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# Preservice Teachers' Perceptions of Students with Learning Disabilities: Using Mixed Methods to Examine Effectiveness of Special Education Coursework

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## Abstract

As the number of K-12 students with learning disabilities educated in general education classrooms grow, it is essential to examine the preparation and perceptions of pre-service teachers (N=15) who will educate students with learning disabilities. Within the context of an undergraduate learning disabilities method course, this study examined how pre-service teachers perceived students with learning disabilities as well as the effectiveness of particular course experiences, including fieldwork with students with learning disabilities, video vignettes, lesson planning, assigned reading, and center-based instruction, in shifting perceptions. Using a convergent, mixed method design, teacher educators at a university in the northeast used surveys, journals, and focus groups to examine pre-service teachers' perceptions over time. Both quantitative and qualitative data indicate perceptions shifted positively in response to the methods course. Reflections and suggestions for other teacher educators are offered.

## Keywords

Teacher Education, Learning Disabilities, Perceptions, Pre-Service Teachers, Special Education



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Since learning disability (LD) is the largest federal disability category (IDEA, 2004), it is highly likely that pre-service teachers (PSTs) will encounter students with LDs when they enter the profession. If teachers' perceptions towards students with LDs directly impact students' outcomes (Good & Brophy, 2007; Woodcock, 2010), it is essential for PSTs to examine their perceptions of students with LDs prior to their work in the field. Teacher education programs can serve as a dynamic space where both PSTs and teacher educators engage in classroom research, in an effort to combine the scholarship of teaching and learning. In doing so, PSTs and teacher educators can examine PSTs' perceptions and how those perceptions can impact the education of students with LDs. Further, this context provides essential feedback for teacher educators as they create and revise teacher preparation programs.

## Relevant Research

In the last 20 years, researchers (i.e., Aldrich, 2000; Berry, 2010; Bowlin, 2012) have examined both in-service teachers' and PSTs' attitudes about inclusive education. Some have explored teachers' perceptions and attitudes toward students with disabilities in general. Others have focused their research on teachers' perceptions and attitudes toward students with specific types of disabilities. Few studies have explored PSTs' perceptions and attitudes towards students with LDs.

A number of researchers have studied in-service teachers' attitudes toward inclusive education (Berry, 2010; Cook, Cameron, & Tankersley, 2007; Gal, Schreur, & Engle-Yeger, 2010; Scruggs, Mastropieri, & Leins, 2011). Others have explored both pre-service and in-service teachers' attitudes toward inclusion (Berry, 2010; Burke & Sutherland, 2004; Cook, Tankersley, Cook, & Landrum, 2000; Douglas, 2014; Gokdere, 2012; Sarı, Çeliköz, & Seçer, 2009). However, the most extensive body of research pertains to PSTs' attitudes toward inclusive education (Ahsan, Sharma, & Deppeler, 2012; Ajuwon, Lechtenberger, Griffin-Shirley, Sokolosky, Zhou, & Mullins, 2012; Aldrich, 2000; Bowlin, 2012; Casarez, 2012; Casarez, 2013; D'Alonzo, Giordano, & Cross, 1996; Forlin, Earle, Loreman, & Sharma, 2011; Forlin, Loreman, Sharma, & Earle, 2009; McHatton, & McCray, 2007; Oswald & Swart, 2011; Rao & Lim, 1999; Romi & Leyser, 2006; Savolainen, Engelbrecht, Nel, & Malinen, 2012; Scruggs, Mastropieri, & Leins, 2011; Sharma, Forlin, & Loreman, 2008; Shippen, Crites, Houchins, Ramsey, & Simon, 2005; Soodak, Podell, & Lehman, 1998; Swain, Nordness, Leader-Janssen, 2012; Taylor & Ringlaben, 2012).

Romi and Leyser (2006) examined the attitudes toward inclusion of 1,155 PSTs in Israel. Participants expressed support for inclusion. Ahsan, Sharma, and Deppeler (2012) employed two standardized scales to examine 1,623 Bangladesh PSTs' attitudes toward inclusion. Results revealed that PSTs' attitudes were impacted by the length and level of their training and interactions with people with disabilities. Bowlin (2012) used a pre- and post-survey to examine the impact of a completing a one-semester special education course and watching either a co-teaching video or an in vivo observation on the attitudes of 153 pre-service general and special education teachers. Results revealed that special education courses can positively influence PSTs' perceptions and attitudes toward inclusion. Casarez (2012) surveyed 172 pre-service teachers about their attitudes toward inclusion. Results revealed that PSTs held positive beliefs and attitudes toward inclusion. Each of the four studies described above relied entirely on survey instruments or scales to gather data.

A few studies examined PSTs' perceptions of students with disabilities (SWDs) (Aldrich, 2000; Forlin, Loreman, Sharma, & Earle, 2009; Hastings & Oakford, 2003; Sharma, Forlin, & Loreman, 2008; Sharma, Forlin, Loreman, & Earle, 2006; Sze, 2009). Aldrich (2000) used a survey to research 172 pre-service early childhood teachers' attitudes. Data revealed that PSTs held positive attitudes about both inclusion and SWDs in general. Hastings and Oxford (2003) used the *Impact of Inclusion Questionnaire* to survey 93 PSTs about their perceptions and attitudes toward SWDs. Data revealed more negative attitudes toward children with emotional and behavior challenges than those toward children with intellectual disabilities. Sharma et al. (2006) used a four-part survey instrument to examine the attitudes of 1,060 PSTs in Australia, Canada, Hong Kong, and Singapore. Data showed that PSTs have more positive attitudes toward inclusion and SWDs when they receive additional training and have more extensive experiences with people with disabilities. Forlin et al. (2009) examined a data set of 603 PSTs. Those who had completed an undergraduate degree had positive attitudes towards people with disabilities. The four studies described above used either survey instruments or an existing data set for their research.

Only two studies broke down PSTs' perceptions and attitudes of SWDs by categories that included LDs (Cook, 2002; McHatton & McCray, 2007). Cook used modified versions of the *Opinions Relative to Integration of Students with Disabilities* scale to examine the attitudes of 181 undergraduate pre-service general educators. Results revealed that PSTs held more favorable attitudes toward the inclusion of students with LDs than students with behavioral disorders, multiple disabilities, or intellectual disabilities. McHatton and McCray examined the perceptions of elementary and secondary PSTs' attitudes toward the inclusion of SWDs in their classroom. Similar to Cook, the results of this study showed that PSTs held the most favorable perceptions regarding the inclusion of students with LDs. Both studies (Cook, 2002; McHatton

& McCray, 2007) relied entirely on surveys to gather data. There is a limited amount of research pertaining to PSTs' attitudes when working with SWDs, nor are there studies which have explored PSTs' perceptions and attitudes toward working with students with LDs.

## Theoretical Framework

This study is predicated on the belief that teachers' perceptions impact teachers' behaviors. Rosenthal and Jacobson's (1968) study showed that teachers' expectations impacted student performance, described as the "Pygmalion Effect." If teachers' perceptions and attitudes directly impact outcomes for students with LDs (Woodcock, 2010), and we know that teachers' perceptions are often formed during their teacher education programs (Woolfolk-Hoy & Spero, 2005), it is essential to examine teaching and learning within pre-service teacher education. Of particular interest are the structures, methods and experiences within teacher education programs to prepare teachers to educate students with LDs. In order to do so, we engaged in contextual classroom research (Cross, 1998). This intersection of teaching and discovery (research), within the scholarship of teaching and learning (SoTL), guided our theoretical approach (Boyer, 1990). In doing so, we could "systematically investigate questions related to student learning—the conditions under which it occurs, what it looks like, how to deepen it, and so forth—and do so with an eye not only to improving [our] own classroom but to advancing practice beyond it" (Hutchings & Shulman, 1999, p. 13). The goal of this research study was to improve student learning and teacher education.

This pilot study examined the effects of a LD methods course on PSTs' perceptions of students with LDs and participants were PSTs at a private university in the northeast, enrolled in their third year of an Integrated Elementary/Special Education (IESE) program. At the conclusion of the program, the PSTs graduate with dual certification in elementary education (1-6) and special education (K-12). While PSTs from the program could teach elementary education or special education, in both cases, PSTs' perceptions about SWDs and specifically, students with LDs, will impact their future practice. Furthermore, the effectiveness of course elements have the potential to inform teacher educators in their practice. Using a mixed methods design, this study examined how PSTs perceived students with LDs as well as the effectiveness of particular experiences embedded within a LD methods course, using the following research questions:

**Quantitative Research Question**

RQ1. How did PSTs' perceptions of students with LDs change in response to an LD methods course?

**Qualitative Research Question**

RQ2. In what ways did PSTs perceptions of students with LDs change in response to a LD methods course?

RQ3. Which elements of a learning disabilities methods course impacted PSTs' perceptions of students with LDs?

**Mixed Methods Research Question**

RQ4. To what extent do quantitative and qualitative data converge? How and why?

## Researchers

The three authors, White, female university faculty members at the same university (at the time of the study), served as researchers for this study. We were former K-12 special educators with 7-28 years of public education experience. The first author was the instructor for the LD methods course. Data for this study were collected and major analyses completed collaboratively while we were concurrently engaged in additional educational research and teaching special education courses within the University's IESE Program. As part of the teaching faculty at our university, we sought to reflect on the effectiveness of our own practices as teacher educators as well as integrating the findings from this study into our programmatic planning. Further, we regularly advised and supervised pre-service teachers in classroom-based fieldwork or practicum settings.

## Method

### Design Rationale

To address these research questions, we chose a mixed method approach. While mixed methods research offers space to integrate quantitative and qualitative data (Creswell, 2014; Creswell, Plano Clark, Gutmann, & Hanson, 2003; Greene & Caracelli, 1997; Teddlie & Tashakkori, 2003), it also allows reflective teacher educators to examine the effectiveness of their teacher education courses, using a variety of data sources with an analytic plan that allows for meaningful data collection and analysis over time.

Special education scholars Klingner and Boardman (2011) argued that the complexity within the context of both special education itself as well as the preparation of teachers responsible for educating SWDs, requires that the field shift away from the dominant, experimental research design, toward the use of mixed methods. Shifting from privileging quantitative approaches, Klingner and Boardman argue that special education research should utilize mixed methods for the methodology's "untapped potential" (p. 216). This rationale, within the context of the scholarship of teaching and learning, allowed for us to contextualize the experiences and perceptions of PSTs in our IESE program. The remainder of this section includes a description of the research design, descriptions of the participants, and both quantitative and qualitative data collection and analyses followed throughout the study.

### Research Design

This study employed a convergent parallel mixed method design (Creswell, 2014) (see Table 1) and was comprised of a six-phase process. Phase I included the collection and analysis of pre-course quantitative and qualitative data. Phase II was the 14-week LD methods course. During Phase III, we collected and analyzed post-course quantitative and qualitative data. Phase IV included collecting and analyzing additional qualitative data. During Phase V we compared data and during Phase VI, interpreted the entire corpus of data. The quantitative component included pre- and post-course surveys to determine the impact of the methods course on undergraduate students' perceptions. The qualitative component included pre- and post-course journal responses and post-course focus groups. This method added breadth and scope to the study (Creswell, 2014) and offered opportunities to triangulate and elaborate on results (Greene & Caracelli, 2003).

**Table 1.** *Convergent Parallel Mixed-Methods Design* (based on Creswell, 2014)

| *Phase I* | *Phase II* | *Phase III* | *Phase IV* | *Phase V* | *Phase VI* |
|---|---|---|---|---|---|
| Collection and analysis of pre-course quantitative and qualitative data | 14-week LDs methods course | Collection and analysis of post-course quantitative and qualitative data | Collection and analysis of additional post-course quantitative data | Data comparison | Interpretation of entire analysis |

## Participants and Recruitment

Before recruiting participants, the university's Institutional Review Board (IRB) approved the study. All participants, PSTs ($N$=15) in the IESE program at a private university in the northeast, consented to be part of the study. Participants were recruited from the pool IESE teacher education candidates who were in the second semester of their junior year. Fourteen of the participants were female and one participant was male. Fourteen participants were White and one participant was Black. All participants were enrolled in a 300-level, LDs methods course.

## Quantitative Data Collection and Analysis

This study used one quantitative source. A survey was created by our research group, which was intended for use in the LDs methods course for PSTs' reflection of their own perceptions. The survey employed a Likert scale where participants had to "strongly agree," "agree," "disagree," or "strongly disagree" with statement about students with LDs. Statements addressed topics including: ability to support the learning needs of students with LDs, preparation to teach students with LDs, outcomes for students with LDs, students with LDs' resiliency, and students with LDs' neurobiological structures. For example, *It will be challenging for me to support the academic needs of students with LDs*, and *Students with LDs are lazy*.

Before administering the survey, we met with current special educators and teacher educators to discuss the content of the statements. Based on their feedback, we made revisions to the initial set of statements, and omitted three statements. Using the remaining 17 statements, a final survey was created. Once consent was received, participants were surveyed. Results from the pre-course survey indicated relatively high internal consistency ($\alpha$ = .716 - .706), suggesting that the survey measured a single construct. Additionally, there were no significant differences between participants on the pre-course survey. At the conclusion of the course, participants completed the post-course survey.

We used SPSS to carry out quantitative analyses. Descriptive statistics, including frequency counts were examined. A paired samples t-test was used to determine if there were significant differences in pre-service teachers' pre- and post-course survey scores.

## Qualitative Data Collection and Analysis

This study used response journals and focus groups to examine PSTs' perceptions of students with LDs. Before the start of the course, PSTs responded to the following journal prompts: *When you hear the term "learning disability," what comes to mind? How do students with LDs learn best?* At the conclusion of the course, PSTs responded to the same prompts. Participants then engaged in focus groups with two of the researchers. There were three focus groups, which included five to six PSTs. In sixty-minute focus groups, we repeated the same

questions that were part of the post journal activity because we wanted to see how the participants would respond in a focus group setting and to determine if there were convergence among the data. Participants responded to the prompts and the following additional questions: *When you think about your experiences in this course, do you think your perceptions about students with LDs have changed? If so, how? Were their experiences in this course that made you think differently about students with LDs? If so, what were they?* During the focus groups, PSTs shared their individual responses in the group, and often extended ideas presented by other participants. Before analyzing these data, we conducted a member check by sending the focus group transcripts to all the PSTs in the study to check for accuracy, and all agreed they accurately reflected their responses.

To analyze the qualitative data, we used a qualitative methodology developed by Rhodes, Hill, Thompson, and Elliott (1994), combining comprehensive process analysis (Elliott, 1989), grounded theory analysis (Strauss & Corbin, 1990), and McCracken's (1988) interview approach. This approach, consensual qualitative research analysis (CQR), is typically used in the field of psychology, but it is beginning to gain traction in other domains (Greenfield, Rinaldi, Proctor, & Cardarelli, 2010). The CQR approach allows a group of researchers to use a consensus method to analyze and understand data.

Adhering to CQR, we collected pre- and post-course journals prior to analysis, individually coded data into themes based on the emerging data, used a consensus method to determine themes and outcomes as a team, and then compared data across cases to establish regularity of findings within the sample. After analyzing the journals, we determined that hosting focus groups with the same PSTs could provide more detailed and rich description of their course experience and perceptions. Therefore, focus groups were initiated and then the same analysis procedure described above was repeated.

## Results

Results from this study are presented using the study's research questions. Research Question 1's results are quantitative, while Research Questions 2 and 3 are qualitative. Results from Research Question 4 are the interpretation of the corpus of data.

### RQ1. How did pre-service teachers' perceptions change in response to a LD methods course?

Analysis of the pre-course survey showed no significant differences between participants. Therefore, data from pre- and post-course surveys were examined. A paired samples t-test indicated significant differences ($t(15) = 3.149$, $p = 0.007$) between pre- and post-course survey means. Results from the pre-course survey ($x$=42.25; SD=4.24) and post-course survey ($x$=40.19; SD=3.95) indicated a decrease in mean score of 2.06 (SD=2.62) (see Table 2). Therefore, pre-service teachers' mean scores on the post-survey decreased, which showed an increase in their positive perceptions about students with LDs.

**Table 2.** *Descriptive Statistics*

| | *M* | *SD* |
|---|---|---|
| Language Attitudes of Teachers Scale Score (LATS) – pre | 42.25 | 4.24 |
| Language Attitudes of Teachers Scale Score (LATS) – post | 40.19 | 3.95 |

*N* = 15

Further examination of the survey questions' means and frequency counts allowed for more nuanced understanding of these data (see Appendix A). Pre- and post-course survey responses to questions 16 and 17 offered the greatest differences over time. For example, mean scores for Q16 (*I feel prepared to teach students with learning disabilities*) shifted from 2.56 (*SD*=0.63) to 1.75 (*SD*=0.45), which indicated that students perceived themselves as better prepared to educate students with LDs. Further, the item analysis indicated that before the course students responded as "strongly agree," "agree," and "disagree," however, after the course students shifted and responded only in the "strongly agree" and "agree," categories. A similar example is Q20 (*Students with learning disabilities offer innovative and unique perspectives*), where means scores shifted from 1.69 (*SD*=0.60) to 1.31 (*SD*=0.48) and after the course all the responses shifted to the affirmative. In contrast, question 3 (*I predict that I will not teach students with learning disabilities and in general education classrooms*) and question 10 (*Student with learning disabilities grow up and struggle professionally*) showed no differences over time. While two of the items showed little to no growth over time (Q3, Q10), eight of the items (Q4, Q8, Q11, Q14, Q16, Q17, Q20, Q21) showed a mean score change that ranged from 0.31 to 0.81. The remaining items had mean score changes of 0.31 or less: Q1, Q2, Q5, Q7, Q12, Q15, Q24.

**RQ2. In what ways did pre-service teachers' perceptions of students with LDs change in response to a LD methods course?**

Using CQR, each researcher analyzed individual pre-service teachers' pre- and post-course journals independently. After researchers identified themes, a consensus method was used to determine themes and outcomes. Then, we compared data across 15 cases and reported them in terms of general, typical and variant outcomes (see Table 4). A *general outcome* means the theme was identified in 14 (93%) or 15 (100%) of the cases, indicating that outcomes were representative of pre-service teachers in all cases. A *typical outcome* means the theme was identified in at least seven (47%) but no more than 13 (87%) of the cases, while a *variant outcome* means the theme was identified in at least two (13%), but no more than six (40%) of the cases. This section presents the findings by theme.

**Theme 1: Language.** The first theme identified, language, emerged from the journal data. Both pre- and post-course journals indicated that PSTs' responses were *typical* for using specific, appropriate language to describe students with LDs, where they used strength-based and person-first language. Data indicated *variant* responses for pre-course journals that included specific definitions of LDs, including language used in the federal definition of specific learning disabilities, while post-course journals were *typical*, which indicated four more PSTs provided a specific definition of LDs at the end of the course.

***Specific appropriate language.*** Ten out of fifteen PSTs used specific appropriate language when referring to students with LDs in the pre-course journals. Examples of appropriate language included the phrases "differently-abled" and "a student with a learning disability." Twelve out of fifteen PSTs used specific appropriate language in the post-course journals. One said, "a person who thinks in a different way than I do," and another said, "students who may need a little more help."

***Specific definition of a learning disability.*** Three PSTs provided a specific definition of LD in the pre-course journals, including "students with dyslexia or dysgraphia." Examples of a non-specific definition of LD included "students who struggle with learning," and "a person who needs extra instruction." In contrast, seven of the fifteen PSTs included a specific definition of LD in their post-course responses. Examples included the terms: "auditory processing disorder," "visual processing disorder," "dyslexia," "dyscalculia," and "dysgraphia."

**Theme 2: Instruction.** The second theme identified was instruction, which included four outcomes: sensory, differentiation, lesson structure, and accommodations and/or modifications. Journal data indicated that PSTs' responses were *typical* for identifying the use of multisensory instruction to teach students with LDs and the need to differentiate instruction for students with LDs. Data indicated a shift over time from *variant* to *typical* outcomes for both lesson structure and the use of accommodations and/or modifications. Overall, responses were similar pre- and post-course for sensory and differentiation, but indicated positive shifts for lesson structure and accommodations and/or modifications.

***Sensory.*** Eight of the fifteen PSTs identified a multi-sensory approach (VAKT: visual, auditory, kinesthetic, tactile) to instruction as a specific method used for teaching students with LDs. One student explained, "I know that students with learning disabilities learn through all their senses and need to be stimulated in more than one area in order to retain the information." In contrast, eleven PSTs identified the use of a multi-sensory approach in their post-course journals. One PST explained that instruction needed to have "something set up visually, orally, and kinesthetically - it really helps," and another explained, "by using all the different movements and senses, students are more likely to have understood at least one of these methods of teaching."

***Differentiation.*** In pre-course journals, ten of the fifteen PSTs described differentiated instruction as an instructional strategy for teaching students with LDs. Aspects of differentiated instruction included person-centered (use topics of interest for specific students), individualized instruction, instruction based on assessment data, and instruction based on student background knowledge. Thirteen of the fifteen PSTs included an aspect of differentiated instruction in their post-course journals, for example, one reported, "students with learning disabilities learn best from teachers who try to understand their needs...every learner is different (and) benefit from explicit instruction."

***Lesson Structure.*** Six of the fifteen PSTs identified a specific lesson structure as an appropriate instructional strategy to use with students with LDs. Examples of a specific lesson structures included explicit instruction, modeling, scaffolding, and guided practice. Eight of the fifteen PSTs included specific lesson structures as an appropriate instructional methodology in their post-course journals. Examples included "students with learning disabilities also need more wait time," and "students will learn best if they are able to use models to learn math equations (and) hands-on methods."

***Accommodations and/or modifications.*** The PSTs did not cite accommodations (adjustments that do not reduce learning or performance expectations) or modifications (adjustments that reduce learning or performance expectations) as an instructional strategy in their pre-course journals. However, seven of the fifteen PSTs specifically mentioned using accommodations and and/or modifications in their post-course journals. One PST explained, "as a teacher, we have to accommodate their needs, and not give up on them." Another said, "students need special accommodations and modifications to learn at the same pace as their peers."

**Table 4.** *Outcomes from the Cross-Analysis of Pre- and Post-Course Journals of Fifteen Pre-Service Teachers*

| *Themes* | *Outcomes* | *Pre-Course Journal Cases (type of outcome)* | *Post-Course Journal Cases (type of outcome)* |
|---|---|---|---|
| Language | Specific appropriate language (person-first, strength-based) | 10/15 (Typical) | 12/15 (Typical) |
| | Specific definition of a learning disability | 3/15 (Variant) | 7/15 (Typical) |
| Instruction | Sensory (VAKT) | 8/15 (Typical) | 11/15 (Typical) |
| | Lesson structure (explicit instruction, modeling, scaffolding, guided practice) | 6/15 (Variant) | 8/15 (Typical) |

| | | | |
|---|---|---|---|
| | Differentiated (person-first, individual-specific, using assessment results, relevant to background/previous knowledge) | 10/15 (Typical) | 13/15 (Typical) |
| | Accommodations and/or modifications | 0 | 7/15 (Typical) |

*Note.* General: 14 – 15; Typical: 7–13; Variant: 2–6

In general, journal data indicated three distinct and positive outcome changes from pre- to post-course: specific definition of LDs, lesson structure, and accommodations and/or modifications. Across all themes, PSTs' responses were *typical*, which indicated that at least seven of the 15 PSTs identified such outcomes.

After analyzing this pre- and post-course journal data, it was determined that more detailed, rich descriptions were needed from the PSTs to confirm or disconfirm these results. Therefore, focus groups were conducted, which included prompts identical to the journal prompts (*When you hear the term "learning disability," what comes to mind?; How do students with LDs learn best?*) as well as additional prompts (*When you think about your experiences in this course, do you think your perceptions about students with LDs have changed? If so, how?; Were there experiences in this course that made you think differently about students with LDs? If so, what were they?; Do you feel prepared to teach students with LDs?*). After these data were collected, CQR was utilized and the same procedures were followed with the focus groups. The cross-case analysis presents the general and typical findings by theme (see Table 5).

**Table 5.** *Outcomes from the Cross-Analysis of Focus Groups of Fifteen Pre-Service Teachers*

| *Themes* | *General Outcomes* (14 or 15 cases) | | *Typical Outcomes* (7-13 cases) | |
|---|---|---|---|---|
| Language | Specific appropriate language (person-first, strength-based) | 14/15 | Specific definition of a learning disability | 11/15 |
| Instruction | | | Differentiated (person-first, individual-specific, using assessment results, relevant to background/previous knowledge) | 11/15 |
| | | | Lesson structure (explicit instruction, modeling, scaffolding, guided practice) | 10/15 |
| | | | Accommodations and/or modifications | 10/15 |
| | | | Sensory (VAKT) | 7/15 |

*Note.* General: 14 – 15; Typical: 7–13; Variant: 2–6

**Theme 1: Language.** As with the journal data, the theme of language also emerged from the focus groups. Focus group data indicated that PSTs' responses were *general* for using specific, appropriate language to describe students with LDs, where they used strength-based and person-first language. Data indicated *typical* responses that included specific definitions of LDs, including language used in the federal definition of specific LDs.

***General outcome: specific appropriate language.*** Fourteen out of fifteen PSTs used specific appropriate language when referring to students with LDs during the focus groups. Examples of appropriate language included the phrases: "students who might struggle in one area of their education," and "students with LDs."

***Typical outcome: specific definition of a learning disability.*** Eleven PSTs provided a specific definition of LD in the focus groups. Examples included "all the different forms like the dyscalculia, dyslexia, dysgraphia, auditory processing disorder," and "there's so many different types of LDs."

**Theme 2: Instruction.** As with the journals, the second theme identified was instruction, which included four outcomes: sensory, differentiation, lesson structure, and accommodations and/or modifications. Focus group data indicated that PSTs' responses were *typical* for identifying the need to differentiate instruction for students with LDs, elements of lesson structure, the use of accommodations and/or modifications, and the use of multisensory instruction to teach students with LDs.

***Typical outcome: differentiation.*** Eleven of the fifteen PSTs described differentiated instruction as an instructional strategy for teaching students with learning disabilities. Aspects of differentiated instruction included person-centered, individualized instruction, instruction based on assessment data, and instruction based on student background knowledge. For example, one PST reported that she needed to "take time to figure out what the student prefers and what ways they best succeed in the classroom; one strategy might not work for one student that might work really well for another; it is different for every student."

***Typical outcome: lesson structure.*** Ten of the fifteen PSTs identified a specific lesson structure as an appropriate instructional strategy to use with students with LDs. Examples of a specific lesson structures included explicit instruction, modeling, scaffolding, and guided practice. Pre-service teachers reported they would use "repetition, visuals, explicit directions...hand it out on paper so they can actually see it," and "extra scaffolding and more modeling."

***Typical outcome: accommodations and/or modifications.*** Ten of the fifteen PSTs specifically mentioned using accommodations and/or modifications as an instructional strategy. One PST reported that "it's just that they need more accommodations or strategies to learn something," and another said they would provide "more accommodations in the area [students with LDs] struggle in."

***Typical outcome: sensory.*** Seven of the fifteen PSTs identified a multi-sensory approach to instruction as a specific method used for teaching students with LDs. One PST said, "something we need to keep in mind is that we don't just lecture our students… there's a kinesthetic aspect that we're teaching, a visual aspect and an auditory aspect, because not all students learn the same way." Another reported, "visual, auditory, kinesthetic, tactile - you have to try and use all of those to reach almost everyone in the class," and another PST said, "you need the visual, the auditory, the kinesthetic, the hands-ons... everyone needs to be aware to use models as well as the visual.... maybe sing a song - anything to help them remember whatever it is they need to remember."

## RQ3. Which elements of a learning disabilities methods course impacted pre-service teachers' perceptions of students with learning disabilities?

In addition to identifying perceptions about language and instruction, within the focus groups, PSTs identified specific course elements that affected their perception of students with LDs. These data were collected upon completion of the course and the cross-case analysis presents the general, typical and variant outcomes (see Table 6).

**Table 6.** *Course Elements from the Cross-Analysis of Focus Groups of Fifteen Pre-Service Teachers*

| *Course Element* | *General Outcomes* (14 or 15 cases) | *Typical Outcomes* (7-13 cases) | *Variant Outcomes* (2-6 cases) |
|---|---|---|---|
| Video vignettes | 15/15 | | |
| The overall course experience | 14/15 | | |
| Fieldwork | | 10/15 | |
| Center/Stations | | 10/15 | |
| *Dyslexic Advantage* (book) | | | 6/15 |

| | |
|---|---|
| Coursework connections | 4/15 |
| Lesson planning | 2/15 |

*Note*. General: 14 – 15; Typical: 7–13; Variant: 2–6

### *General Outcomes*

***Video vignettes.*** Throughout the course, pre-service teachers watched a series of video vignettes of adults with LDs describe their educational experiences and accomplishments in adulthood. Each vignette lasted approximately 10 minutes. All of the PSTs reported the videos positively affected their perceptions of students with LDs. One PST stated, "I definitely think the videos really did help me change my perspective... instead of having [the course instructor] talk about it and then also practice it, we were able to hear directly…. through video from someone who's been through that experience and seeing their struggles and successes as well." Another PST reflected on future practice as impacted by these vignettes and said, "it's all really helpful to see what I, as a teacher, can do to help these students push forward and support them rather than just being, *Oh this student is just lazy*." Finally, one PST commented on the presentation of the vignettes within the course. She said, "I think it was interesting, but also helpful to have awhile to watch. I would think about them through the week and having that much time allowed me to reflect even more, and connect the videos to the other ones."

***The overall course.*** Fourteen of the fifteen PSTs reported the "overall course" impacted their perceptions of students with LDs. One student stated, "I feel a lot more prepared than I did in the beginning of this year." Another PST said, "I think about how I came into this semester thinking about students with LDs, which was basically very naïve… after this semester I learned a lot more on how to actually teach students with LDs and what interventions they need. I learned about more like the neuroscience of like how their brains are not the same. I learned a lot of things that I wished I learned earlier on." While there were evidence of feeling prepared due to the course, another PST reported that she felt "a lot more prepared than I did in the beginning of this year," but that she needed "more hands-on experiences in a classroom to feel a lot more comfortable." After the LD methods course, the PSTs in this study went on to complete their practicum and student teaching experiences in both elementary and special education.

### *Typical Outcomes*

***Fieldwork.*** Fieldwork was a 50-hour requirement of the course and pre-service teachers were placed in area urban, public elementary classrooms. Pre-service teachers were assigned two cooperating teachers (CTs), both a general and special educator, and spent half their time with each teacher. Integral to this fieldwork experience included creating and implementing lesson plans for students with and without LDs as well as receiving feedback from CTs and the instructor of the LD course. Ten out of the fifteen PSTs reported that the required fieldwork positively affected their perceptions of students with LDs.

Pre-service teachers reported that they were able to see the connections between coursework and fieldwork. For example, one commented, "we got to see how that [providing different accommodations for different students] would play out." Another PST explained that the authentic nature of the experience was, "a lot more effective when we're writing [lesson plans] for an actual class," and another reported, "I think it was really great that we were placed in a classroom where there was at least one student with a LD… it made me aware [of students with LDs]." Further, another candidate explained their appreciation of modeling and said, "[modeling] can be used for students with LDs and I've seen it being done in fieldwork and I've seen it done in the [LD methods] course." Pre-service teachers also indicated that they

made connections with K-12 students through the fieldwork experience, for example, one explained, "I think this course helped me make a connection [with a student] - more than I would have if I didn't have this course."

***Centers/stations.*** Pre-service teachers learned about the use of centers and stations as an instructional strategy for teaching students, inclusive of students with LDs. As part of the LD methods course, PSTs participated in multisensory lessons within a structure of center/station-based teaching and learning. Ten of the fifteen PSTs reported this course element positively affected their perceptions of students with LDs. When asked about course elements, a PST responded, "all the different centers." Another PST explained, "having the centers… There are just so many different ways to teach…it's so much more apparent that there's many different ways that [students] could learn." One PST reported that she learned to, "think… more outside of the box….and how to instruct a student who may have a LD," while another student stated, "I just thought the activities were really helpful - [it showed me] how explicit we need to be…. [creating lessons] isn't as difficult as I had anticipated."

### *Variant Outcomes*

***Dyslexic Advantage.*** Six out of fifteen PSTs reported the required reading, *Dyslexic Advantage*, affected their perception of students with LDs. One PST stated, "I think reading the *Dyslexic Advantage* was also extremely helpful. It opened my eyes more to how [people with LDs] think and how the book really focused on the strengths, which is what should be focused on." Another explained that the book, "definitely gave me a more thorough understanding of dyslexia… I used to think it was reading, that's it," while another said, "when I read the book, I learned that it's not just about flipping the symbols…. how [strengths] play into how the student is learning and that there are specific instructional strategies for each."

***Connections to program coursework.*** In addition to the LD methods course, PSTs in this study concurrently took three other method courses (two literacy and one math) and a special education assessment course. Four of the fifteen PSTs reported connections made between elements taught in other courses. One PST stated, "Something that [a program faculty member] had said to me last semester was that in special education, sometimes teachers think they have to do everything independently, but there's a lot of collaboration and that sort of – that made me feel so much better about even thinking about special education and LDs." Another reported, "I'm taking [the LD methods] class with screening diagnostics… I think two and two go together in many ways."

***Lesson planning instruction/assignments.*** Pre-service teachers received explicit instruction on developing lesson plans for teaching students with LDs. Two of the fifteen PSTs reported instruction with lesson planning affected their perception of students with LDs. One PST explained, "definitely writing lesson plans and then actually doing the lessons has been really helpful and definitely changed my perspective on students with LDs." Another PST said, "I think that I feel like a lot more prepared, in terms of writing the accommodations, because I feel like before this class we were just pulling some random accommodation out of thin air, because we didn't know what would actually be helpful."

When asked specifically during the focus groups, PSTs identified specific course elements that shifted their perceptions about students with LDs. The use of video vignettes was a *general* outcome, while fieldwork and centers/stations were *typical* outcomes. While we asked about specific course elements, 14 of the 15 PSTs articulated that the overall course impacted their perceptions. The next section discusses the first level of convergence, within the qualitative data, as well as the extent of convergence across all data.

**RQ4. To what extent do quantitative and qualitative data converge? How and why?**

By design, this study intended to examine PSTs' perceptions of students with LDs over time and used a variety of data sources. This mixed design allowed for us to systematically collect and analyze data as a team as well as reflect on the stages where data converged or diverged. Further, the strength of the design allowed for the collection of rich data as well as the integrated use of CQR methods to increase validity and triangulate data.

### *Convergence of Qualitative Data*

After Phase III, we collected and analyzed post-course quantitative and qualitative (survey and journal) data and we discussed the limited outcome shifts that were identified in the journal data. Simultaneously, we analyzed the survey data that indicated a positive change in pre-service teachers' perceptions. However, we determined that more data were needed to capture PSTs' perceptions upon completion of the course and Phase IV was implemented. After engaging PSTs in focus groups, we examined those data in conjunction with the journal data.

As expected, the focus groups allowed PSTs to expand on the journal work completed independently (Krueger & Casey, 2000). Purposefully, we attempted to gather data that could validate and identify data saturation (Strauss & Corbin, 1990) by asking PSTs about their understanding about LDs as well as instruction for students with LDs. Both data sources were collected after the completion of the course and, therefore, essential to examine together. Overall, using a side-by-side comparison, data revealed a convergence around the definition of a LD, differentiation, lesson structure, sensory, and accommodations and/or modifications (see Table 7). These *typical* outcomes were evident in seven to 13 of the cases. One point of divergence was the specific, appropriate language used in both the focus groups and journals. It was a *general* outcome in the focus groups, but a *typical* outcome in the journals.

Additional data about the course elements helped deepen understanding of PSTs' perceptions of the experiences that influenced their shifts in perception. The three specific elements (identified as *general* and *typical*) included direct field experience teaching students with LDs, while the video vignettes allowed pre-service teachers to learn about adults with LDs, and both required that they reflect about the experiences. The centers/stations element required PSTs to participate as students in multisensory teaching and learning experiences. The other *general* outcome indicated that students reported the "overall course experience" shifted their perceptions. This particular data points supports the overall assertion that PSTs' who participate in a LD methods course, which includes these three specific elements, will experience a positive shift in perceptions. The convergence of these qualitative data supported the qualitative validity of the data gathered and analyzed as part of this study.

**Table 7.** *Convergent Outcomes from the Cross-Analysis of Focus Groups & Journals of Fifteen pre-service teachers*

| *Themes* | *General Outcomes* (14 or 15 cases) | | | *Typical Outcomes* (7-13 cases) | | |
|---|---|---|---|---|---|---|
| | | Focus groups | Post-course journals | | Focus groups | Post-course journals |
| Language | Person-first, strength-based language | 14/15 | | Person-first, strength-based language | | 12/15 |
| | | | | Specific definition of a learning disability | 11/15 | 7/15 |
| Instruction | | | | Differentiated (person-first, individual-specific, using assessment results, relevant to | 11/15 | 13/15 |

| | | |
|---|---|---|
| background/previous knowledge) | | |
| Lesson structure (explicit instruction, modeling, scaffolding, guided practice) | 10/15 | 8/15 |
| Accommodations and/or modifications | 10/15 | 7/15 |
| Sensory (VAKT) | 7/15 | 11/15 |

*Note.* General: 14 – 15; Typical: 7–13; Variant: 2–6

### *Convergence of Qualitative and Quantitative Data*

After converging the qualitative data, Phase V of the study was begun, where both qualitative and quantitative data were combined. The joint display of data is in Table 8 and organized by theme.

***General perceptions.*** Overall, the LD methods course positively shifted PSTs' perceptions about students with LDs. The significant differences ($p$=0.007) showed that PSTs' means scores decreased by 2.06, indicating an increase in their positive perceptions. Similarly, qualitative data showed *typical* and *general* outcomes across all themes, post-course, indicating a convergence of these data. With regard to preparation in particular, PSTs' responses to Q16 (*I feel prepared to teach students with LDs*) showed the greatest mean change score ($x$=0.81) and the overall course experience showed *general* outcomes among PSTs, which indicated the LD methods course shifted perceptions about their own preparedness to teach students with LDs.

**Table 8.** *Joint Display of Data*

| | ***Themes*** | ***Quantitative*** | ***Qualitative*** | ***Convergence/ Divergence*** |
|---|---|---|---|---|
| General Perceptions | Did a LD methods course change PSTs' **perceptions** of students with LDs? | Yes | Yes | Convergence |
| | Upon completion of a LD methods course, did PSTs **feel prepared to teach** students with LDs? | Yes | Yes | Convergence |
| Language | Upon completion of a LD methods course, did PSTs use **strength-based, person-first language**? | Yes | Yes | Convergence |
| | Upon completion of a LD methods course, did PSTs provide a **specific definition of a learning disability**? | Yes | Yes | Convergence |
| Instruction | Upon completion of a LD methods course, did PSTs report that students with LDs require **differentiated methods**? | Yes | Yes | Convergence |
| | Upon completion of a LD methods course, did PSTs report that students with LDs require specific **lesson structures**? | Yes | Yes | Convergence |
| | Upon completion of a LD methods course, did PSTs report that students with LDs require **accommodations and/or modifications**? | | Yes | |

| | |
|---|---|
| Upon completion of a LD methods course, did PSTs report that students with LDs require **multisensory** teaching? | Yes |

***Language.*** Data about language used by PSTs showed convergence. Responses to survey questions (Q5, Q8, Q14, Q15, Q20), that used strength-based language, showed a positive shift pre- to post-course as did data from journals and focus groups. Data from focus groups indicated *general* outcomes (14 PSTs used this language) and post-course journals had *typical* outcomes (12 PSTs). After the completion of the course, PSTs could *typically* provide a specific definition of a LD and mean scores from Q11, which stated that students with LDs had different neurobiological brain structures, shifted from $x$=2.25 to $x$=1.94, indicating a clearer understanding of the neurobiological definition of LDs. Collectively, quantitative and qualitative data indicated that language used to describe students with LDs as well as defining LDs positively shifted.

***Instruction.*** Upon completion of the methods course, PSTs' reported data converged in terms of differentiation and lesson structures, while data about multisensory instruction and providing accommodations and/or modifications showed less convergence. PSTs *typically* reported the need to differentiate for students with LDs as well as provide specific lesson structures to support students' learning.

## Discussion

Due to the nature of the measures used at the completion of the course, including focus groups, post-course journals, and the post-course survey, all which included similar content, we were able to systematically explore the convergence and divergence of these data (Greene, Benjamin, & Goodyear, 2001). All data converged except for data around the need to use multisensory instruction or to providing accommodations, likely due to the fact that there were no specific survey questions asking such questions.

The integration of these data allowed us to examine PSTs' changes in perceptions, both over time and gathered in different contexts, but similar to reports from other mixed methods researchers (Plano Clark, Garrett, & Leslie-Pelecky, 2009), the data integration was challenging. Compared to studies using survey methods alone to measure PSTs' perceptions (Bowlin, 2012; Casarez, 2012), this study allowed for deeper understanding of PSTs' perceptions by gathering qualitative data, both from individual participants and those data gathered through focus groups. While the survey data suggested a significant difference in perceptions over time, the focus groups indicated some of the detailed growth PSTs presented around using person-first language to describes students with LDs, suggesting that this language aligned with the more positive perceptions gathered through the survey. Similarly, survey questions about educating students with LDs indicated the need for specific methods, and the journals and focus groups allowed participants to identify and describe such methods. Collectively, the mixed methods design supported our need to examine perceptions of PSTs from a variety of vantage points.

Results from this study indicate that a LD methods course that included the use of center-based teaching and video vignettes as well as a fieldwork experience with students with LDs were effective in positively changing PSTs' perceptions of students with LDs. The use of multiple measures allowed us to examine both our pedagogical skills as teacher educators, including the specific approaches to teaching and learning, as well as determining whether or not the LD methods course was successful in shifting PSTs' perceptions. In doing so, we hope that these results will inform the teaching and learning within our IESE program and provide a model to other teacher education programs.

Compared to PSTs enrolled in discrete programs (general teacher education programs), PSTs enrolled in integrated programs showed an increase in positive attitudes about SWDs, in general, and inclusion (Gao & Mager, 2011; Kim, 2011) as well as a deeper understanding of special education knowledge (Van Laarhoven, Munk, Lynch, Bosma, & Rouse, 2007). Our study extends this growing body of research and suggests that a LD methods course can shift perceptions about students with LDs and as well as how to best educate them, and we recommend that teacher education programs consider integrating such a course into their program.

While this study's results will inform our integrated teacher education program, we are careful not to make generalizations to other programs. Additional limitations include sample size as well as the pilot survey. While internal consistency was appropriate, the survey could have been improved by including more instructional-based questions and more questions overall, to improve the ability to detect saturation. While the number of participants in this study were small, the purpose of the study was to impact our practice and make necessary changes to our program.

While we know that the comprehensive training to prepare all PSTs to educate *all* students in inclusive settings is essential (Harvey, Yssel, Bauserman, & Merbler, 2010), it is equally important to prepare PSTs to educate students with LDs. As teacher educators, if we can work reflectively with PSTs about their perceptions of students with LDs as well as PSTs' instructional practices, in the context of our teacher education programs, we will better serve *all* students. Further, our engagement with contextual classroom research serves as a model for other teacher educators who choose to engage in the scholarship of teaching and learning.

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# Appendix A

*Survey Means (Standard Deviation) and Frequency Counts By Question*

| *Survey Question* | *M* (SD) | *Frequencies* | | | |
|---|---|---|---|---|---|
| | | *Strongly agree* | *Agree* | *Disagree* | *Strongly disagree* |
| PREQ1: with learning disabilities experience academic success. | 1.44 (0.51) | 9 | 6 | 0 | 0 |
| POSTQ1: Students with learning disabilities experience academic success. | 1.25 (0.45) | 12 | 3 | 0 | 0 |
| PREQ2: Students with learning disabilities need the same instruction as students without learning disabilities. | 2.94 (0.77) | 0 | 5 | 6 | 4 |
| POSTQ2: Students with learning disabilities need the same instruction as students without learning disabilities. | 3.19 (0.66) | 0 | 2 | 8 | 5 |
| PREQ3. I predict that I will not teach students with learning disabilities in general education classrooms. | 3.88 (0.34) | 0 | 0 | 2 | 13 |
| POSTQ3. I predict that I will not teach students with learning disabilities in general education classrooms. | 3.87 (0.34) | 0 | 0 | 2 | 13 |
| PREQ4. Students with learning disabilities offer single perspectives. | 3.19 (0.40) | 0 | 0 | 12 | 3 |
| POSTQ4. Students with learning disabilities offer single perspectives. | 3.50 (0.52) | 0 | 0 | 7 | 8 |
| PREQ5. Students with learning disabilities have strengths that allow them to be successful in the classroom. | 1.44 (0.51) | 9 | 6 | 0 | 0 |
| POSTQ5. Students with learning disabilities have strengths that allow them to be successful in the classroom. | 1.25 (0.45) | 12 | 3 | 0 | 0 |
| PREQ7. It will be easy for me to support the academic needs of students with learning disabilities. | 2.50 (0.82) | 2 | 5 | 7 | 1 |
| POSTQ7. It will be easy for me to support the academic needs of students with learning disabilities. | 2.25 (0.58) | 1 | 9 | 5 | 0 |
| PREQ8. When I work with students with learning disabilities, I think first think a out what they can do. | 1.75 (0.68) | 6 | 8 | 1 | 0 |
| POSTQ8. When I work with students with learning disabilities, I think first think about what they can do. | 1.38 (0.50) | 10 | 5 | 0 | 0 |
| PREQ10. Students with learning disabilities grow up and struggle professionally. | 3.25 (0.45) | 0 | 0 | 11 | 4 |
| POSTQ10. Students with learning disabilities grow up and struggle professionally. | 3.25 (0.68) | 0 | 1 | 8 | 6 |
| PREQ11. Students with learning disabilities have different neurobiological brain structures compared to students without learning disabilities. | 2.25 (0.45) | 0 | 11 | 4 | 0 |
| POSTQ11. Students with learning disabilities have different neurobiological brain structures compared to students without learning disabilities. | 1.94 (0.68) | 4 | 9 | 2 | 0 |
| PREQ12. St dents with learning disabilities are lazy. | 3.93 (0.25) | 0 | 0 | 1 | 14 |
| POSTQ12. Students with learning disabilities are lazy. | 3.88 (0.34) | 0 | 0 | 2 | 13 |
| PREQ14. Students with learning disabilities are hard-working and resilient. | 2.00 (0.52) | 2 | 12 | 1 | 0 |
| POSTQ14. Students with learning disabilities are hard-working and resilient. | 1.69 (0.60) | 6 | 8 | 1 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| PREQ15. Students with learning disabilities grow up and have successful careers. | 1.56 (0.63) | 8 | 6 | 1 | 0 |
| POSTQ15. Students with learning disabilities grow up and have successful careers. | 1.34 (0.50) | 10 | 5 | 0 | 0 |
| PREQ16. I feel prepared to teach students with learning disabilities. | 2.56 (0.63) | 1 | 5 | 9 | 0 |
| POSTQ16. I feel prepared to teach students with learning disabilities. | 1.75 (0.45) | 4 | 11 | 0 | 0 |
| PREQ17. Students without learning disabilities work harder than students with learning disabilities. | 2.81 (0.40) | 0 | 3 | 12 | 0 |
| POSTQ17. Students without learning disabilities work harder than students with learning disabilities. | 3.06 (0.85) | 1 | 1 | 8 | 5 |
| PREQ20. Students with learning disabilities offer innovative and unique perspectives. | 1.69 (0.60) | 6 | 8 | 1 | 0 |
| POSTQ20. Students with learning disabilities offer innovative and unique perspectives. | 1.31 (0.48) | 11 | 4 | 0 | 0 |
| PREQ21. Students with learning disabilities have weaknesses that make it hard to be successful in the classroom. | 2.44 (0.63) | 1 | 6 | 8 | 0 |
| POSTQ21. Students with learning disabilities have weaknesses that make it hard to be successful in the classroom. | 2.75 (0.68) | 0 | 6 | 7 | 2 |
| PREQ24. Students with learning disabilities experience academic failure. | 2.63 (0.72) | 0 | 7 | 6 | 2 |
| POSTQ24. Students with learning disabilities experience academic failure. | 2.50 (0.89) | 1 | 9 | 2 | 3 |

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