

January 2019

Mixed Methods Research to Improve Course Design for Preservice Teachers

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Recommended Citation

White, Elizabeth S. and Miller, Kyle E. (2019) "Mixed Methods Research to Improve Course Design for Preservice Teachers," *International Journal for the Scholarship of Teaching and Learning*: Vol. 13: No. 1, Article 13.
Available at: <https://doi.org/10.20429/ijstl.2019.130113>

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Abstract

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Keywords

mixed methods research, democratic principles, preservice teachers, teacher education coursework, interdisciplinary collaboration

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Mixed Methods Research to Improve Course Design for Preservice Teachers

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Received: 15 September 2017; Accepted: 30 July 2018

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INTRODUCTION

There are few studies that document the experiences and perspectives of preservice teachers enrolled in required psychology-based courses (Lin, Chiu, & Lai, 2014). However, in a foundational course, preservice teachers need to learn the content deeply and flexibly in order to become effective teachers (Darling-Hammond, 1998). Preservice teachers bring implicit theories about how children learn and develop, which will inform their teaching practices and relationships with students (Jones, Bryant, Snyder, & Malone, 2012; Pajares, 1992). Therefore, the role of any instructor is to activate that previous knowledge and help students examine, deconstruct, and revise those theories based on research and evidence-based practice (Zull, 2002). While little is known about Child Development courses, much is known about effective instruction in higher education, as effective teachers are extremely knowledgeable in the content area and provide timely feedback to students (Bain, 2004). The purpose of this mixed methods study was to examine student learning and outcomes associated with a Child Development in Education course required for all PK-12 education majors and to use those findings to inform course improvement efforts. We were particularly interested in students' perceptions of learning and course relevance to future coursework, their satisfaction with course content, delivery methods, assessments, and pre- and post-content knowledge.

THEORETICAL FRAMEWORK

Principles of Democratic Classrooms and Continuous Quality Improvement served as philosophical frames for this study. A main goal of this investigation was to allow students to express their perspectives and interests without consequences, making it a democratic endeavor (Dewey, 1966). Dewey believed that meaningful education comes from the sharing of responsibilities on the part of each person in regard to shaping the aims, policies and activities of the social group to which you belong (Dewey, 1961, 1938). Historically, at our university, tenured and tenure-track faculty members exclusively determined the content and direction of a foundational Child Development course. The design of this study was based upon the desire to elicit student perspectives to modify curricular and instructional components of the course, rather than relying upon faculty assumptions or

interests. As researchers and instructors, we desired to shift some of the power and decision-making to students; helping to facilitate a more democratic educational climate (Ültanir, 2012; Gutmann, 1999). The design created an opportunity to model the democratic process for students, as well as use student data to respond to the needs of our community of students.

This study was also inspired by a desire to improve the academic quality of coursework and student satisfaction through features of the Continuous Quality Improvement (CQI) philosophy. CQI is an approach built upon the documentation and systematic improvement of academic program quality (Harper & Lattuca 2010). Beginning in the 1990s, CQI was embraced by higher education to address the growing critique that universities were neglecting to respond to the changing needs of students (Lattuca & Stark, 2009), and continues to serve as an organizational tool for planning and program review (Middle States Commission on Higher Education, 2002). This perspective suggests that effective curriculum practice can result from defining objectives, measuring outcomes, and then using those findings to improve the delivery process (Briggs, Stark, & Rowland-Poplowski, 2003; Lattuca & Stark, 2009). The work is ongoing and should include professional development, collaborative decision making, and responsive leadership. For this study, CQI served as a philosophical framework to improve the teaching and learning process in a required course for undergraduate students based on student data.

Student Learning & Satisfaction

In the current study, we examined student learning over time because retention of concepts may reveal insights into the effectiveness of course processes. Because the Child Development in Education course is a foundational course with curricular content that students are expected to retain for future coursework and for professional practice, student learning (or lack thereof) is particularly relevant to course improvement efforts. Further, we examined both perceived learning and actual learning, as prior research has shown that these two constructs do not always align. For example, Adesoji, Omilani, & Dada (2017) examined learning related to chemistry concepts, comparing student perceptions of difficulty to actual learning difficulty experienced in a sample of Nigerian high school students. Results of chi-square

analysis revealed that students actually experienced significantly more difficulty with concepts than self-reported. This misalignment and overestimation of one's ability or knowledge has also been found in college aged populations in regard to performance of computer skills (Grant, Malloy, & Murphy, 2009) and knowledge of biology concepts (Ziegler & Montplaisir, 2014). Thus, examining both perceived and actual learning is important to fully understand students' course experience.

We also examined students' course satisfaction ratings at the end of the semester including perceptions of course relevance to future coursework and profession, satisfaction with course assignments, and alignment between objectives and class activities. Course satisfaction among college students is important, as it is associated with perceptions of faculty knowledge (Elliott & Shin, 2002; Paechter, Maier, & Macher, 2010), and the quality of instruction received (Lee, 2014; Lee, Srinivasan, Trail, Lewis, & Lopez, 2011; Elliott, 2002; Tessema, Ready, & Yu, 2012). Thus, students' course satisfaction ratings have implications for students' course experiences and the need for possible modifications to the course.

The Child Development in Education Course

The Child Development in Education Course is required for all education majors, and it is a prerequisite for all methods and clinical courses. The course provides an opportunity for students to build a foundational knowledge of the various aspects of child development that are essential for all future teachers and education professionals. A myriad of topics are addressed including physical development (e.g., fine and gross motor skills, health, brain development), cognitive learning theories (e.g., Behaviorism, Piaget's Cognitive Developmental Theory, Vygotsky's Sociocultural Theory, Information Processing), and social and emotional development (e.g., attachment theory, personality, temperament, friendships, prosocial behavior). The course also addresses broader contextual factors such as family structure and processes, the media, and risk and resilience. The assigned textbook for the course, Bergin and Bergin's (2015) "Child and Adolescent Development in Your Classroom," is organized thematically and includes detailed classroom implications for all topics discussed. The knowledge developed in this course is relevant to teaching strategies, curriculum implementation, assessment practices, student engagement, motivation, and classroom management.

One of the primary goals of the course is for students to critically examine theories of cognitive, social, and emotional development and then use observations in school settings to link these theories to actual classroom practice. To meet this goal, students complete 9 hours of PK-12 classroom observations at the University Laboratory Schools during the semester and then write two papers connecting these observations to concepts and principles of development discussed in class. The first paper, "Clinical I Paper," is due mid-semester and addresses physical development and cognitive theories including Behaviorism, Piaget's Cognitive Developmental Theory, Vygotsky's Sociocultural Theory, and Information Processing. The second paper, "Clinical II Paper" is due at the end of the semester and addresses concepts related to social and emotional development, motivation, classroom management, and classroom setup. Students also complete a social issues project (usually creation of a website) to

provide information about a pertinent social issue (e.g., depression, bullying, body image, etc.) that affects school age students. These topics are self-chosen and students may work in groups or independently. Students present their work to peers at the end of the semester.

The course lays the foundation for all future education courses at the University so effective course design and teaching practices are essential. Additionally, knowledge of theory and of links between theory and practice are assessed by Illinois' Teacher Performance Assessment (edTPA) which is required for teacher licensure. Despite the importance of the course, issues persist regarding instructor retention and quality, as many are non-tenure-track faculty, teach the course intermittently, and have limited child development training. Further, because the course is required for all education majors, each class includes a wide range of academic majors including elementary education, music education, special education, business education, physical education, and social sciences. Thus, students bring diverse educational interests and backgrounds to the course, and we were unsure if students from all majors felt they were being effectively prepared for their chosen field of study. The Master Syllabus for the course is guided by the belief that learning is an active process (Fink, 2003; Zull, 2002) that requires a variety of learning activities and opportunities to apply knowledge (Hattie, 2011). However, how these activities and assignments are implemented by instructors and received by students remains unclear.

THE CURRENT STUDY

The purpose of this study was to understand student perceptions and learning outcomes of a Child Development in Education course. We were particularly interested in students' pre- and post-content knowledge, perceptions of learning, beliefs about course relevance, and satisfaction with course content, delivery methods, and assessments. We also aimed to explore whether or not perceived learning and course satisfaction differed by student major. The following research questions guided this study:

1. Does students' course content knowledge change from pretest to posttest?
 - a. Do students show gains in perceived knowledge?
 - b. Do students show gains in actual knowledge?
2. Does perceived learning and course satisfaction at the end of the semester differ by student major?
3. How do students describe their experiences with the course?

In the current study, an embedded correlational mixed methods design was used in which quantitative data were the primary data source while qualitative data served a secondary role (Creswell & Plano Clark, 2007). Inherent in this design is the notion that "different questions need to be answered, and that each type of question requires different types of data" (Creswell & Plano Clark, 2007, p. 67). The current study aimed to examine broader trends regarding students' perceived knowledge, actual knowledge, and satisfaction with course materials, processes, and assessments (quantitative data) as well as more specific detailed information regarding students' learning experiences and suggestions for course improvement (qualitative data). The value of

this approach is the ability to examine broader trends in relation to student performance and satisfaction while also developing a more in-depth understanding of students' experiences with the course (Mistry, White, Chow, Griffin, & Nenadal, 2016).

METHOD

Participants

Data were collected at a large public university located in the Midwestern United States (IRB Protocol Number: 2015-0271; Project ID: 949287). All students enrolled in the Child Development in Education course in Fall 2015 were recruited for participation. Participants ($N = 167$) ranged in age from 18 to 50 ($M = 19.83$; $SD = 3.07$). The sample was 84.4% ($n = 141$) female, and 14.4% ($n = 24$) were transfer students. Most participants were sophomores ($n = 138$, 82.6%), and almost all reported that the course was required for their major ($n = 163$, 97.6%). The sample was majority White ($n = 143$, 86%). Students were diverse with respect to academic major: special education ($n = 75$, 44.9%); general education ($n = 52$, 31.1%); music education ($n = 19$, 11.4%); social sciences ($n = 8$, 4.8%), and other education ($n = 11$, 6.6%). See Table 1 for a full description of the participant sample.

Procedure

A member of the research team visited each section of the Child Development course at the beginning of the Fall 2015 semester. Specifically, there were seven instructors across nine sections of the course. Five sections were taught by three tenure-line faculty while the four remaining sections were taught by adjunct faculty. Student enrollment in each section ranged from 19 to 27 while class start times ranged between 9:35 a.m. and 4:30 p.m. When visiting each class, the researcher provided a summary of the study, distributed and collected consent forms, and administered the pretest. The final question on the consent form asked students to indicate their willingness to participate in a semi-structured interview about their experiences with the course. Students were contacted via email to schedule an interview with a member of the research team. Ultimately, five students responded and agreed to participate from the course sections of four different instructors (see Table 4). Semi-structured interviews took place after the mid-semester point (October- November) in order to allow students adequate time to become acquainted with the course content, learning activities, and assignments. Interviews were conducted in a private office and were audio-recorded. The posttest assessment was administered at the end of the fall semester in person by one of the research team members.

MEASURES

Perceived knowledge. Students responded to 17 items assessing perceptions of course content knowledge on the pretest and posttest. First, students rated their familiarity with 12 topics (e.g., risk and resiliency, Sociocultural theory, etc.) addressed in the course on a scale from 1 (*never heard of it*) to 5 (*strong understanding*). Next, students rated their ability to apply five theories (e.g., Behaviorism, Piaget's Theory, etc.) to real world settings on a scale from 1 (*very poor*) to 5 (*excellent*).

Actual knowledge. Students responded to four questions assessing course content knowledge on the pretest and posttest. The first item was a multiple choice item assessing knowledge of Bronfenbrenner's Bioecological Model and environmental sys-

	n	%	Range	Mean	SD
Student gender					
Female	141	84.40	--	--	--
Male	24	14.40	--	--	--
Student age	167	--	18-50	19.83	3.07
Student race and ethnicity					
African American	2	1.20	--	--	--
Asian	3	1.80	--	--	--
Latino/a	10	5.99	--	--	--
Multicultural	7	4.19	--	--	--
White	143	85.63	--	--	--
Year in School					
Freshman	1	0.60	--	--	--
Sophomore	138	82.60	--	--	--
Junior	18	10.80	--	--	--
Senior	8	4.80	--	--	--
Other	1	0.60	--	--	--
Student major					
General education	52	31.10	--	--	--
Special education	75	44.90	--	--	--
Music education	19	11.40	--	--	--
Social sciences	8	4.80	--	--	--
Other education	11	6.90	--	--	--
Course required for major					
Yes	163	97.60	--	--	--
No	2	1.20	--	--	--
Transfer student					
Yes	24	14.40	--	--	--
No	142	85.00	--	--	--

Note: The n's for individual variables vary due to some missing data

tems theory. Students were given the following prompt: "This theorist believed that children's development is influenced by a number of intersecting influences within and across various systems (i.e., family, community, media, government, etc.)." Students were then asked to identify the theorist from four response options. The question was marked as "correct" if they chose Urie Bronfenbrenner and "incorrect" if they chose another response option.

The second item was a multiple choice item in which operant conditioning was described: "Your teacher praises you each time you participate in class. As a result, you continue to partic-

ipate during class discussions. This is an example of...” Students were given four response options; the question was marked “correct” if they chose operant conditioning and “incorrect” if they chose another response option.

Third, students were asked to provide an example of scaffolding. Student responses that included descriptions of assistance from a more-competent other, hints or questions to guide learning, breaking down a task into manageable steps, or instructional supports to foster understanding/ability were marked as “correct.” The first and second author evaluated student responses together; disagreement was resolved by consensus.

Fourth, students were asked to explain why early childhood is a critical time for brain development. Student responses that included descriptions of increased brain plasticity, neural connections, synaptic pruning, and rapid rates of brain growth during early childhood were marked as “correct.” Again, the first and second author evaluated student responses together, and disagreement was resolved by consensus.

Course satisfaction. Students completed nine items assessing course satisfaction; these items were only given on the posttest. First, students rated the importance of six course components to their learning. Specifically, they rated materials (the textbook), course processes (lectures, classroom observations), and assignments (Clinical I paper, Clinical II paper, Social issues project) on a scale from 1 (*not at all important*) to 5 (*very important*). Next, students rated course relevance to their future coursework and to their future profession on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Finally, students rated the degree to which learning activities aligned with course objectives on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

Academic major. Students self-reported academic major (see Table 1). Because of the variety of responses across students, these majors were collapsed thematically for analysis purposes. Students who reported early childhood education, elementary education, middle grades, or bilingual elementary education were labeled as general education majors. Students who reported special education, deaf/ hard of hearing education were labeled special education majors. Students who reported music education, choral music education, or theatre studies were labeled music education majors. Students who reported communication sciences and disorders, speech pathology, or psychology were categorized as social science majors. Finally, students who reported business teacher education, Spanish education, or physical education were labeled as other education majors.

Demographics. Demographic information was collected on the pretest (see Table 1). Students self-reported age in years and indicated year in school by circling “freshman,” “sophomore,” “junior,” or “senior.” They indicated gender by circling “male” or “female.” Students reported if the course was required for their major and if they were a transfer student by circling “yes” or “no.” Finally, students self-reported their own race/ethnicity. Students who reported White or Caucasian were labeled White. Students who reported African American were labeled African American. Students who reported Asian or Asian American were labeled Asian. Students who reported Hispanic or Latino/a were labeled Latino/a. Students who reported multiple pan-ethnic categories (e.g., “Black + white,” “White/Asian/Hispanic”) were labeled multiracial.

Semi-structured interview. A subsample ($n = 5$) participated in semi-structured interviews. Interview participants were

asked numerous open-ended questions regarding meaningfulness of assignments, reflections on learning activities and experiences, and recommendations for course improvement. The semi-structured nature of the interview supported the democratic vision of the study by asking some scripted questions, but also encouraging participants to speak freely about their experiences and aspects of the course. Students were asked to describe what they enjoyed most about the course and aspects that were meaningful to their learning as well as what they enjoyed least about the course and aspects that had not met their expectations. Students were also asked to describe which assignments had contributed the most and the least to their learning, why they felt this way, and recommended modifications to better promote learning. They were also specifically asked to describe their experiences regarding the 9 required observation hours at the University laboratory schools, noting both strengths and weaknesses of the task and recommendations to improve it. Students were asked how they anticipated using the knowledge/content from the course for future classes or fieldwork and what content they believed was needed but not currently included. The interview concluded by asking students for any final recommended modifications to strengthen the course (see Appendix for Interview Script). Along with the scripted questions, interviewers employed follow-up probes to elicit more comprehensive responses or clarify participants’ comments during the interview (Berg, 1998).

ANALYSIS

Quantitative analysis. All survey data were entered into SPSS v. 24. To examine students’ perceived learning, we used paired samples t-tests to compare perceptions of course content knowledge at the beginning of the semester (pretest) and perceptions of knowledge at the end of the semester (posttest). Paired samples t-tests were also used to compare self-reported ability to apply theory to practice from pretest to posttest. To determine actual learning, the four content test questions were marked as correct or incorrect for pretest and posttest. We used McNemar’s test, which is appropriate for examining consistency in dichotomous outcomes for paired samples, to compare the proportion of correct answers from pretest to posttest. Finally, we used a one-way Analysis of Variance (ANOVA) followed by Games-Howell post hoc comparisons to determine if course learning and satisfaction differed by student major. The Games-Howell test is preferred for pairwise comparisons with unequal sample sizes (Shingala & Rajyaguru, 2015).

Qualitative analysis. The qualitative analysis of the interview data followed an iterative process described by Boyatzis (1998). The process involves elements of open, axial and selective coding, as well as the constant comparative method (Corbin & Strauss, 2015). Raw data consisted of audio recordings of the interviews that were then transcribed verbatim for further analysis. We then reviewed each transcript and created outlines of the transcripts (open codes) that were compared and discussed in an analysis meeting between the two lead researchers. The outlines served as a pre-emptive step to creating preliminary codes. We then organized the preliminary codes into hierarchical categories that were defined in a working codebook. The codebook was independently applied to each full transcript by one of the lead researchers and a graduate assistant. The two coders then brought the coded transcripts together and discussed any discrepancies. NVivo was used to organize and code the transcripts

for further interrogation (QSR International, 2010). The coded excerpts within each node were further explored for patterns and any negative case examples. This allowed for the selective coding process and identification of the three main themes, as well as subthemes.

RESULTS

RQ1a. Do students show gains in perceived knowledge from pretest to posttest?

Results from paired samples t-tests showed that students rated themselves as significantly more familiar with almost all course topics at the end of the semester when compared to ratings at the beginning of the semester (see Table 2). Similarly, students' self-reported ability to apply theory to practice also showed statistically significant gains over time for all topics (see Table 3).

RQ1b. Do students show gains in actual knowledge?

Students responded to four questions assessing course content knowledge. Results from McNemar's test comparing the proportion of correct answers from pretest to posttest were mixed. There was no significant difference observed for the proportion of correct answers given by students on the multiple choice question assessing knowledge of Bronfenbrenner's Bioecological Model (pretest: $n = 26$, 18.8%; posttest: $n = 34$, 25.5%). Similarly, there was no significant difference in the number of correct responses explaining why early childhood is a sensitive period for brain development (pretest: $n = 58$, 50.5%; posttest: $n = 70$, 41.4%). There was a significant change over time ($p = .03$) in students' ability to answer the multiple choice question assessing knowledge of Behaviorism correctly with more students providing correct responses on the pretest ($n = 72$, 55.8%) than

the posttest ($n = 58$, 45.0%). However, for the open-ended test question asking students to give an example of scaffolding, there was a significant change over time ($p < .001$) with more correct responses on the posttest ($n = 73$, 52.1%) than on the pretest ($n = 47$, 33.6%). In summary, there was a greater proportion of correct answers over time on the question assessing knowledge of scaffolding, but questions assessing knowledge of Bronfenbrenner's model, Behaviorism, and Brain Development did not show learning gains among students.

RQ2. Does perceived learning and course satisfaction differ by student major?

Perceived learning. Results from one-way ANOVAs showed that there were no significant differences in perceived knowledge based on student major for any of the topics addressed: Obesity, $F(4, 138) = 1.85$, $p = .122$; Risk and Resiliency, $F(4, 139) = 1.12$, $p = .350$; Brain Development, $F(4, 139) = 1.21$, $p = .310$; Behaviorism, $F(4, 139) = .99$, $p = .414$; Piaget's Theory, $F(4, 139) = .23$, $p = .923$; Sociocultural Theory, $F(4, 139) = 1.06$, $p = .379$; Information Processing, $F(4, 139) = .53$, $p = .714$; Bioecological Model, $F(4, 138) = 1.51$, $p = .202$; Attachment Theory, $F(4, 139) = 2.37$, $p = .055$; Emotional Development, $F(4, 139) = .93$, $p = .448$; Theory of Mind, $F(4, 139) = .65$, $p = .626$; Identity Development, $F(4, 139) = .36$, $p = .835$. Similarly, results from one-way ANOVAs indicated no significant differences in ability to apply theory to real world settings based on student major for the following topics: Behaviorism, $F(4, 139) = .84$, $p = .501$; Piaget, $F(4, 139) = .92$, $p = .451$; Sociocultural Theory, $F(4, 139) = .78$, $p = .540$; Information Processing, $F(4, 139) = .43$, $p = .785$; and Bioecological Model, $F(4, 139) = .03$, $p = .998$.

Course satisfaction. Results from one-way ANOVAs examining student course satisfaction showed some significant differences in ratings based on student major. First we present findings for the six items asking students to rate the importance

of course materials, processes, and assignments to their learning. Analysis of variance indicated that student ratings of the importance of the textbook differed significantly by student major, $F(4, 139) = 2.78$, $p = .029$, $\eta^2 = .07$. Games-Howell post hoc comparisons showed that social science majors rated the textbook as significantly less important to their learning ($M = 2.71$, $SD = .76$, $p = .020$) when compared with "other" education majors ($M = 4.09$, $SD = .83$). The other comparisons were not significant.

Analysis of variance also indicated that student ratings of the importance of the Clinical I, $F(4, 139) = 4.56$, $p = .002$, $\eta^2 = .12$, and the Clinical II papers, $F(4, 137) = 6.87$, $p < .001$, $\eta^2 = .17$, differed significantly by student major. Games-Howell post hoc comparisons showed that music education majors rated the Clinical I paper as significantly less important to their learning ($M = 3.22$, $SD = 1.31$, $p = .039$) when compared with special education majors ($M = 4.23$, $SD = .80$). Similarly, music education majors rated the Clinical II paper as significantly less important to their learning ($M = 3.11$, $SD = 1.23$, $p = .007$) when compared with special education majors ($M = 4.30$, $SD = .75$). No other

Table 2. Results of t-tests Comparing Students' Self-Reported Content Knowledge from Pretest to Posttest

	Pretest		Posttest		t-test	df	Cohen's d
	M	SD	M	SD			
Obesity	3.88	0.89	3.99	0.83	-1.470	138	-0.12
Risk & Resiliency	3.07	1.01	3.98	0.91	-9.751***	138	-0.83
Brain Development	3.40	0.76	4.07	0.76	-7.948***	139	-0.67
Behaviorism	3.46	0.97	4.36	0.67	-9.544***	139	-0.81
Piaget's Theory	3.24	1.17	4.38	0.66	-10.578***	139	-0.89
Sociocultural Theory	2.71	1.19	4.14	0.80	-13.551***	138	-1.15
Information Processing	2.88	1.08	4.17	0.75	-12.597***	139	-1.06
Bioecological Model	2.06	1.13	3.64	1.03	-13.982***	138	-1.19
Attachment Theory	2.95	1.16	4.41	0.74	-14.135***	139	-1.19
Emotional Development	3.24	0.96	4.32	0.70	-11.811***	138	-1.00
Theory of Mind	2.29	1.01	3.92	0.91	-16.449***	139	-1.39
Identity Development	2.66	1.06	3.79	0.87	-11.148***	139	-0.94

Notes. * $p < .05$, ** $p < .01$, *** $p < .001$

Scale was 1 (never heard of it) to 5 (strong understanding)

Table 3. Results of *t*-tests Comparing Students' Ability to Apply Theory to Practice from Pretest to Posttest

	Pretest		Posttest		t-test	df	Cohen's <i>d</i>
	M	SD	M	SD			
Behaviorism	3.50	0.99	4.17	0.79	-7.68***	139	-0.65
Piaget's Theory	3.15	1.08	4.09	0.80	-9.08***	139	-0.77
Sociocultural Theory	2.83	1.21	3.94	0.85	-10.00***	139	-0.84
Information Processing	2.84	1.10	3.91	0.80	-9.72***	139	-0.82
Bioecological Model	2.28	1.08	3.54	1.01	-10.86***	139	-0.93

Notes. * $p < .05$, ** $p < .01$, *** $p < .001$
Scale was 1 (very poor) to 5 (excellent)

statistically significant differences between majors on ratings of the Clinical I or Clinical II papers were observed.

Student ratings of the importance of lectures, K-12 classroom observations, and the social issues project did not differ significantly by student major: $F(4, 139) = .95, p = .436$; $F(4, 139) = 2.26, p = .065$; $F(4, 131) = 1.86, p = .121$, respectively.

Next, we present findings regarding the three items assessing course relevance and alignment between course activities and objectives. Each of these items violated assumptions of normality, as kurtosis values exceeded the acceptable range of -2 to +2 (George & Mallery, 2010). Further, visual inspection of the distribution indicated a strong negative skew. To address these issues, as recommended by Tabachnik and Fidell (2007), we reflected the variable and performed a log transformation (base-10) for each item. After transformation, measures of skewness and kurtosis were within the acceptable range. ANOVAs were performed on the transformed variables. A one-way analysis of variance showed that ratings of course relevance to future coursework differed significantly by student major, $F(4, 139) = 3.81, p = .006, \eta^2 = .08$. However, Games-Howell post hoc comparisons did not indicate significant differences between groups.

A one-way analysis of variance also showed that ratings of course relevance to one's future profession also differed by student major, $F(4, 139) = 5.69, p < .001, \eta^2 = .12$. Games-Howell post hoc comparisons indicated that music education majors rated the course as significantly less relevant to their future profession ($M = 4.00, SD = .84$) when compared with special education ($M = 4.70, SD = .68, p = .008$) and general education majors ($M = 4.71, SD = .60, p = .009$). The other comparisons for ratings of relevance to future profession were not significant.

Table 4. Description of Interview Sample ($n = 5$)

Name	Major	Year in school	Age	Race / ethnicity
Naomi	Bilingual Elementary Education	Sophomore	19	Multiracial ("Black + white")
Jennifer	Elementary Education	Sophomore	19	white
Abby	Special Education	Sophomore	19	white
Laura	Special Education	Junior	20	white
Celeste	Business Teacher Education	Secondary Bachelor's	50	white

Last, a one-way analysis of variance showed that ratings of alignment between learning activities and course objectives differed by student major, $F(4, 139) = 3.36, p = .012, \eta^2 = .09$. Games-Howell post hoc comparisons showed that music education majors rated significantly less alignment between learning activities and course objectives ($M = 3.83, SD = .99$) when compared with special education majors ($M = 4.53, SD = .79, p = .039$). The other comparisons of student ratings of alignment were not significant.

RQ3. How do students describe their experiences with the course?

The thematic coding process led to the identification of the three most dominant themes discussed across participant interviews. First, participants named the course's main assignment involving *experiential learning* as the most meaningful aspect of the course. Second, participants described the *professional relevance* of the course to their future careers. Third, participants reflected on the importance of *effective pedagogy* in delivering the content of the course. Each theme is presented below with quotations as pieces of evidence. A description of interview participants can be found in Table 4. All names are pseudonyms.

Experiential learning. The most robust theme of 'experiential learning' captured the importance of one of the main course requirements – clinical observation hours. Participants identified the nine observation hours in local schools, and the corresponding report, as the most valuable aspects of the course. Participants believed the authentic classroom environment allowed them to apply content from the course to a real-world setting at a deeper level than would have been achieved through class discussions or videos. For example, Abby, a special education major said, "I liked going to [school name] and then writing the paper. Because it's really about what we learned in the book; seeing it in play." Several participants offered similar responses describing the powerful impact of being part of a 'live classroom' and transferring textbook theories to teacher-student and student-student interactions.

Additionally, participants named the clinical report as an effective assessment and meaningful learning exercise. They believed the process helped them gain a deeper understanding of the theories and concepts of the course. For example, Laura, a special education major, commented, "I actually really liked writing the first clinical observation paper... I just liked being able to connect the theories to what I actually saw in the classroom." Similarly, Naomi, a bilingual elementary education major shared:

It's easy to do the reading and everything for that week, then go to class, and then like not think about it again. But once we're going back and doing our paper with our observations and stuff, then we do revisit all the theories and apply them.

Since the assignment spanned the full semester, students recognized the benefits of reviewing concepts and applying them under different circumstances.

Professional relevance. Participants also spoke to the usefulness of the course content in the theme of 'professional relevance'. A preliminary theme of 'relevance' emerged early in the analysis as an *in vivo* code drawn directly from the first

interview, which was then reinforced by each subsequent interview. Interestingly, the course was both praised and critiqued in regard to its professional relevance. All participants recognized a connection between the content of the course and their future career, which increased their satisfaction with the course. Naomi explained:

I never took a psych class before so all of this stuff is pretty new to me and very relevant obviously for teaching. So I think that's also cool because it directly connects to what we're going to be doing.

Similarly, Jennifer, an elementary education major, reported, "This is honestly my favorite class because it's my first major specific class. So, I finally get a taste of what the rest of my career will be like."

However, there was also a recognition that the course was most relevant to early and elementary education majors with much of the focus on middle childhood and "typical" development. For example, Celeste, a business teacher education major, began by acknowledging the benefits of the course, but also offered a critique:

My license is going to be K-12, but I intend to teach at the high school level. The kids that I'm going to work with are different than the elementary people...It is about the relevance to my future career.

Abby, who was pursuing a special education degree, suggested expanding information on atypical development, which is not thoroughly covered in the textbook. She said:

It may be kind of hard to do this, but like all special education majors need to take this. There's some Autism in the book, but you kind of have to like apply it to special education in your own way. Maybe for some students, it would be beneficial if special education was kind of correlated.

She later commented that her instructor does ask students to apply the information to their specialized area during discussions, which helps.

Effective pedagogy. While participants were prompted to reflect on the content and topics of the course, the focus of most interviews gravitated toward the pedagogical strategies of the course instructors. They had much more to say about *how* the class was taught than *what* was taught. When reflecting on the course, the class format appeared to make the difference, rather than the theories that were covered. For most participants, instructors who incorporated more discussion-based activities were praised, while instructors who were more lecture based, relying on power point slides that covered assigned readings, were viewed less favorably. Abby noted:

It helps that it's more of a discussion based class, so the teacher doesn't just stand up there and lecture. And you get other people's point of views, and you get to listen to other people's ideas...Then I have multiple ideas to use when I get in the field of teaching.

Conversely, Jennifer reported a negative experience with her instructor's pedagogical approach:

I feel like a majority of our class in class time is just our teacher kind of reading off the PowerPoint which is basically just from the book. I feel like kind of sitting in class is—I don't wanna say pointless, but it's repetition of material that I already kind of taught myself.

However, Celeste, a non-traditional student, ultimately preferred less collaborative discussions. Although she acknowledged the importance of "turn and talks" or small group discussions, she desired more lecture time. She also suggested that the generation gap between her and other students might contribute to this preference. The other participants emphasized the positive impact of discussion-based learning.

DISCUSSION

The purpose of this mixed methods study was to understand student perceptions and outcomes of a Child Development course required for all education majors. Democratically involving students in the examination of the course helped us to reflect on the aims and activities of this course; and ultimately, making the course more meaningful for students (Dewey, 1961). We were particularly interested in students' perceptions of learning and course relevance to future coursework and their satisfaction with course content, delivery methods, and assessments. We also evaluated the pre- and post-course content knowledge of students enrolled in the course. Results showed that students rated themselves as significantly more familiar with almost all course topics at the end of the semester when compared to ratings at the beginning of the semester though responses to course content questions did not consistently show learning gains. Further, student reports of course satisfaction differed significantly by major with music education majors reporting lower levels of course relevance and assignment relevance when compared with special education and general education majors. In qualitative findings, students reported an appreciation for experiences that helped them make clear links between theory and practice. Students also noted specific teaching strategies such as opportunities for peer discussion that made an impact on their learning and satisfaction with the course. However, interviews also revealed variability in instructional methods across instructors as some used constructivist methods while others "just read off the Power Points." Major study findings are discussed below in relation to course and program modifications.

Perceived Knowledge & Actual Knowledge

One of the most interesting findings from the current study was the discrepancy in students' self-reported ratings of course content knowledge compared to their actual knowledge over time, assessed through content questions. While comparisons between pretest and posttest ratings showed that students believed they were more familiar with almost all course topics and better able to apply theory to practice over time, their responses to content questions did not show similar learning gains. This misalignment and overestimation of one's ability or knowledge has also been found in college aged populations in regard to performance of computer skills (Grant, et al., 2009) and knowledge of biology concepts (Ziegler & Montplaisir, 2014), and in high school age populations in regard to chemistry concepts (Adesoji et al., 2017). These findings are problematic because they indicate limited retention of skills and concepts. Further, because students believe (as indicated by self-report) that they understand concepts, they are potentially less likely to hone their knowledge or skills related to child development and learning theories for future courses or teacher licensure requirements.

These findings suggest that students would benefit from ongoing review during the semester to support retention of

information, particularly given the foundational nature of the course. Cumulative quizzes, matrices to organize and compare theories, and regular review of concepts during class meetings are currently being encouraged in the course to better support student learning over time. Further, results from semi-structured interviews revealed variability in instructor activities and course processes. Although the Master Syllabus is guided by the belief that learning is an active process (Fink, 2003; Zull, 2002) that requires a variety of learning activities and opportunities to apply knowledge (Hattie, 2011), our findings show that the degree to which these principles are implemented varies considerably by instructor. These differences in instructional practices are likely to affect student learning and retention and may at least partially explain the discrepancy between actual and perceived learning gains over time. Students reported that opportunities for peer discussion and activities that helped them link theory and practice were particularly meaningful to their learning. Thus, we are currently examining ways to support instructors in developing constructivist activities that help build on students' prior knowledge, engender critical thinking skills, and allow for peer collaboration so that multiple perspectives are examined and explored. In addition to course improvements, we have also recommended modifications at the program level to support retention of concepts. Specifically, we are working with faculty within our education programs to support a spiraling curriculum (Bruner, 1977), where learning theories are examined in multiple instructional contexts throughout students' methods and foundation courses to support a better and more nuanced understanding of these concepts over time.

Music Education Majors

Another interesting pattern that emerged from our data was in regards to course satisfaction of music education majors. Specifically, music education majors felt that the child development course was less relevant to their future profession when compared with special education or general education majors. Further, music education majors reported lower satisfaction with course assignments than special education majors. In order to address this issue, we are currently collaborating with the Music Department to increase course relevance to music education majors, particularly in terms of application of learning theories and principles of child development to band, choral, or orchestra instruction. For example, we have explored ways to incorporate research regarding the ways in which music affects emotional states and the role of music and sounds in memory processes into the course. Again, valuing the expressed needs and interests of students as part of the democratic process.

Further, we are exploring more ways to make the classroom observations and associated Clinical I and II papers which helps students link theory to classroom practice more relevant to music education majors by allowing or even encouraging more observations in band, choral, or orchestra classes. Discussion with faculty from the Music Department has also revealed the many demands on music education majors' time, as many are involved with multiple performance ensembles and may teach music lessons to children after school. Becoming aware of these time constraints has made us more understanding of the challenges music education majors may face in completing course requirements.

Similarly, in qualitative findings, a business teacher education major reported less professional relevance to her future teach-

ing in high school settings due to the focus in class on early childhood and elementary development, rather than adolescence. This finding also prompts us to consider the program requirements of other majors, such as business education and physical education, to determine how different program requirements might interfere or support the course satisfaction and success of students enrolled in the course. Overall, both quantitative and qualitative findings highlight the need for more cross-disciplinary connections and more attention to preservice teachers' future teaching contexts for courses that include education majors from diverse fields.

Research Design and Student Input

At a broader level, we also demonstrate the ways in which democratic processes and mixed methods research can be used to identify both course strengths and areas in need of improvement, and how we are using student perspectives and data, rather than just faculty input, to improve course and program design. To prepare preservice teachers to enter into and preserve democratic spaces in schools, the democratic process must be modeled and infused in teacher education programs. Although many programmatic decisions are made at the faculty level, this study relied upon student voices to better understand course processes and to drive course redesign and cross-disciplinary collaborations. The study design encouraged students to share their perspectives and actively participate in modifying a required course, thus infusing democratic principles within teacher education to better meet the needs of all students.

Limitations

Findings should be considered in light of limitations. This study spanned a 16-week semester, and therefore provides short-term data regarding the impact of the course. An attempt was made to collect follow-up data with a post-course survey; however, the response rate was too low to analyze responses and report findings. Longitudinal data could provide important insight on how to support course retention in future courses as part of the program design. Further, our analyses of actual knowledge is only based on four test questions. Future studies should include more questions to better assess student learning more comprehensively.

Although the student demographics represented in this study are typical of teacher education programs (Morrell, 2010), the geographic location of the university and structure of the teacher education program might limit the ability to generalize study findings. Demographic limitations are especially a concern for the subsample of participants who volunteered for the interview portion of the study. Unlike the pre and posttests, interviews were administered outside of class time, which we believe explains the low-level of interest. We recognize that the qualitative findings are based on the perspectives of five students. The qualitative portion is secondary to the quantitative results, but could be strengthened by recruiting a larger and more diverse subsample of students. Based on quantitative findings, designing a study with a purposive sampling procedure to include different majors (i.e., music education) could help explain different levels of satisfaction with the course and support the transferability of findings.

CONCLUSION

Few studies systematically study multiple sections of a course beyond individualized course evaluations to improve content and delivery. This mixed methods study allowed students to share their perspectives on a required course, in combination with pre and posttest data on course knowledge and satisfaction. Findings offer greater specificity in addressing concerns, such as the needs of specific majors and supporting effective pedagogy across all course instructors. This study also reiterates previous research (i.e., Adesoji et al., 2017; Grant et al., 2009) suggesting that students' perceived knowledge might not match actual knowledge of content material. Using this study as a template, programs can gather similar data to improve the quality of coursework for students and democratically involve students in the process.

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APPENDIX

Interview Script

Introduction:

Thank you for participating in this focus group about [course number]: Child Growth and Development. The information you share will help us refine and strengthen this course for future semesters. This session will be audio-recorded for research purposes, but we will not use your name or any identifiable information when presenting findings from this study. Questions will be asked to the whole group. If at any point you do not feel comfortable responding to a question, just say “pass.” We encourage you to speak openly about your experiences, and to respect the input of other focus group members. Although we cannot guarantee that what you say during this focus will be kept confidential by the whole group, we ask you not to share or repeat anything that is said during this session.

1. What have you enjoyed the most about [course number]?

a. Which aspects have been the most meaningful to your learning? How so?

2. What have you enjoyed the least about [course number]?

a. Which aspects have not met your expectations of the course? How so?

3. Which assignments do you believe contributed the most to your learning this semester? Why?

4. Which assignments do you believe contributed the least to your learning this semester? Why?

a. Can this assignment be modified to promote more learning? How so?

5. The clinical experience of 9 observation hours is the main requirement for this course. Please describe your experience with this requirement, as well as its strengths and weaknesses.

a. Do you have any suggestions for improving this component of the course?

6. How do you anticipate using knowledge/content from this course for future classes or fieldwork?

a. What content is not included that you believe is necessary for future classes or fieldwork?

Closing:

Thank you again for sharing your time with us. As we bring this focus group to a close, feel free to offer any final thoughts or opinions that may be of value to improving this course.