Case-based Instruction in Educational Psychology: Comparing Collaborative and Independent Approaches

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Case studies are a staple in teacher education, especially in introductory courses when field experiences are less common. Even though case studies are used frequently, how to use case studies effectively has not been examined in this context. This quasi-experimental study was situated in an introductory educational psychology course for education majors covering major learning theories. Both collaborative and independent uses of case studies were compared to lecture alone across semesters with the same content knowledge measures. A total of 96 students examined three case studies and completed quizzes independently, 86 examined case studies in class in collaboration with classmates and the instructor, and 115 received lectures only. When these conditions were compared, the researchers discovered that case study activities did not always result in greater learning gains than lecture alone. Collaborative analysis of case studies resulted in significantly lower scores in summative assessments.

Keywords: case-based instruction, case studies, educational psychology, undergraduate students

As teacher educators, we constantly strive to better serve our students by facilitating meaningful learning that will better inform our preservice teachers. Educational psychology is the study of learning and teaching across contexts. However, instructional materials including textbooks feature examples from K-12 education that often do not go deeper than superficially explaining theories (Nezhad & Vahedi, 2011; Shuell, 1988, 1996). Despite content that focuses on the K-12 context, educational psychologists continue to generate scholarship across disciplines and content areas. For example, many studies in educational psychology include college students and other adult education populations as participants.

Because of the diverse student population in an introductory educational psychology course paired with the heavy, theoretical nature of the content, the first author of this study explored ways to situate the information in context for her students. Case studies are a common practice to situate learning and are often cited as an active learning strategy from a constructivist perspective (Sudzina, 1997). However, the exact pedagogical procedure about how to use case studies has not been explored to the same extent. In other words, we know that we should use case studies in teacher education, but how do we use case studies? Does it matter how case studies are examined? Is one way more effective than another? Instructional materials are most effective when learners engage with the content and learning environment in meaningful ways (Sudzina, 1997).

The objective of this quasi-experimental study is to evaluate the effectiveness of case studies in an introductory educational psychology course. Data were collected across three semesters of the same course, all "super" sections (of 50 students or more) taught by the same instructor, to examine the effectiveness of case study analyses individually and collaboratively in class. Performance on quizzes were compared between a control group and two treatment groups

in which case studies were added to the instruction for key content of the course. Although case studies are typically used in educational psychology, we sought to answer the following research question: does independent study of cases or collaborative study of cases facilitate learning educational psychology topics more effectively than lecture alone?

Literature Review

Merseth (1991) traced the history of case-based instruction to the case methods used in law school starting in the 1800s. This practice then spread to business education and was popularized in psychology (Kemp, 1980) long before integration into teacher education curriculum. Case studies have been widely used in educational contexts as an effective classroom technique. Indeed, case studies have been well documented as active learning strategies that enhance the learning process (Bonwell & Eison, 1991; Escartín et al., 2015; Merserth, 1996; Yadav et al., 2007). In case-based instruction, students are provided practical examples of dilemmas of real-world situations that they may encounter in their future professional settings (Orr &Weekley, 2019). Gravett et al. (2017) suggested that the inclusion of case studies in educational contexts may be the best way to teach students essential practical skills that involve how to diagnose, decide, and act in specific situations.

Merseth (1996) provided three purposes of case-based instruction, which include: 1) models of best practice that illustrate theoretical principles in practical settings, 2) opportunities to analyze complex situations that help enhance decision-making skills, and 3) activities to practice reflective thinking skills. When these types of activities are incorporated into classrooms, students generally respond to an open-ended question that includes a diverse range of possible solutions. For these types of activities, students may need to provide a brief written response to the case study scenario, or their instructors may require them to develop an action

plan, proposal, or reasoned decision about the outlined situation. However, McFarlane (2015) cautioned that university faculty will need to carefully select case studies to stimulate real-world applications as well as focus on vital characteristics such as practicality, brevity, critical and analytical thinking skills, utility, concurrency, content specificity, and relevancy.

Preservice teachers and other educators are likely to encounter brief case studies and multiple-choice questions on certification and licensure exams. Even though multiple-choice items are included with case study activities, faculty are able to engage learners in higher levels of cognition (e.g., application, analysis, and synthesis) which are more complex than the recognition of definitions (Gilboy et al., 2014). Faculty are able to provide active learning experiences that guide students in advanced and complex thinking tasks focused on situations they may encounter in the future. Further, case-based learning can be particularly effective for students studying abstract concepts such as the application of theoretical concepts to potential professional settings.

For example, Gravett et al. (2017) found that case-based teaching approaches result in authentic learning and can contribute to "resolving the separation of theory and practice" (p. 386). Therefore, the inclusion of case-based learning can provide vital connections between concrete experiences and principles of formal knowledge needed for students to develop an in-depth understanding of course concepts (Gravett et al., 2017). Case-based instruction exposes preservice teachers to "complex and messy problems of practice" in order to develop problem-solving skills situated in teaching (Merseth, 1991, p. 246). By putting theory into practice, this type of exposure to case studies is aligned with a practical orientation.

McAninch (1993) argued that creating this type of alignment is not a simple task. The way the case is studied is a complex pedagogical technique because of the interactions between

and among the instructor, learner, and the case studies. General instructional design principals apply to case-based instruction in which closely aligned concepts should be outlined to provide sufficient background knowledge to process the case. Likewise, the discussion process should be carefully considered with prearranged questions. The rationale for assigning each case should be articulated to the class at the start of each case discussion. Even though McAininch (1993) described specific ways to use cases, she did not test their effectiveness or efficacy. Although two and a half decades later we are not any closer to developing a systematic approach to the use of cases in teacher education, we do know that discussion significantly adds to the learning process as compared to reading and writing alone (Levin, 1995).

Theoretical Framework: Situated Cognition

One goal of instruction is continual lifelong learning that is intrinsically motivated. It was our aim to create instruction that would have a long-lasting effect by both modeling learning strategies that could be generalized to other learning experiences and making the information relevant and useful for each student's future profession. The constructivist approach to professional development was inspired by the theory of situated cognition (Brown et al., 1989). Situated cognition is the idea that knowledge is associated with and influenced by activity, context, and culture (Brown et al., 1989).

In direct instruction applications of this theory, instructors attempt to provide explicit context in the form of case studies to support students' situated cognition (Grant & Grace, 2019; Kemp, 1980; Walker, 2009). The case studies are examples of theory in action by providing scenarios about teachers using educational psychology theories. Although used in teacher education for several decades prior (Kemp, 1980), advocacy for the use of case study

methodology in psychology began in the late 1970s because of its advantages for contextualizing information or data (Kantar, 2013; Walker, 2009). Teaching faculty from engineering (Sankar et al., 2008), medicine (Popil, 2011), and psychology (Meil, 2007) have reported the substantial advantages that case study methods afford their students. A primary advantage of using case studies is the contextualized or situated cognition provided with a "real world" example as well as exemplars to identify common situations and dilemmas (Grant & Grace, 2019; Kantar, 2013; McDade, 1995; Popil, 2011). Another aspect of situated cognition is the social aspect of learning in which collaborative activities contribute to knowledge construction (Brown et al., 1989).

Faculty have appreciated this method specifically because it allowed their learners to practice problem-solving and knowledge construction in an ethical manner because no harm was created for the hypothetical clients, patients, or students (Kantar, 2013; Meil, 2007; Popil, 2011). Faculty who regularly use case study methods in their curriculum demonstrate the value of the active learning experiences where students assemble facts (McDade, 1995), construct knowledge (Morgan, 2009; Morgan et al., 2017; Tanner, 2009), and evaluate hypotheses (Meil, 2007). Moreover, teaching faculty have collected and reported data about their students' increased confidence, engagement, and interests when they use case studies within their curriculum (Grant & Grace, 2019; Meil, 2007). The instructors implemented the case study method to increase student engagement, provide context for information, and guide students' critical thinking during class session.

Methodology

In the following study, our goal was to increase learning gains by promoting conceptual relevance with case studies. Furthermore, the theory of situated cognition calls on cognitive

apprenticeships in which the learner gets to observe an expert's reaction to an authentic problem. The case studies in this study serve as a tool for the instructor to show the student an authentic problem and situate the content in a real-life scenario. Quasi-experimental methodology was used to answer the following research question: does independent study of cases or collaborative study of cases facilitate learning educational psychology topics more effectively than lecture alone?

Research Context

The following study was conducted at a medium-sized public university located in the southeastern United States with students enrolled in an introductory-level educational psychology course. According to the course catalogue, the course consists of the study of educational psychology concepts through examination of learning and teaching processes, with the goal of applying this knowledge to enhance the learning of all students in a variety of educational settings and contexts. The course is required for all education majors whether their degree leads to teacher certification or not (e.g., communication disorders, American Sign Language interpretation). It is important to note that although *introductory psychology* is required for all education majors, it is *not a prerequisite for educational psychology* at this institution. Also, the introductory educational psychology course was scheduled as a "super section" with an enrollment capacity of 160 students. The instructor held a doctorate in educational psychology. The IRB at the instructor's institution approved the use of human subjects for these studies.

Participants

Of the 306 students enrolled across the treatment and control groups, 297 students completed all the measures. Participants in the control group (n = 115) participated in lectures

and content quizzes. Those in the first treatment group (n = 86) completed case studies in addition to participating in lectures and content quizzes. The second treatment group (n = 96) participated in lectures, and completed reading quizzes and case study quizzes. Across groups, the study participants were primarily White (n = 176), female (n = 258), second-year students (n = 164), and in good academic standing (n = 183).

Materials

Case studies and accompanying assessments were aligned with the major learning theories in educational psychology (see Table 1). Case studies were adapted from existing case studies developed by Ormrod et al. (2007). Each case study presented classroom scenarios within the context of K-12 learning in the United States in which a learner encountered a learning difficulty and the teacher responded accordingly. The assessments included application-oriented, multiple-choice questions covering the content from the case study and were administered before the regular, weekly reading quizzes with the same multiple-choice format.

Table 1

Case Study Content Based on Low Quiz Scores

Case Study	Content
1	Piaget's Four Stages of Cognitive Development
2	Vygotsky's Sociocultural Theory
3	Operant Conditioning

Procedures

The performance of 115 students in the control group on a summative assessment were analyzed. The case studies and formative assessments were pilot tested with students (n = 12) during the previous semester and revised based on student feedback (Fisher & Frey, 2015). Using the case studies, we created two treatment conditions to compare to the control group. The

first case study treatment was an independent analysis of a case study. A total of 86 students independently analyzed case studies and completed an accompanying formative assessment without class discussion. For the second case study treatment (n = 96), we "integrated" the case studies and formative assessments into class sessions in which students analyzed the cases together. See Table 2 for a summary of procedures.

Table 2

Design of Study: Comparing Independent and Collaborative Case Study Analysis

Group (N)	Lecture	Case Studies	Independent Formative Assessment	Collaborative Formative Assessment	Summative Assessment
Control (n = 115)	X				X
Treatment 1 (n = 86)	X	X	X		X
Treatment 2 (n = 96)	X	X		X	X

A one-way multivariate analysis of variance (MANOVA) was conducted to detect overall significant differences across interventions across quizzes (Field, 2013). A Bonferroni correction was used to account for the multiple tests being conducted by dividing the alpha by the number of tests (6). Therefore, significance was determined at a p-value of less than .008. Post-hoc analyses (Tukey) were run to determine the exact nature of significant differences found across case studies.

Results

Table 3 includes the descriptive statistics of the summative assessments across the three groups: control, independent case study (Treatment 1), and collaborative case study (Treatment 2). Across case studies, the collaborative case study group resulted in the lowest quiz scores. Across treatment groups, the highest quiz scores were found for the second case study on

Vygotsky. All treatment groups yielded quiz scores ranging from zero to perfect scores across case studies.

Table 3

Descriptive Statistics across Summative Assessments and Treatment Groups

Case Study	*Control* (*n* = 115)		*Treatment 1* (*n* = 86)		*Treatment 2* (*n* = 96)	
	Range	*Mean%(SD)*	*Range*	*Mean%(SD)*	*Range*	*Mean%(SD)*
1	0-100	76.52(21.40)	0-100	75.58(21.56)	0-100	57.92(29.94)
2	0-100	89.22(18.97)	0-100	90.00(19.10)	0-100	77.50(34.85)
3	0-100	67.39(20.00)	0-100	70.47(26.39	0-100	59.03(29.26)

Note. Range is the spread of lowest to highest of the raw scores, Mean % is the average score for the quiz within that group of students.

Overall, significant differences across groups were found on summative assessments [F (12, 578) = 4.340, $p < .001$; Wilk's $\Lambda = 0.842$, partial $\eta^2 = .083$]. See Table 4 for MANOVA test statistics indicating significant differences across treatment groups for each of the three case studies. Post-hoc analyses revealed further significant differences in scores on all three summative assessments. Specifically, the collaborative case study intervention resulted in significantly *lower* quiz scores than lecture alone. Furthermore, when students examined case studies independently, they scored significantly *better* than when students examined case studies collaboratively. However, there were no significant differences in summative assessment scores between the lecture and independent case study groups.

Table 4

One-way MANOVA Comparing Summative Assessment Scores across Groups

Case Study	df	*F*	*p*	$\eta 2$
1	2	17.92	.00	.43
2	2	7.43	.00	.32
3	2	5.17	.01	.22

Discussion and Conclusions

Although research on how to conduct and assess case-study instruction is a step in the right direction, there are many unanswered questions about improving the process. For example, we feel it is important to replicate these conditions in collaboration with other teacher educators. Merseth (1991) suggested that novice teacher educators should observe more experienced instructors who teach the same case studies; this is similar to the lesson study approach popular in Japan (Fernandez & Yoshida, 2012). This model includes teachers rotating classes and observing each other using a method and providing feedback until it is perfected. In terms of instructional design, formative assessments requiring writing could provide evidence of what has been learned in a different way than was captured in this study through multiple choice items (Levin, 1995). Thus, future research should incorporate these features.

Overall, the lecture-only condition was just as effective as assigning the case studies as independent work in terms of summative assessment outcomes. Using case studies did not automatically accomplish "situated cognition" as outlined in Brown et al.'s (1989) theory of cognitive apprenticeship. Case studies were implemented in the units on Piaget's stages of cognitive development, Vygotsky's sociocultural theory, and behaviorism. Of these three topics, students demonstrated the greatest mastery of Vygotsky across all three treatment conditions.

Given the nature of the content, it is possible that students exchanged misinformation during collaborative case study activities (Lundeberg et al., 2007). Likewise, it is possible that the collaborative condition made students less accountable for learning independently. This could explain why the collaborative group resulted in the lowest quiz scores across all three case studies. Additionally, it is possible that more guidance is needed for case-based learning within this course (e.g., coaching, feedback, scaffolds). Furthermore, variations in performance may be

associated with major/discipline. Prior experience may be related to performance, as only some participants had taken introduction to psychology previously.

Scholarly Significance

Many of the students in similar educational psychology classes may go on to serve students in public schools; others may be civil servants or practitioners in the private sector. Overall, we aim to improve the instruction provided for our future practitioners and teachers. In the past, using case studies has been identified as a pedagogy worth innovating. In particular, we chose to situate the problem using case studies and found that this was not always an effective instructional approach. The key mechanism promoting effective learning may be more related to the requirement of formative assessments completed independently. Future researchers and instructors should consider these findings to avoid simply allowing students to complete formative assessments collaboratively in class.

Almost universally, case studies are included in educational psychology texts (Sudzina, 1997); however, how to use them or deploy them in class should be addressed in these materials. Recent research shows that knowledge sharing in class can be affected by environmental factors, including extrinsic motivation (Sriratanaviriyakul & El-Den, 2019). Furthermore, information sharing during collaborative case study sessions may need to be taught explicitly compared to the independent analysis of a case study (Liu & Chen, 2019; Sriratanaviriyakul & El-Den, 2016). It is possible that formative assessments completed independently provides accountability and extrinsic motivation to share in class (Fisher & Frey, 2015). The current findings point to the effectiveness of case studies as a tool to be accompanied by such extrinsic motivators as formative assessments.

Limitations and Future Directions

We would like to acknowledge the limitations of this study and suggest changes for future research. Although collaborative case studies were not effective in this sample, it is difficult to generalize the findings to the greater population. Further replication should be conducted. Additionally, we also suggest that future researchers include pretests to gauge the relationship of prior knowledge to performance, as well as control for students who have completed introductory psychology curriculum. Furthermore, the case studies could be implemented with in-class writing prompts in addition to discussions, as opposed to multiple-choice questions. Guidelines for discussing and writing about cases could be developed by co-teachers in the future (Engle & Faux, 2006). Lastly, the use of random assignment would provide a counterfactual that could help the interpretation of our future results.

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