment groups included ineffective classroom management strategies to their decisions on the posttest and provided reasons for why they did not select these strategies. These ineffective strategies were described by the experts in the cases as the unsuccessful methods that did not work to solve a classroom management situation. Our second interpretation relates to the sources of students' reasons is that they often were based on students' previous experiences in K-12 education and their established beliefs about effective strategies to deal with classroom management situations. A number of researchers have contended that preservice teachers, particularly those early in their teacher education program, often use their beliefs they bring to their preservice preparation as a lens to interpret new knowledge and experiences, and to justify their decisions (Calderhead & Robson, 1991; Munby, 1982). This interpretation may be especially relevant for this population of students. The students in the class were mostly sophomores or juniors and typically were early in their sequence of teacher education courses. The freshman and sophomores years in the typical ECE and ELED programs are filled with so-called "general education" or academic content courses related to disciplines these students will teach (e.g. writing, social sciences, elementary mathematics, sciences). Students typically have taken background "educational foundation" courses (history and social foundations of education, child development, educational psychology). Students in these majors begin specific methods classes as juniors. While the child development and educational psychology courses provide brief introductions to child guidance and classroom management, the students had not yet had focused on methods of teaching and managing students. Many had not yet experienced practicum experiences in classrooms.

The results of this study also indicated no significant treatment effect on the number of reasons students created on the posttest to justify their decisions. This may be because students did not engage in deep analysis of the cases, and therefore they failed to develop a thorough understanding of the classroom management strategies and situations described in the cases. There is evidence in the literature that preservice teachers, due to their lack of teaching experiences, are unable to notice significant features of classroom practices and analyze cases in a superficial manner (Kim & Hannafin, 2009; van den Berg, 2001). Only a few students within each group seemed to use what they learned from the cases to support their decisions about why particular alternatives would be successful. This finding is consistent with what King, Wood and Mines (1990) have pointed out, that many undergraduate college students, even seniors, often fail to use evidence to justify their reasons or decisions.

In addition, the results revealed no significant relationship between group and type of strategies students reported on the pre and posttests. The majority of the strategies students in each group generated on both the pretest and the posttest were related to dealing with inappropriate behavior. Similarly, majority of the strategies students chose to apply to the classroom management situations described in the open-ended questions were related to controlling pupils' behavior in the classroom. However, the results indicated compared to the worked example group the case-based reasoning and faded worked example groups selected more control strategies on the posttest. This implies cases in the form of worked examples better directed students' attention to more effective classroom management strategies (i.e., guidance strategies) described in the cases, thus students might tend to choose more of these strategies on the posttest. Yet, it should be noted that the results showed the treatment group did not predict the probability of the selection of more than suppression strategies for each open-ended question on the posttest. We, therefore, may not confidently argue that the worked example group was more likely to select more effective classroom management strategies than the other two groups. Furthermore, prevention and guidance strategies constituted relatively small percentages of the total strategies students in each group created or selected on both the pre and posttests. These findings related to the type of strategies students generated and selected to use in classroom management situations are congruent with the results of a recent study in which Balli (2011) examined a group of preservice teachers' memories and beliefs about classroom management. Analysis of students' written narrative about their description of an 'excellent teacher' showed that the most common classroom management strategies students described in their narratives were related to the assertive discipline model (Canter & Canter, 1992), which emphasizes control strategies including establishing rules and procedures and setting consequences for inappropriate behavior. Balli (2011) argued that because the strategies associated with this model are used widely in K-12 classrooms, preservice teachers have substantial amount of experience with these strategies and therefore their beliefs regarding these strategies are well established. Balli (2011) also found that students depicted few guidance and prevention strategies (i.e., building pupil-teacher relationships, helping pupils learn self-control, maintaining pupil motivation, and accomplishing smooth transitions) in their narratives which often reflected incomplete understanding of these strategies. Providing students with opportunities to practice using guidance and prevention strategies in dealing with multiple classroom management situations may help them develop better understanding and skills pertaining to these skills. For instance, real-life teaching cases may illustrate how experienced teachers apply these strategies to managing different classroom management problems.

The results of the current study also showed the number of ‘student generated ideas’ representing classroom management strategies not described in the cases that students studied constituted a relatively high percentage among the total number of strategies students created on the posttest. This study was aimed at challenging students’ prior beliefs by exposing them to multiple perspectives about classroom management strategies, but the results imply that working on realistic teaching cases related to classroom management did not bring a substantial change on students’ existing knowledge and conceptions about classroom management. The partial structure of preservice teachers’ conceptual models of teaching, their perseverance of beliefs, and their tendency to be resistant to change in beliefs have been established in the literature. One of the most well known theories explaining the influences of previous experiences on people’s information acquisition and interpretation of new information is mental model theory. According to this theory, people create mental representations of their experiences and knowledge. The extent to which new information is perceived to be consistent with the existing mental structures determines whether or not the information will be accepted easily and how that information will be interpreted. According to Bransford, Vye, Adams, and Perfetto (1989), information that does not correspond to people’s mental models are difficult to comprehend and hard to recall. Similarly, the conceptual change literature in science has provided extensive research evidence that students’ existing beliefs and conceptions are resistant to change and can hinder their acceptance and assimilation of new knowledge that conflicts with their already held beliefs (e.g. Guzzetti, Synder, Glass, & Gamas, 1993; Nussbaum & Novak, 1982). Consequently, one can speculate that preservice teachers in the current study might selectively attend to case information that seemed to reinforce their existing beliefs and disregard the information that was in conflict with their preconceived beliefs and understanding about classroom management.

Limitations of the Study and Future Research Suggestions

This study was aimed at comparing the impact of three types of case-based approaches (worked example, faded work example, and case-based reasoning) on preservice teachers’ decision making and reasoning skills related to realistic classroom management situations. Participants in this study received a short-term implementation of one of these three major approaches to case-based learning. To be better equipped for the complexities of teaching, however, preservice teachers need to be provided with ongoing experiences about classroom situations. This study therefore can be considered as the first step of the general purpose of improving preservice teachers’ reasoning and decision making related to classroom teaching. Studying the impact of a long-term exposure to the three case methods on preservice teachers’ learning and decision making would be a fruitful direction for future study.

Additionally, most students in this study were in their second or third year of teaching education program. These students typically have taken background “educational foundation” courses, but many had not yet experienced practicum experiences in classrooms. Consistent with their limited, if any, teaching experiences they often engaged in surface analysis of the cases describing complex classroom management situations. The results might have been different if participants were in their final year in the teacher education program and had some teaching experience in K-12 classrooms. Future studies should replicate the comparison of these three case based approaches with preservice teachers who are at different stages in their program.

Moreover, this study focused on the analyses of students’ reasoning and decision making based on their written work. However, some students might not adequately reflect their reasoning in a written format. Future studies should combine methods that would allow students reflect their reasoning and decisions in both written and oral formats. To illustrate, an interview method can be used to support the data from the written case analysis and problem solving. Finally, this study examined the quantity of decision alternatives and reasons students generated on the pre and posttests. However, the quality of alternatives and reasons may be a better indicator of students’ actual learning with these three case-based approaches. Therefore, examining the extent to which these case-based approaches impact students’ ability to develop quality alternatives and reasons in different decision tasks might have strengthened the study.

The overall conclusion of the current study is, while the present study did not demonstrate consistent differences among the three conditions or major changes in students’ approaches to classroom management from pre to post measures, aspects of the results are interesting. Approaches to classroom management selected by students earlier in their pre-service teacher education program emphasize control and suppression strategies, rather than prevention or positive change strategies. These strategies seem to be consistent with students’ prior experiences and seem resistant to short term instructional change. The present results suggest that studying the development of students’ ideas about classroom management over the course of their teacher training and contrasting students

exposed to longer term uses of case-based or worked examples approaches may be necessary to examine the efficacy to these instructional approaches in this important area of teacher education.

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