Regions with the highest rates of teacher certification and students' cognitive milestones with learning disabilities or emotional/behavioral issues

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Abstract The teacher’s special education certification (SPEC) degree is a barometer for their competence in study, practice, and policy. This research compared the test scores of elementary and middle school children with learning disabilities and emotional and behavioural disorders taught by Special Education Teachers (SET) to those of students who General Education Teachers (GET) led in the same subject areas. The type of certification for teachers has little impact on most student groupings. In Learning Disabilities (LD) and regular education, students with LD and more extraordinary intellectual ability performed better in English language arts (ELA) with a trained teacher. Students with Emotional Behavioural Disorders (EBD) who were less proficient in mathematics were less likely to be helped by SET compared to General Education (GE) and Licensed Special Education Teachers (LSET). These words’ actual meanings are examined concerning SET quality measures. The outcomes reported here should be understood under several constraints. Operational datasets, like the one utilized in this study, rarely contain data on crucial factors that affect an exceptional education-certified or dual-certified teacher’s capacity for effectiveness.

Keywords: dual certification, SET, ELA, GET, LSET

1. Introduction

With average intellect and reasonable educational and socio-cultural chances, specific learning disabilities (SLDs), and neuro-developmental disorders, are defined by difficulties with reading, writing, and math skills. SLDs happen without mental, sensory, or neurological problems (Cristofani et al 2023). Emotional-behavioural Disorders (EBD) are provided to an estimated 353,000 students in the US (Gersib and Mason 2023). Because these instructors were certified in SE, the proportion of SWDs in their classes needed to match their propensity to leave their positions. Secondary-level reading difficulties are considered more severe than those at the elementary level. However, as it is believed that one of the duties of elementary school teachers is to train students to read fluently, this is primarily done at the lower levels. As a result, secondary reading promotion is frequently disregarded (Barwasser et al 2021). Reading, writing, speaking, and listening are just a few functional skills that are impacted by learning disabilities. Information receiving and retrieval are different idiosyncratic abilities (Nasir 2020).

Teachers are essential in helping children with EBD overcome their significant academic (SA) and social-emotional (SEO) challenges. Due to their low intellectual accomplishment and problematic behaviours obstructing progress, students with EBD need numerous opportunities to respond to academic cues, frequent feedback, and evidence-based method (Cumming et al, 2021). Instructors refer students who may have SE needs to the Student Services branch of the Ministry of Education, which determines the least restrictive placement option (Griffith et al, 2022). ID symptoms can range from mild to severe, depending on the disorders underlying cause. This is crucial for figuring out what kind of help is needed, allocating resources, selecting study subjects, and even for legal reasons (Tafila et al 2021). Less than one percent of children ages 3–21 who meet the criteria for emotional disturbance under the Individuals with disabilities education act receive SES (Leggio and Terras 2019). This study examines the regions with the most excellent rates of teacher certification as well as pupils’ cognitive development and emotional/behavioral milestones.

2. Literature Review
Watts et al. (2023) demonstrated our ability to comprehend the perspectives and experiences of academics working with students with intellectual disabilities. Using Bronfenbrenner’s bio ecological approach, Collins et al. (2022) investigated how students’ senses of self, competence, and pride develop in response to their experiences in the classroom and the wider world. The proportion of SWDs in these teachers’ classes did not correlate with their odds of leaving the profession because special education certification (SPEC) attenuated this association Gilmour and Wehby (2020). Bullying from peers is more likely to occur in kids with learning and developmental issues, according to Peguero et al. (2020). Compared to young people with visible disabilities, those with invisible disabilities are less likely to be bullied in isolated situations. Two children with LD had their emotional and academic growth measured after completing a computer-based training program. After completing a computer-based training program, two children with LD were assessed for their emotional and academic development by Sioli et al. (2020). Layden et al. (2022) looked into the career objectives of SETs who deal with children who have intellectual disabilities (ID), developmental delays (DD), and autism spectrum disorders (ASD) using an online poll. Rimfeld et al. (2019) looked carefully at the demographics of the lecturers. Over 16,000 twins were included in the twins’ early development research, a longitudinal study of twins using national birth records, between 1994 and 1996. According to (Yang et al. 2019), were 9,295 pupils enrolled in total, whose ages ranged from 6 to 16. Van (2022) examined how school-aged children with SLD, ADHD, and ADHD with SLD could think and behave. Information on sixty-six kids from a far-flung region was saved for the study. Hamzah et al. (2020) interviewed educators to discover what they knew and how they felt about the topic. Eraty (2020) designed to assess the effectiveness of teaching young persons with intellectual disabilities the leisure skills of marbling and stone painting through direct instruction. Goldman and Gilmour (2021) reviewed three years of state administrative data on special education (SE) kids in grades 4-8 with ASD. Brunsting et al. (2022) examined increases in burnout among 230 special educators dealing with adolescents who had emotional and behavioural challenges in 15 school districts across the country who were selected using stratified random sampling throughout three periods in a school year. Nine high schools with emotional and behavioural issues received training on writing descriptive essays to advocate for their needs related to the transition (Cuenca et al 2019). Dellatorr et al. (2022) examined how high-ability or gifted (HIAs/G) parents view family relationships, educational practices, indications of emotional/behavioural problems, and possibilities for their teenagers. Means (2019) determined the qualities of a professional development program that would make it easier to handle kids who have EBD or who are at risk for developing it in the classroom.

3. Methodology

The standards for teacher certification can range from one nation to another, as well as from various states or regions. Cognitive milestones are developmental signs that show typical advancement in cognitive skills like language learning, problem-solving, attention, memory, and social cognition. On the other hand, LD is a neurological condition that influences how people with average or above-average intellect process and react to information.

3.1. Data source

Data about students, teachers, and schools in North Carolina (NC) are collected and submitted annually for use in state accountability measures. Students in grades 4-8 at regularly scheduled public schools in NC who had ever been diagnosed with a condition qualifying them for SES and had an Individualized Education Program (IEP) were included in the sample. Throughout the study period, SWDs in North Carolina could take traditional or adapted tests. Most kids with LD or EBD could finish the regular or adapted tests, but the few who spent the extra test were disqualified. Because the modified assessment revealed that children had increased learning needs, researchers could explore disability heterogeneity within that sample. So that test results from several years could be compared, students who took a new kind of exam each year were disqualified. If a student’s test scores or demographic information are missing, they will not be included in the sample (8.02 percent). Then, we split the LD children who took the regular test, the EBD kids who took the adapted test, and the EBD students who took the routine test into four groups. Difficulty, impairment, and outcome sample sizes are presented in Table 1. Instructors in the same impairment group who passed the new exam worked with these students less frequently than those who had taken and failed the average assessment or held multiple certifications.

3.2. Variables

At the end of each grade, NC Math and ELA assessments evaluated pupils’ academic progress. Respectable reliability estimates were attained for the common ELA and math tests. IEP teams found that pupils could not show mastery of grade-level skills on the regular exam. Thus, those students took the modified examinations. The altered test was provided to students who required more immediate academic assistance.

3.3. Main predictors

Teacher certification status and certification subject area were included in the administrative files. Teachers in North Carolina become certified in special education (SE) by passing a licensing exam, completing the required courses, and
participating in fieldwork. A teacher had two qualifications if they held certification in either SE or primary education (PE) and a certificate in at least one subject area. After receiving their initial certification, teachers in North Carolina can pass a licensure exam to get a certificate in other subject areas. These instructors come into two categories: those who passed the exam for the other certification and already held a franchise in one place, and those who finished teacher preparation programs in both SE and the other field to obtain their licenses. Passing an exam is all it took for a small fraction of the sample’s educators to become dually certified. Disaggregating the dual-certification type led to small cell sizes, wherein just 2.11 percent of pupils were taught by teachers who had earned their licenses via examination.

3.4. Control variables

The student’s IEP status, whether or not they received FRL, whether or not they were labelled as ELL or gifted, whether or not they had taken two or more math or reading classes, whether or not they had changed schools, and so on are some of these indicators. Other indicators include the student’s race and ethnicity, gender, prior math score, last year’s ELA score, and IEP status. Characteristics of their peers included gender, race, ethnicity, language proficiency, socioeconomic status, and eligibility for subsidized or free meals. In addition, they varied the size of the classes to see what would happen. It featured signs from the model for the instructor’s years of experience if the instructor was uncertified or just held a provisional teaching license, and whether the instructor had an alternative certification.

3.5. Analyses

According to Feng and Sass (2013), they adjusted the relative importance of each student’s peers and teachers based on the number of math and English language arts teachers they had in a given school year. Three separate regression analyses were performed on each disability by exam samples. An initial ordinary least squares (OLS) regression model was created for each topic, factoring in variables such as certification indicators, student characteristics, classroom characteristics, instructor characteristics, and school characteristics. For each academic year and grade, particular outcomes were predetermined. Our method excluded any confounding variables and identified the precise achievement gap between SWDs for a specific quality taught by a SE or dual certification teacher and those taught by a general certification teacher over an academic year. Models with school-fixed effects were built after accounting for school-level variables. Due to the average discrepancy in achievement between these subgroups, researchers compared teachers with General Education Qualifications (SEQ) in the same school to those with SE or DC. Because differences in school leadership, culture, expectations, and school-wide behaviour systems are consistent over time, these factors are not included in analyses of school-fixed effects. Third, a model was developed employing controls for classroom, instructor, and school variables and fixed effects for the students. This method investigates whether students’ math and English language arts achievement differ between the years a SE or DC teacher taught them and the years they were led by a GET after adjusting for contextual factors.

<table>
<thead>
<tr>
<th>Variables Independent variables</th>
<th>Emotional/behavioural disorders</th>
<th>Learning disabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reg</td>
<td>Mod</td>
</tr>
<tr>
<td>% GE cert.</td>
<td>79.603</td>
<td>52.774</td>
</tr>
<tr>
<td>Obs.</td>
<td>4.573</td>
<td>1.121</td>
</tr>
<tr>
<td>% SPED cert.</td>
<td>7.197</td>
<td>18.425</td>
</tr>
<tr>
<td>Avg. math score (SD)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Avg. ELA score (SD)</td>
<td>-0.764</td>
<td>(0.987)</td>
</tr>
</tbody>
</table>

4. Results

For each handicap, test type, and topic, table 2 displays OLS model findings, whereas table 3 displays results from the school fixed effects model and the student fixed effects model. Because students take the assessments at different points in time during the lifespan of the investigation, sample sizes fluctuate subject by subject and across impairment groups. In most samples, there was disagreement between the OLS estimates, the student fixed effects estimates, and the school updated effects estimates. For students with LD who took the revised assessment, the initial negative correlations between SEC and DC and ELA outcomes were 0.09 SD and 0.07 SD, respectively, in the student-appointed effect models. After being adjusted for multiple comparisons, these associations lost statistical significance, dropping to 0.04 SD and 0.03 SD, respectively. There should be more uniformity in the application of this design. There was no statistically significant link between having a dual-certified instructor and lower ELA performance on the revised exam EBD students took in a school setting, as measured by
either the OLS or the student fixed effect models. Differences in estimated associations between certification and academic performance can be seen in the model coefficients, indicating that different approaches were used to account for unmeasured time-invariant factors.

Table 2 Learning Disabilities: Student Outcomes.

<table>
<thead>
<tr>
<th>Subject area</th>
<th>Modified assessment</th>
<th>Regular assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS</td>
<td>School FE</td>
</tr>
<tr>
<td>Math</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dual</td>
<td>-.115***</td>
<td>-.162</td>
</tr>
<tr>
<td></td>
<td>(.086)</td>
<td>(.028)</td>
</tr>
<tr>
<td>SPED</td>
<td>-.152***</td>
<td>-.108*</td>
</tr>
<tr>
<td></td>
<td>(.108)</td>
<td>(.112)</td>
</tr>
<tr>
<td>ELA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dual</td>
<td>-.074***</td>
<td>-.108***</td>
</tr>
<tr>
<td></td>
<td>(.022)</td>
<td>(.026)</td>
</tr>
<tr>
<td>SPED</td>
<td>-.095**</td>
<td>-.091*</td>
</tr>
<tr>
<td></td>
<td>(.031)</td>
<td>(.037)</td>
</tr>
<tr>
<td>R²</td>
<td>.795</td>
<td>.316</td>
</tr>
</tbody>
</table>

Learning disorders, often known as learning disabilities, limit a person’s ability to acquire, process, or apply knowledge successfully. These impairments can affect various learning skills, including reading, writing, math, and thinking. It’s crucial to understand that learning difficulties reflect a person’s cognitive processing skills in a particular area more than intelligence. Regular and modified assessment is the two areas of linear disability. In Figure 1, the learner disabilities in (a) ELA and (b) math are regularly assessed.

Figure 1 Regular assessment of Learner Disabilities (a) ELA and (b) Math.

Figure 2 Modified assessment of Learner Disabilities (a) ELA (b) Math.
Students with emotional/behavioural issues are depicted in Figure 3. Pupils with emotional illnesses experience more significant personal and academic difficulties than normal pupils. Anxiety, depression, and post-traumatic stress disorder (PTSD) are just a few ailments that fall under emotional disorders. These conditions can significantly impair students’ capacity to study, control their emotions, and communicate with peers and teachers. The Modified Assessment of Emotional and Behavioural Disorders is depicted in Figure 4 as (a) Math and (b) ELA.

Data are shown in Tables 2 and 3 comparing the average development of children taught by dual-certified teachers and certified SET to students taught by certified GET with the same levels of training and experience.

4.1. **Comparing General Education to Dual Certification Validation for Special Education Teachers**

Teachers holding dual and GE degrees helped LD children do better on the standardzed ELA test. In contrast to academics or staff, students are the focus of this differentiation. Children with LD who took classes from teachers with special education (SE) and general education (GE) credentials performed 0.03 SD worse on the ELA test than pupils who took lessons from teachers who only had GECs. On the ELA test, students with learning disabilities at the same school who took
ELA classes from teachers with dual certifications performed 0.03 SD poorer than students whose ELA instructors had degrees in accessible education. Students with learning disabilities who took the test following its modification and were instructed by teachers with GEC performed better than those who took it following its change and were led by teachers with dual or SEQ. In comparison to teachers with merely a current teaching certificate, individuals with dual or SE credentials did not improve their pupils’ performance on the modified evaluation. Even in mathematics, a pattern can be found.

4.2. Certification in Special Education vs. Dual Certification

After running the student fixed effects models, we used post hoc analyses to compare teachers with dual and SEC, controlling for factors such as the teachers’ experience, education, and the demographics of their classrooms and students. Students with LD who teachers with SE or DC instructed did not see a decline in their ability in English language arts. Students with EBD performed 0.26 SD worse on the modified arithmetic assessment when required by a teacher with an SEC than students taught by a teacher with dual certification.

5. Discussion

Faculty at SWD come from a wide variety of academic backgrounds. Despite the widespread belief that SET who have earned accreditation have received high-quality training, very few researchers have investigated whether or not this belief is borne out in actual classroom results for students of varied disabilities and intelligence levels. Additionally, they looked into whether or not students with LD and EBD performed better whether taught by SE, dual, or GCT. This study contributes to the body of research by investigating dual certification and utilizing a sizable dataset that enables the disaggregation of effects according to educational achievement and handicap status. The results demonstrate that most student groups’ academic performance was generally unaffected by the SPET, dual, or GEC. This is after considering variations amongst schools, instructors, and students. A few substantial deviations from these conclusions occurred.

Both high performers with LD and low achievers with EBD benefited from having dual-degree instructors. These findings provide fresh insight into the relationship between certification and SWD academic achievement, identify which kids benefit most from teachers with particular qualifications, and raise additional concerns regarding the usefulness of using certification as a stand-in for competency in the classroom. Students with learning disabilities who completed the regular ELA exam showed a substantial correlation between dual certification and their performance, similar to the one discovered by Feng and Sass between SEC and student outcomes. Student sample sizes, modelling choices, and the precise meaning of certification affect how strongly certification is linked to SWD academic achievement. This research suggests that some students would benefit from having teachers with experiences outside of SE.

Meanwhile, few states mandate that educators have DC. Students with LD who took the standardized test performed better in ELA when instructed by a teacher with dual certification rather than a teacher with only a GEC. When there are many students with disabilities (SWDs) in the class, it might be difficult for teachers to collect accurate data, especially if the classes are small or if the students constantly switch between various types of evaluations. Another limitation of teacher human capital is the need for such hiring standards. Education specialists who work with kids with LD and EBD urgently need a more thorough study on reliable indicators of instruction quality.

6. Conclusion

There are a few things to remember when trying to make sense of these results. This study addresses a gap in the literature by drawing attention to the challenges associated with using administrative datasets like the one employed here to learn more about the critical factors that influence a teacher with dual certification in SE and GE. A teacher’s ability to give high-quality instruction may be impacted by how services are provided, the climate or educational standards of the school, or the quantity of time they spend teaching confident youngsters. School fixed effects models can help fill in some gaps, but they still need to include enough details on how things like laws, how teachers educate in the classroom, and improvements in student learning relate to one another. Finding out if certification influences SWD outcomes and if school-specific characteristics moderate this relationship are critical research questions that can only be answered by large-scale data gathering.

Furthermore, these numbers only represent one state with its unique set of rules regarding licensing. Results may not indicate how individuals with disabilities who have completed a unique education program (SEP) fare in other settings. It is recommended to rerun this experiment using new data sets. Despite these limitations, the results demonstrate the need for additional study of dual certification, classroom settings, and methods for locating outstanding educators. They also wonder if a credential in SE is necessarily an indicator of a good teacher.

Ethical considerations

Not applicable.
Declaration of interest
The authors declare no conflicts of interest.

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