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Middle and High School Teachers' Perceived Expertise and Needs in Disciplinary Literacy

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For years, secondary educators have been tasked with incorporating literacy into their instruction, supported by training and courses; however, these may not fully meet the specific needs of teachers. Despite their existing expertise, teachers are often taught general literacy strategies, which leaves gaps in targeted and ongoing professional learning because their needs were not included in the co-design process. This study aimed to recognize teachers' perceived expertise, challenge misconceptions that subject-area teachers do not incorporate literacy practices, and inform professional learning through teachers' experiences and perspectives. Therefore, we surveyed 165 middle and high school teachers across eight subject areas to assess their knowledge and self-efficacy in disciplinary literacy. Our results extend existing research that highlights the expertise of subject-area teachers, while also building on scholarship that emphasizes the need for the literacy scholar's expertise to be combined with others' perspectives and expertise.

Keywords: *collaboration, instructional practices, literacy, teacher education/development, middle schools, high schools, survey research, secondary teachers, disciplinary literacy, self-efficacy, communities of practice, literacy leaders*

Secondary educators have been tasked with integrating literacy into their instruction for years, with many teachers engaging in professional learning, workshops, and required coursework to align with these initiatives. In the last decade, teacher education programs in the United States have been required to include at least one literacy course for all preservice educators (International Literacy Association and National Council of Teachers of English [ILA & NCTE], 2017), though we recognize that such requirements differ internationally. At the time of this study, the authors were literacy teacher educators at five higher education institutions in South Carolina, where we frequently taught these courses. State departments and school administrators often asked us to design learning aligned with predetermined literacy learning objectives, often without considering teachers' existing expertise or instructional contexts. Typically, these teachers were introduced to a blend of content-area literacy (CAL) and disciplinary literacy (DL) strategies through a single required course or one-off professional development. While these experiences provided an important starting point, the limited time frame often results in a patchwork of strategies rather than a sustained, responsive, or co-designed professional learning approach (International Literacy Association [ILA], 2018, 2020).

To better understand teachers' perspectives, we developed, validated, and implemented a survey to examine middle and high school teachers' self-efficacy and knowledge related to DL practices. Our purpose was twofold: to contribute to the growing scholarship that highlights the DL expertise of secondary educators and to challenge the assumption that literacy knowledge only resides with literacy scholars (Fang & Coatoam, 2013; Graham et al., 2021; Savitz et al., 2024). Centering teachers' voices not only informs how we revise the content and design of our courses and professional learning but also helps ensure that these experiences are better aligned with teacher needs and realities, without altering course objectives that are often tied to accreditation or state-level expectations. More broadly, this work disrupts deficit narratives that position secondary teachers as disengaged from, or not responsible for, literacy instruction. This study offers an important reminder: advancing DL cannot rest solely on the expertise of literacy educators. It requires honoring teachers' lived knowledge, co-constructing learning, and redefining what counts as literacy expertise across educational systems.

In this article, we present one component of a larger study that explored middle and high school teachers' perceptions of their self-efficacy concerning two key areas: adolescent literacy practices (see Savitz et al., 2024) and DL knowledge and practices. This paper focuses specifically on DL and responds to two guiding research questions: (1) Within specific aspects of DL, how does the self-efficacy of teachers of different subject areas vary? (2) Within a subject area, how does the self-efficacy of teachers vary across different aspects of DL? This manuscript shares our analysis of 165 secondary teachers' views of their knowledge and efficacy with DL practices across eight subject areas: science, social studies, mathematics, English language arts, physical education, visual arts, performing arts, and world languages. By centering teachers' perspectives, this analysis builds on our broader goal of challenging narrow definitions of literacy expertise and informing more responsive coursework and professional learning. Examining variation across and within subject areas provides insight into how disciplinary norms and pedagogical expectations shape teachers' self-perceptions, offering literacy schools and professional learning facilitators a nuanced understanding of where support is most needed and where disciplinary strengths can be leveraged in co-constructed learning environments.

These questions arose from our ongoing concern about how subject-area educators are often viewed from deficit perspectives, assumptions that they neither understand nor implement literacy practices in their classrooms. Rather than relying on these assumptions, we wanted to go directly to the source—the teachers. First, we sought to understand their self-reported self-efficacy related to DL knowledge. Second, we aimed to honor their voices by learning what they identified as their pedagogical disciplinary knowledge (i.e., how to effectively teach disciplinary content to students). These insights help us consider more meaningful entry points for professional learning.

We framed the survey through a self-efficacy lens because, as Bandura (1997) and others argue, higher teacher self-efficacy correlates with greater confidence, a willingness to try new instructional approaches, a stronger commitment to student learning (including for those who struggle), and deeper reflection on teacher practices (Brock, Robertson, et al., 2021; Graham et al., 2001; Hodges, et al., 2019; Leader-Janseen & Rankin-Erickson, 2013; Varghese et al., 2016). While we did not aim to identify specific sources of self-efficacy (e.g., mastery experiences or vicarious experiences), we were interested in understanding teachers' perceived confidence in enacting DL practices. Self-reported confidence offers insight into areas of strength and need, providing a foundation for designing more responsive and collaborative professional learning.

By asking teachers directly, we sought to shift the design of professional learning away from the assumptions of literacy scholars and toward teachers' self-identified areas of expertise and growth. This approach aligns with research on adult learning, andragogy, and communities of practice, where teachers are positioned as co-constructors of knowledge. In this way, our study goes beyond a survey tool; it speaks to the underrepresentation of teacher voice in literacy research and contributes to the fields of professional learning and DL. Scholars such as Moje and Ellison (2016), Hinchman and O'Brien (2019), and McLean Davies et al. (2022) have argued that secondary teachers' perspectives are essential to understanding how DL is enacted and how literacy researchers can better partner with teachers to improve student learning, both in literacy and across disciplines. Our study aims to meet that need.

We therefore begin by briefly unpacking the evolving understanding of DL and how it manifests in school settings. We outline current perspectives on DL, examine how different stakeholders interpret it, explore empirical research on DL enactment in middle and high school classrooms, and end with a discussion on the value of building communities of practice to support DL application across school settings.

Conceptual Framework

In this section, we discuss the instructional shifts in DL that have occurred in recent years, with an increased focus on real-world and problem-based learning, enactment and embodiment of the disciplines' literacy practices, and recognition that content learning in secondary education is an amalgamation of many individual disciplines. We then articulate teachers' perceptions of literacy as they impact teachers' efficacy in DL enactment in classrooms—an area that is underrepresented within the existing literature. Finally, we finish this section with an overview of effective practices in DL professional learning (PL).

DL is rooted in other research traditions, including content-area reading, college reading and writing, English for specific purposes, and genre studies, and it is an evolving concept (Gabriel, 2023; Wolsey & Lapp, 2024). Its predecessor, CAL, is often defined as content-neutral comprehension practices, such as making predictions, using graphic organizers, or summarizing text (e.g., Ortlieb et al., 2024) that support the ability to use reading and writing to acquire content knowledge (McKenna & Robinson, 2014). DL, by contrast, emphasizes the enactment of the knowledge, skills, abilities, conventions, competencies, and habits of mind possessed by individuals who create, communicate, use, and produce information within the specified field (Ippolito et al., 2024; Lent & Voight, 2019). It is an instructional approach that emphasizes and clearly demonstrates how students can develop and utilize texts tailored to specific purposes or audiences (Gabriel, 2023). For example, in mathematics, content-area strategies, such as monitoring comprehension while reading a word problem, illustrate how general literacy practices intersect with disciplinary reasoning; however, content-area strategies do not fully capture disciplinary literacy practices, such as constructing meaning through multiple representations (e.g., graphs, tables, algebraic expressions) that typify mathematics as a discipline (Kane et al., 2024). Fang et al. (2023) make a similar point in their recent study, which illustrated mathematical habits of mind through their observation of a mathematician engaging with an unfamiliar, complex mathematics text. Their analysis documented two key areas: general comprehension strategies and behaviors, and discipline-specific approaches, such as reasoning and logical argument, to construct meaning from the text.

Scholars also emphasize that DL should incorporate social and problem-based learning through texts that require students to critique existing ideas and generate new knowledge (Burke & Kennedy, 2024; Gabriel, 2023; Rainey et al., 2021). For example, science is not static nor purely procedural (Alston et al., 2020); instead it requires classroom instruction to engage students in analytic and source literacy (Spires et al., 2018), scientific discourse, and knowing and applying scientific concepts and processes using various methods and texts (Windschitl et al., 2018) to make personal, social, and philosophical decisions related to scientific issues (Thomas & Drew, 2021). In social studies, this could look differently as the focus is more on sourcing, contextualization, close reading, corroboration, and combining perspectives from texts and one another (Monte-Sano & Thomson, 2022; Spires et al., 2018; Sun et al., 2024) with the intent of becoming civically engaged (Lesh, 2023; Savitz et al., 2021; Wineburg & Reisman, 2015).

Even further, while scholars argue that DL instruction in secondary classrooms should attend to domain-specific differences in literacy practices, text types, and epistemologies (e.g., Moje, 2015), the concept of what defines a discipline within secondary schools has been questioned (Croce & McCormick, 2020; Gabriel, 2023). Core subjects are often "an amalgamation of multiple disciplinary traditions" (Ortlieb et al., 2024, p. 5). For example, the subject area of ELA typically draws on rhetoric, argumentation, composition, literary criticism, theatre arts, oration, language arts, creative writing, and journalism (Rainey et al., 2024). The same can be said for all subject areas, such as the varying literacy demands in the discipline of engineering, which depend on location, role, and traditions within specific disciplines—for example, electrical versus structural engineering (Wilson-Lopez et al., 2022). Therefore, the DL associated with each subject area may vary tremendously based on the disciplinary content, subject area, and expectations of disciplinary insiders in various geographic spaces (Croce & McCormick, 2020; Monte-Sano & Thomson, 2022). This interdisciplinary approach means that instruction within subject areas is less about thinking like an expert in the field and more about the ability to think expertly and critically while engaging with a range of texts for various purposes (Gabriel, 2023; Ippolito et al., 2024).

Teachers' Perceptions of Literacy

Hinchman and O'Brien (2019) and McLean Davies et al. (2022) argue that efforts to instantiate DL instruction have too often prioritized the epistemologies undergirding literacy, thereby sublimating the expertise and values of subject-area teachers. Based on an analysis of curriculum, teacher standards, and institutional structures, McLean Davies et al. (2022) argue that efforts to enact DL have positioned literacy as separate from—and more important than—subject-matter instruction. This perspective questions secondary teachers' sense of professional identity and expertise within their discipline, often unintentionally heightening the tensions between literacy and subject-area specialization. These scholars argue that because subject-area teachers' professional learning and socialization have been grounded primarily in subject-specific pedagogical work, they may have strong implicit understandings of DL that are not readily recognized through traditional evaluative means.

Another example where literacy stakeholders may present instructional approaches that are antithetical to the epistemologies, norms, and values that define disciplinary work is presented by Chandler-Olcott (2017), who describes how specialist subjects, such as PE, are often positioned as "literacy's handmaiden" (p. 149)—that is, valued less for their disciplinary contributions and more for their perceived ability to reinforce reading and writing in service of other subjects. Siebert and Draper (2008) discussed how literacy approaches "failed to properly acknowledge the influence of the discipline of mathematics on what counts as text, reading, and writing" (p. 235; see also Siebert et al., 2016). Similarly, Greenleaf and Hinchman (2020) explain science

teachers' "wholesale rejection" of literacy approaches as a product of the belief that students should be *doing* science, not reading about it (p. 388). These are only a few examples of how DL practices are not valued or understood within those spaces.

Savitz et al. (2024) point out that this may be partly because the language of literacy instruction, often taught in coursework and professional learning, may privilege the efficacy of disciplines. However, professional learning should emphasize the importance of literacy instruction in the disciplines and theories that align with DL (ILA, 2019; Kane & Saclarides, 2022; Kerns et al., 2018) without making assumptions about teachers' knowledge and the language, literacy, and terminology across disciplines (Elish-Piper et al., 2016; McLean Davies et al., 2022). Doing so aligns with recent DL scholarship by Hinchman and O'Brien (2019), Ippolito et al. (2024), McLean Davies et al. (2022), Puig and Froelich (2022), and many others who argue that efforts to instantiate DL instruction cannot prioritize the epistemologies undergirding literacy, thereby sublimating the expertise and values of subject-area teachers and instructional coaches.

PL and DL

Research has shown that professional learning and coursework designed and implemented with multiple stakeholders, including literacy and subject-area specialists and teachers, yield a range of positive outcomes. Across studies, these outcomes include student growth in scientific receptive knowledge and productive use of scientific language (Hayden et al., 2019), to meaningful use of quantitative literacy within the authentic and embedded local political contexts (Brock, Wiest, et al., 2021), to preservice teachers' improved integration of literacy teaching moves into their instruction practices (Rainey et al., 2021). Thomas and Drew (2021) implemented a three-year, practice-based professional learning project that utilized instructional materials and practices that could be immediately applied to teachers' classrooms in fundamental and derived scientific literacy. Learning occurred in cycles where teachers and the project team developed scientific literacy units and instructional materials, implemented them in classrooms, and then reflected on the process, instruction, and student outcomes, leading to continuous curriculum revision. Hayden et al.'s (2020) study with middle school science teachers had similar results.

Relatedly, K–12 students, preservice teachers, and in-service teachers' growth has been noted when literacy and subject area teachers collaborate and learn together (Chandler-Olcott et al., 2016; Hayden et al., 2019). Cinnamon et al. (2021) found that through an integrated professional learning experience, social studies teachers learned value in teaching DL through historical inquiry; ELA teachers learned to anchor general literacy skills in historical content; and they all demonstrated leadership in collaborative instructional development. The PL focused on historical inquiry and teachers identified benefits, including an enhanced understanding of literacy and critical thinking skills and an appreciation for the collaboration between English and social studies teachers. Subsequently, teachers implemented inquiry-based DL, used primary sources, and reduced the need for lectures and note-taking. In a study by Lee et al. (2021), these same results were found when literacy and social studies scholars met biweekly with social studies teachers to collaborate and implement a DL project in their classrooms. Teachers emphasized the benefits of working alongside the scholars and that the collaboration positively impacted their professional knowledge, leading to improved instruction. All these studies found that the PL led teachers to better integrate DL within their instruction, with teachers' perception that students' engagement and learning increased because of the changed instruction.

Other research highlights the importance of starting with foundational and subject-area knowledge before transitioning to DL learning. For instance, Aguirre-Muñoz et al. (2024) determined that PL, which starts with strong foundations in subject matter, better prepares teachers to incorporate DL techniques effectively in their instruction, which "in turn enhances their ability to support English learners (ELs) effectively in STEM subjects" (n.p., section 4).

Theoretical Framework

This body of research highlights the significance of acknowledging the in-depth content expertise that disciplinary teachers bring to their classrooms—expertise that is often overlooked or undervalued in literacy-focused professional learning. Rather than assuming gaps in teacher knowledge, our approach begins with honoring what teachers already know and do. We focused on disciplinary teacher expertise in our previous section to challenge deficit narratives and establish a foundation for more respectful, collaborative professional learning (Brock, Robertson, et al., 2021). This is because, in this study, we aimed to understand how teachers perceive their readiness and needs, rather than diagnosing shortcomings. We want to emphasize how having these data must bridge to how our professional learning is co-constructed to be meaningful, context-responsive learning experiences. To support this aim, we drew on multiple theoretical perspectives. Self-efficacy theory (Bandura, 1997) informed the design of our survey instrument, given its strong association with teachers' beliefs about their ability to engage in new and complex practices (Coelho, 2020; Dismuke, 2015; Hodges et al., 2019). However, our broader approach to professional learning is grounded in adult learning theory, particularly andragogy (Knowles, 1984), and communities of practice (Lave & Wenger, 1991), which

emphasize collaboration, context, and the centrality of teacher voices in shaping learning.

Professional Learning

Research indicates that effective professional learning is job-embedded, ongoing, content-focused, and needs-based (Learning Forward, 2015). It involves actively engaging learners, collaboration, utilizing models of effective practice, providing coaching that offers constructive feedback, and offering expert support and reflection (Darling-Hammond et al., 2017). Additionally, as Desimone's (2009) meta-analysis asserts, high-quality professional learning cannot be limited in scope or relevance. Instead, it must be coherent with teachers' existing knowledge and beliefs; of sufficient duration for intellectual, and subsequently pedagogical, change to occur; and engage participants in collective, supported discourse and practice. Research has also shown that this support and modeling can be strengthened through building and fostering school-district-university partnerships (Cosenza et al., 2023; Lee et al., 2021). These beliefs were foundational to our approach to the study – we sought to gather teachers' perceptions *befor*e designing PL opportunities precisely, so PL reflected these hallmarks of quality professional learning.

Andragogy and Communities of Practice

Approaching PL as reflective, collaborative, and responsive to teachers' needs aligns with Knowles's (1984, 1989) conceptions of andragogy, which emphasizes that adult learners bring diverse experiences, motivations, and knowledge that should shape their learning. When educators share their experiences and expertise in social contexts, they form professional learning communities (Dufour et al., 2021; Robertson et al., 2020) and communities of practice (Lave & Wenger, 1991), which promote collective inquiry and mutual growth (Gonçalves et al., 2022; Tannehill & MacPhail, 2017). Rather than privileging a single "expert," we envision communities where all members contribute as legitimate participants based on their disciplinary expertise, unified by a student-centered purpose (Centre for the Use of Research Evidence in Education [CUREE] & Pearson School Improvement, 2012; Wenger, 2010).

These communities thrive on ongoing, reflective dialogue (Brock, Robertson, et al., 2021; Dobbs et al., 2016) and a shared commitment to support students. Yet, challenges arise when one voice, often that of the literacy specialist, is perceived as dominant. While this may seem logical, it undermines the goal of DL professional learning, which requires drawing on the diverse strengths of *all* teachers (Wenger, 2010). Successful PL must start by understanding where teachers feel confident and where they need support, making space for their voices and knowledge to shape the work. Just as teachers must reflect on their own efficacy, we, as literacy specialists and experts, must examine what we know, how we collaborate, and how we avoid reproducing top-down, deficit-based models (Morrison et al., 2021). To support this shift, we designed a study grounded in teacher voice and self-efficacy to better understand how educators view their readiness to teach DL and how professional learning can be reimagined accordingly.

Methods

In the following section, we briefly discuss the development of the Teachers' Self-Efficacy in Content-Area and Disciplinary Literacy (CADL) Scale (O'Byrne et al., 2020), share the items specific to this article's research questions, describe data collection and the participants of this study, and end with data analysis procedures before sharing our findings and situating them within existing scholarship.

Instrument Development and Validation

The CADL Scale contains three subsections: (1) a 40-item general literacy and literacy instruction scale, the analysis of which is reported elsewhere (Savitz et al., 2024); (2) subject-specific DL items (between 7 and 11 items depending on the subject area); and (3) teacher demographic and teacher disposition items. This article focuses exclusively on the second section, which examines subject-specific disciplinary literacy, as well as certain teacher demographics. These items were designed using Lent and Voigt's (2019) outline of DL practices (reading, writing, and speaking/thinking) in eight different subject areas, as well as subject-specific standards documents where necessary (e.g., Common Core Math Practice Standards).

As detailed in O'Byrne et al. (2020), the development of the CADL Scale included three phases: (1) review of relevant and current literature on DL to address content validity; (2) solicitation of expert feedback on items from eight experts in specific literacy subfields, such as these terms are in relation to what the experts were experts about, those specific literacy subfields assessment, digital literacies, culturally sustaining pedagogies, writing instruction, English language learners, academic language, CAL, and DL to address face and content validity; and (3) cognitive interviews (Collins, 2003) with 19 middle and high school teachers from eight different subject areas to address response process validity. Items were revised for content, length, and clarity based on feedback from the literacy experts and teachers. For instance, we opted to use the terms "traditional" and "non-traditional" texts, supplemented by parenthetical examples and a glossary, to minimize discrepancies in interpretation.

Although scale validation often includes statistical procedures such as factor analysis to provide evidence for construct validity, this study intentionally did not pursue that

approach. Because the survey was designed to reflect disciplinary distinctions, each subject area received parallel items tailored to its content and practices. For example, the item "I am confident in my ability to teach vocabulary specific to the performing arts (e.g., meter, forte, aria . . .)" was mirrored in social studies as "I am confident in my ability to teach vocabulary specific to social studies and the use of context to learn unknown words (e.g., democratic vs Democratic, amnesty, artifact)." While the structure and intent of these items remained consistent, their disciplinary specificity limited the applicability of traditional construct validation techniques. Instead, validation efforts prioritized content alignment, expert review, and teacher feedback through cognitive interviews. In line with recommendations from the *Standards for Educational and Psychological Testing* (American Educational Research Association et al. [AERA], 2014), these steps were deemed a sufficient validity argument in this exploratory context.

Subject-Specific Disciplinary Literacy Items. The DL portion of the CADL Scale asked participants to select one of eight subject areas based on their primary teaching assignment: ELA, mathematics, science, social studies, performing arts, visual arts, physical education, and world languages. Participants then responded to seven core items adapted for their discipline using a 4-point Likert scale (highly confident to not confident), with options to skip or select "not sure." Each item assessed teacher self-efficacy related to DL practices such as teaching strategies, vocabulary, reading and writing like disciplinary experts, and apprenticing students into disciplinary thinking. For instance, the Strategies Ability item for science emphasized identifying relevant and valid evidence and sources, identifying and interpreting patterns and relationships, recognizing and understanding symbols, etc., while the ELA version focused on using literary techniques for analysis and comprehension of theme, bias, point-of-view, figurative and descriptive language, rhetoric, dramatic structure, etc.

- Knowledge of literacy strategies that support learning in [subject-area] classes (Strategies Knowledge)
- Ability to teach students how to use literacy strategies that support learning in [subject-area] classes (Strategies Ability)
- Ability to teach vocabulary specific to [subject-area] (Teach Vocab)
- Ability to teach students how to read and comprehend traditional texts like a [disciplinary expert] (Traditional Texts)
- Ability to teach students how to interpret, analyze, and use nontraditional texts like a [disciplinary expert] (Nontraditional Texts)
- Ability to teach students how to write like a [disciplinary expert] (Expert Writer)
- Ability to apprentice students through the process of thinking like and becoming a [disciplinary expert] (Becoming Expert)

Next, we provide examples of the *Strategies Ability* item as it appeared to science and ELA teachers so that readers can get a sense of how our questions were similar and different across subject areas.

- **Science:** I am confident in my ability to teach students how to use literacy strategies that support learning in science classes (*e.g., identifying relevant and valid evidence and sources; identifying and interpreting patterns and relationships; recognizing and understanding symbols; understanding and interpreting abstract ideas; demonstrating problem-solving techniques; analyzing and interpreting scientific problems to draw conclusions and make predictions; participating in discussion*)
- **English:** I am confident in my ability to teach students how to use literacy strategies that support learning in English language arts classes (*e.g., using literary techniques for analysis and comprehension of theme, bias, point-of-view, figurative and descriptive language, rhetoric, and dramatic structure; using critical lenses for analysis and comprehension to compare and contrast texts and themes, analyze and understand multiple perspectives, ask questions and form connections with texts; participating in discussion*)

Because literacy is foundational to ELA and world languages, teachers in those subjects also received three additional items on reading and writing process knowledge and instruction.

- Knowledge of the reading process and components of literacy (Reading Process Knowledge)
- Ability to provide instructional support for the reading process and components of literacy (Reading Process Ability)
- Knowledge of how to teach writing as a process (Writing Process Knowledge)

ELA teachers received one further item on their ability to support writing as a process.

- Ability to provide instructional support for writing as a process (Writing Process Ability)

Teacher Demographic Items. The final section of the survey asked participants to share demographic data using a provided list. There were eight demographic variables of interest:

- Subject area
- Completion of the required state literacy course (SLC)
- Status as a certified educator
- Years of teaching experience

We did not ask questions about gender, race, ethnicity, or affiliation with a specific school, district, or city because cognitive interviewees shared concerns that this information could lead to a potential lack of anonymity.

Data Collection

To determine the best way to distribute our survey to teachers statewide, we consulted with representatives from the State Department of Education. They provided us with a listserv of all middle and high school principals to help disseminate the purpose of our study and our Qualtrics survey. Once IRB approved our research across all institutions, we sent a recruitment email with a link to our survey and the study's purpose to those principals, asking them to share this with their respective faculties. We sent a follow-up email shortly after the initial one. We also employed a form of snowball sampling by recruiting participants at state education conferences for middle and secondary teachers across all content areas. We sent the survey link to 669 principals, and it remained active for 9 weeks. Unfortunately, this recruitment strategy does not let us know which administrators shared the recruitment email with their faculty and which did not. Due to this uncertainty, it is not possible to determine a response rate.

Participants

In total, 206 teachers completed the first section of the CADL scale on adolescent literacy instruction. Of these, 165 teachers also completed the remaining two sections: subject-specific DL items and demographic data. Thus, the total sample size for the analyses presented here was $n = 165$. Summaries of the distributions of the eight demographic variables of interest for these 165 teachers are presented in Table 1.

To determine if this sample was representative of the population of secondary teachers in South Carolina, the sample distributions presented in Table 1 were compared to data from the 2019–2020 professional certified staff file for the state (Dickenson et al., 2020). The sample was determined to be fairly representative of the target population in terms of years of experience, teaching position, and grade level taught. That said, ELA teachers and those from the Lowcountry region were overrepresented in the sample, while PE teachers and those from the Midlands region were underrepresented.

Data Analysis

The data analysis for this quantitative study was primarily exploratory and focused on creating visualizations of the item response distributions that facilitated comparisons of teachers' perceptions of their DL expertise within and across subject areas. We chose to focus on describing the trends present within the collected data, as opposed to using *p*-values to make inferential statements, because, as noted in the American Statistical Association's 2016 statement on *p*-values:

> Good statistical practice, as an essential component of good scientific practice, emphasizes principles of good study design and conduct, a variety of numerical and graphical summaries of data, understanding of the phenomenon under study, interpretation of results in context, complete reporting, and proper logical and quantitative understanding of what data summaries mean. No single index should substitute for scientific reasoning. (Wasserstein & Lazar, 2016)

To date, little DL research has focused on teachers' perceptions of their DL expertise in a quantitative manner, so we did not use a priori hypotheses suitable for a null hypothesis significance testing approach. Furthermore, we chose to present the survey results visually rather than in a table because, as noted in Gelman et al. (2002), several statistical studies on displaying data have concluded that visualizations are better suited for perceiving trends and making comparisons—the goals of this study. In contrast, tables are best suited for looking up specific information. Data visualization is an analytical approach that has grown in both rigor and popularity with the advent of the field of data science and the advancement of visualization software (e.g., Healy, 2018).

A mosaic plot was created for each of the seven core literacy items to facilitate comparisons of teachers' reported self-efficacy across subject areas. That is, within an item, a separate bar was created for each subject area, which was segmented according to the proportion of respondents selecting each possible response option. In a mosaic plot, the width of the bars is proportional to the group size, or the size of a subject area in this case. As a result, subjects such as PE, with relatively few respondents, will have very thin bars and thus be de-emphasized in the visual comparison. A separate bar to the right of the mosaic plot was created to display the overall item response distribution combined across subject areas.

These visualizations (see Figure 1) allowed for easy comparisons of which subject-area teachers reported higher and lower levels of efficacy within a particular aspect of DL. For instance, if the sampled teachers in a particular subject area had more efficacy than typical in the overall sample, then the bar for that subject would have higher selection rates for the *highly confident* and *fairly confident* options (the lightest gray colors in Figure 1) and lower selection rates for the *developing* and *not confident* options (the dark gray and

TABLE 1
Demographic Characteristics of Participants

Characteristic	*n*	%
Read2Succeed completion		
Yes	102	62.2
No	62	37.8
Certified educator		
Yes	158	96.9
No	5	3.1
Years experience		
0–3 years	19	11.5
4–7 years	19	11.5
8–14 years	47	28.5
15+ years	80	48.5
Teaching position		
General education teacher	141	85.5
Special education teacher	13	7.9
Instructional or literacy coach	6	3.6
Media specialist	4	2.4
Support personnel	1	0.6
Grade level		
Middle	65	39.6
High	80	48.8
Both	19	11.6
School setting		
Rural	86	52.4
Suburban	48	29.3
Urban	30	18.3
Region		
Upstate	50	30.3
Midlands	31	18.8
PeeDee	23	13.9
Lowcountry	61	37.0
Discipline		
English language arts	61	37.0
World languages	12	7.3
Math	27	16.4
Science	20	12.1
Social studies	25	15.2
Physical education	3	1.8
Visual arts	10	6.1
Performing arts	7	4.2

black colors, respectively, in Figure 1) compared to the separate bar for the combined distribution. For subject areas that noticeably differed in their responses to an item, a two-proportion *z*-interval was calculated to provide an idea of how large observed differences might be in the population represented by this sample, assuming large enough counts for the normality assumption to be reasonable (i.e., at least 10 selecting the response option of interest and 10 selecting other response options in both subject areas).

To facilitate comparisons of teachers' reported self-efficacy within a subject area, a separate segmented bar graph was created for each of the eight subject areas (e.g., ELA or math). These bar graphs display the response distributions for each literacy item side by side. That is, within a subject, a separate bar was created for each item, segmented according to the proportion of respondents selecting each possible response option. These visualizations (see Figure 2) facilitated easy comparisons of the aspects of DL items for which the sampled teachers in a particular subject area demonstrated higher and lower levels of efficacy. For instance, when looking within a subject, the aspects of DL for which teachers had higher levels of efficacy correspond to the bars displaying higher selection rates for the *highly confident* and *fairly confident* options (the lightest gray colors in Figure 2) and thus lower selection rates for the *developing* and *not confident* options (the dark gray and black colors, respectively, in Figure 2).

Though respondents were allowed to select "*not sure"* or "skip" any item, this was rarely done on the subject-specific DL items. Four respondents selected "*not sure"* to a total of six items, and eight respondents skipped a total of ten items. With such a low missingness rate (approximately 0.1%), these *not sure* and skipped responses were simply omitted from determining the item response distributions.

Results

Overall, the secondary teachers surveyed reported high levels of self-efficacy in teaching aspects of DL, as measured by our subject-specific items. Notably, reports of high self-efficacy extended beyond ELA teachers, who have historically been most associated with teaching reading and writing. For example, the *"not confident"* option was never selected by world languages, social studies, physical education, or performing arts teachers (as can be seen by the absence of this response option for these subject areas in Figure 2), and no teachers selected the *"not confident"* choice for the teaching vocabulary item (as seen in the top panel of Figure 1). Math teachers also had some of the highest levels of efficacy across all items, as seen by a comparison across subject areas in Figure 2. These results align with current scholarship that demonstrates how subject-area teachers are engaging in the DL demands in their classrooms (Ippolito et al., 2024; Lee et al., 2021; McLean Davies et al., 2022; Thomas & Drew, 2021).

Secondary Teachers' High Self-Efficacy in Teaching Vocabulary

Overall, secondary subject-area teachers reported the highest levels of self-efficacy in teaching vocabulary: 72.1%

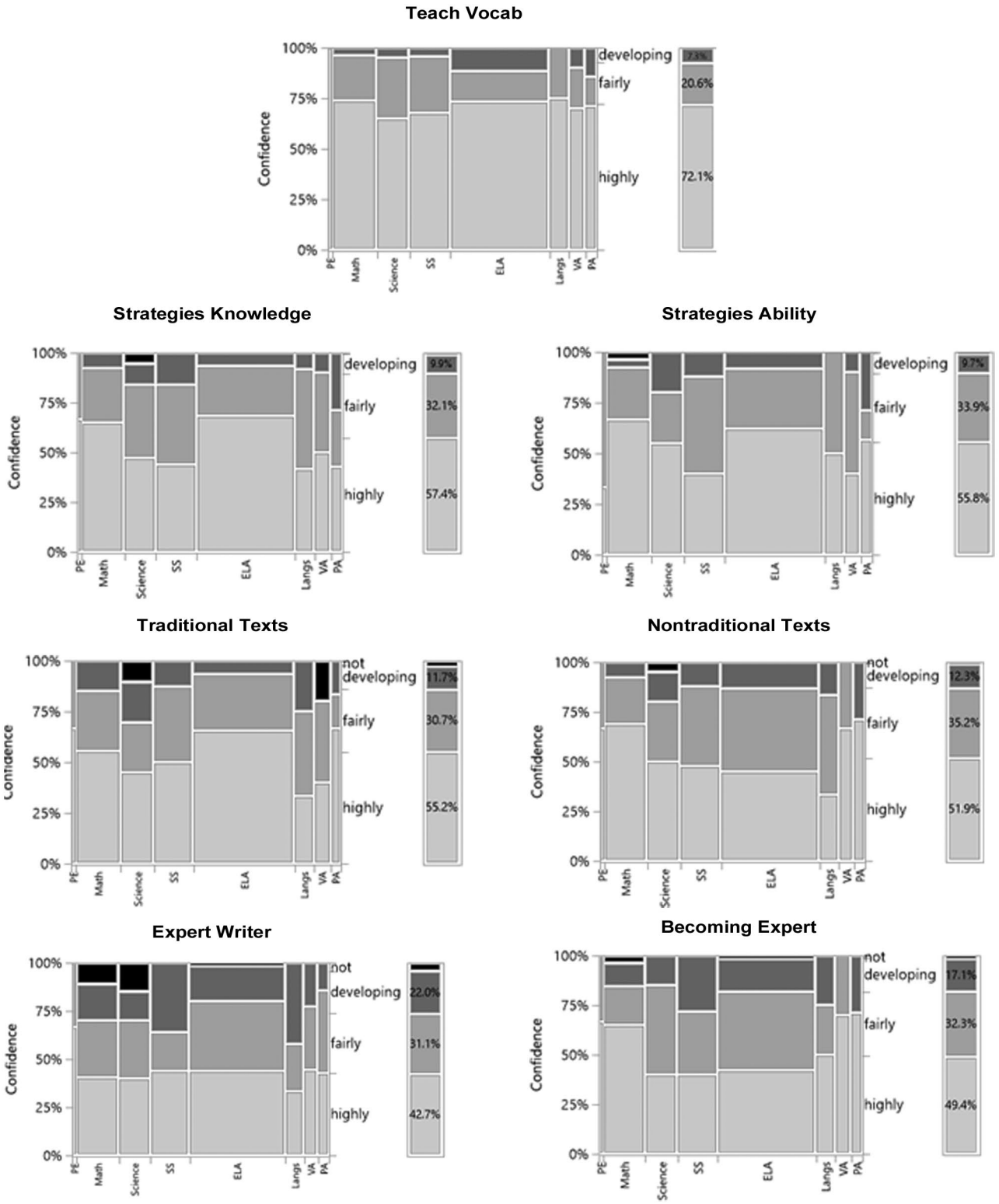

FIGURE 1. *Mosaic plots comparing item response distributions across subject areas.*
Note. PE = physical education, SS = social studies, ELA = English language arts, Langs = world languages, VA = visual arts, PA = performing arts.

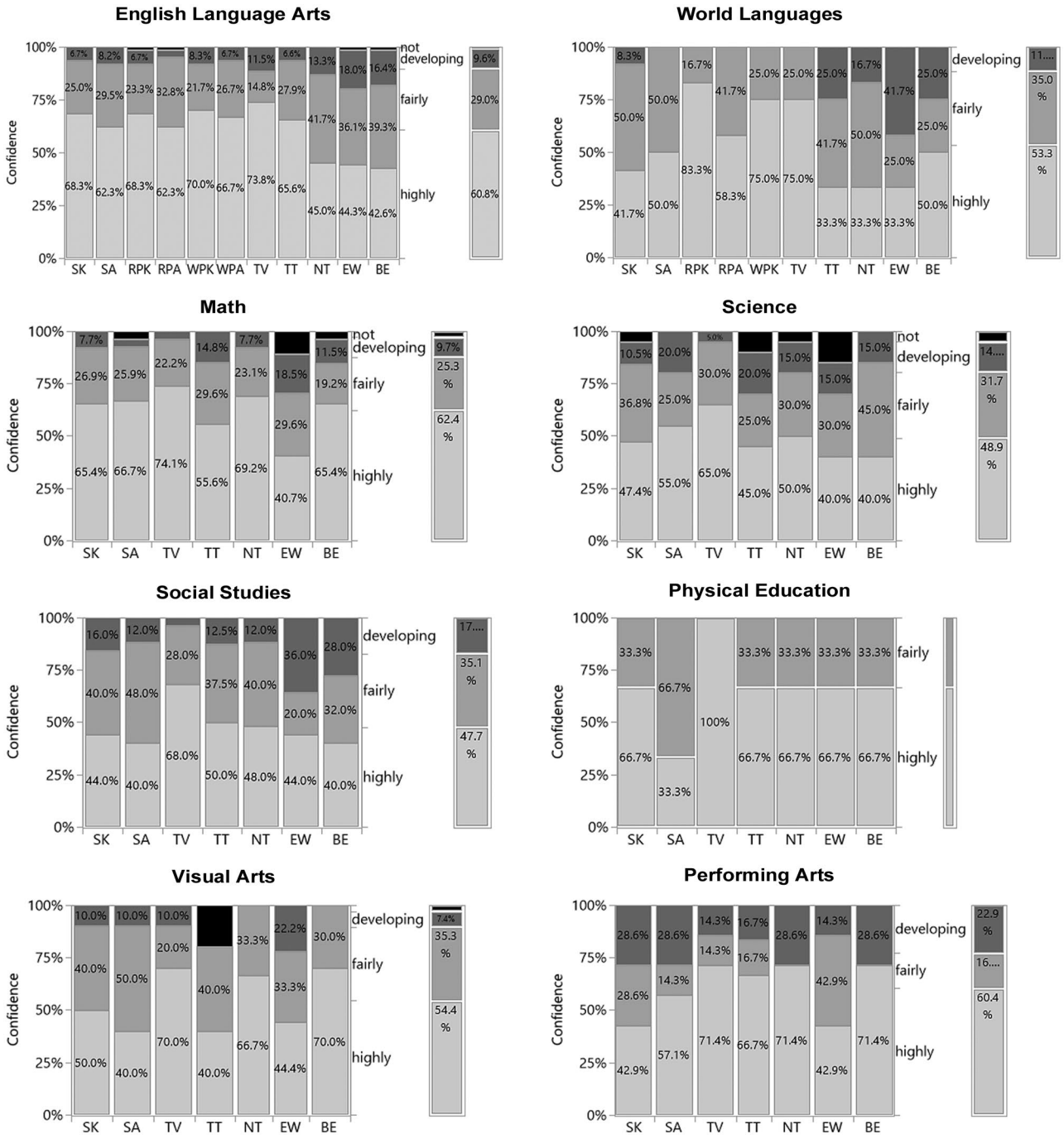

FIGURE 2. *Segmented bar graphs comparing item response distributions within a discipline.*
Note. SK = strategies knowledge, SA = strategies ability, RPK = reading process knowledge, RPA = reading process ability, WPK = writing process knowledge, WPA = writing process ability, TV = teach vocab, TT = traditional texts, NT = nontraditional texts, EW = expert writer, BE = becoming expert.

of the surveyed teachers selected "highly confident" for the teaching vocabulary item, and another 20.6% selected "fairly confident." The mosaic plots comparing item response distributions across subject areas (see Figure 1 below) reveal that this high level of efficacy in teaching vocabulary was consistent across all eight subject areas. Recall that, in each panel of Figure 1, the bar to the right of the mosaic plot displays the overall item response distribution combined across subject areas.

The segmented bar graphs, which compare the response distributions across items within a subject (Figure 2), reveal that teaching vocabulary was the literacy item with which teachers across subject areas reported the highest self-efficacy. ELA, world language, math, science, social studies,

and PE teachers all reported greater levels of self-efficacy in teaching vocabulary than in the other six literacy items. Performing and visual arts teachers also reported high levels of self-efficacy in teaching vocabulary. However, in both cases, they reported similar levels of self-efficacy in supporting students to become subject-matter experts.

Secondary Teachers' Low Self-Efficacy in Teaching Writing

Secondary teachers across all eight subject areas reported low self-efficacy in *teaching writing like subject-matter expert*s. As the mosaic plots in Figure 1 illustrate, only 42.7% of all surveyed teachers reported high self-efficacy in teaching writing. The segmented bar graphs in Figure 2 tell the same story, however, in greater detail: In all subject areas except PE, the percentage of teachers who selected "highly confident" in *teaching students to write like experts* was among the lowest compared to the other literacy items. Even ELA teachers, who are traditionally tasked with teaching writing, reported low levels of self-efficacy in *teaching students to write like experts* compared to other literacy items. PE teachers were an anomaly here: Unlike teachers in other subject areas, they reported the lowest self-efficacy in teaching reading strategies (only 33.3% selected "highly confident"; see Figure 2).

Secondary Teachers' Differing Results for Becoming a Subject-Matter Expert

Whereas findings related to self-efficacy in *teaching vocabulary* and *teaching students to write like experts* were largely consistent across teachers in all eight subject areas, findings related to teachers' self-efficacy in *apprenticing students to become disciplinary experts* differed by discipline (see Figure 1). We defined apprenticing for respondents as the teacher acting as an experienced expert who teaches by modeling and demonstrating disciplinary work. Specifically, as the *becoming expert* mosaic plot in Figure 1 shows, teachers in four subject areas—PE, math, visual arts, and performing arts—reported higher self-efficacy in *apprenticing students*. In contrast, science, social studies, ELA, and world language teachers reported lower self-efficacy in this area. In fact, in ELA, science, social studies, and physical education, teachers had similarly low levels of efficacy in *becoming experts* as they did in *teaching students to write like an expert*.

The segmented bar graphs in Figure 2 confirm this finding, revealing that *becoming experts* was among the lowest-ranked literacy items for ELA, science, and social studies teachers (i.e., teachers in these subject areas selected this item with lower percentages of highly confident responses compared to how they ranked other literacy items). PE and world language teachers ranked *becoming experts* roughly on par with other literacy items, while math, visual arts, and performing arts teachers ranked it higher than the other items. Indeed, a higher proportion of math teachers (.654) than ELA teachers (.426) in the sample indicated were highly confident with *becoming experts*, with a 95% confidence interval estimating this difference in proportions (math–ELA) could be as small as .001 or as large as .449 in the population.

Secondary Teachers' Differing Results for Traditional and Non-Traditional Texts

Finally, there were also disciplinary differences in teachers' reported self-efficacy with "traditional" and "non-traditional" texts. Specifically, as Figure 2 illustrates, nearly 66% of ELA teachers reported high self-efficacy with traditional texts, including novels, plays, and short stories. In contrast, only 45% of ELA teachers reported high self-efficacy with non-traditional texts, such as video clips or blogs. By contrast, in math, science, visual arts, and performing arts, teachers reported greater efficacy working with non-traditional texts than with traditional texts (Figure 2). A noticeably higher proportion of math teachers (.692) than of ELA teachers (.450) indicated they were highly confident in working with non-traditional texts, with a 95% confidence interval estimating that the difference in proportions (math–ELA) could range from .025 to .460 in the population. Thus, our findings highlight that teachers may hold differing views of their capabilities related to literacy instruction, depending on what they consider "text."

Discussion and Implications

This study was guided by two goals: to contribute to research that recognizes the perceived expertise of subject-area teachers and to support the growing call for collaborative, co-designed professional learning between disciplinary educators and literacy scholars. These goals directly address ongoing challenges in professional learning design, particularly the need to move away from deficit-based models and toward approaches that recognize and honor the knowledge and needs of all educators. In the following section, we revisit these goals through the lens of our findings and discuss implications for researchers, PL facilitators, and teacher educators invested in more inclusive and effective DL professional learning.

Perceived Expertise of Subject-Area Teachers

Across disciplines, two consistent patterns emerged in Figure 1: Teachers reported the highest efficacy with vocabulary instruction and the lowest with disciplinary writing, while confidence with multimodal and digital texts varied by discipline. While the respondents of our study did not feel

efficacious in all things DL, they did report being efficacious in many ways, aligning with previous research and scholarship (Graham et al., 2021; Hinchman & O'Brien, 2019; McLean Davies et al., 2022). For instance, these teachers reported high self-efficacy in teaching domain-specific vocabulary (see top panel of Figure 1), which may not be surprising, as teaching vocabulary is a common topic in coursework and professional learning, possibly due to vocabulary being part of many state standards regardless of discipline (e.g., Common Core Standards, 2010; National Council for the Social Studies, 2013; NGSS Lead States, 2013). Additionally, teachers across all grades and subjects learn about tiered vocabulary (Beck et al., 2013), where Tier 1 consists of common, everyday words students should know; Tier 2 includes words used across content areas; and Tier 3 involves discipline-specific words. This framework has been traditionally included in professional learning for decades (e.g., Hinchman & O'Brien, 2019).

Learning academic vocabulary has frequently been identified as critical for teachers and essential for students to know and use within learning (Hiebert, 2020; Windschitl et al., 2018), but there is also a need to move beyond individual word understanding to participate within the disciplinary discourse (Gabriel, 2023; Sun et al., 2024; Thomas & Drew, 2021). For instance, Kane et al.'s (2024) study emphasized the interrelationship in vocabulary instruction in mathematics classrooms, requiring students (and teachers) to understand disciplinary terminology beyond definitions and to grasp conceptual understandings of fractions, percentages, ratios, proportions, and even slope. By exploring the different ways that ratios and percentages, for example, are represented symbolically, students can begin to have access to a foundational principle about knowledge-building in mathematics.

On the other hand, our respondents reported a lower self-efficacy with disciplinary writing (see bottom-left panel of Figure 1), aligning with existing educational research that highlights a widespread lack of effective PL in teaching text-based forms of writing, not to mention multimodal composition (Graham, 2021; Graham et al., 2018; Hodges et al., 2022). For example, in national surveys, 64% of middle school teachers and 70% of high school teachers reported receiving minimal to no formal preparation in the teaching of writing (Gillespie et al., 2014; Graham et al., 2014). This finding is especially unfortunate given that writing has repeatedly been found to support subject-area learning (Fang et al., 2023; Graham et al., 2021; Ippolito et al., 2024) and not by just asking students to write in formulaic ways to meet the requirements of high-stakes testing (e.g., Graham, 2021). When secondary teachers lack efficacy to teach writing in their disciplines, possibly because the pressures of high-stakes testing can narrow teachers' pedagogical perspectives (Jonsson & Leden, 2019), students may not engage in writing practices that reflect the embodiment of specific disciplines. This may mean that students could be asked to write extended constructed responses to preset prompts or formulate writing, such as a five-paragraph essay, in lieu of research exploration reports in science or historical analyses in social studies.

Another DL practice where teachers felt less efficacious concerned using a variety of text types, including multimodal and digital texts (e.g., Bråten et al., 2020). Our respondents reported differing levels of self-efficacy depending on the texts with which they work (see mosaic plots for traditional and non-traditional texts in Figure 1). Broadening definitions of *text* in DL instruction is critical because narrow definitions of text privilege monomodal, print-based, and alphabetic work and have often eroded trust between subject area teachers and literacy stakeholders (Greenleaf & Hinchman, 2020; Siebert et al., 2016). When we broaden what counts as text, mathematics classroom teachers can better envision what it means to model for students how to read a chart or table or what it means to encourage mathematical writing (Kane et al., 2024); social studies classrooms can explore documentaries and political cartoons (Lesh, 2023); and dance classrooms can critique a performance (Savitz & Leonard, 2024). Therefore, our findings make sense in understanding why some subject areas report strong self-efficacy with multimodal, nonlinear, or nonalphabetic forms of texts, even while they report less self-efficacy with monomodal, print-based, and alphabetic texts. Findings from this survey suggest a need for English teacher educators to do more to support ELA teachers in using multimodal and digital texts since ELA teachers in this survey reported much lower self-efficacy with multimodal texts than with print-based, monomodal, and alphabetic ones (as seen by comparing the response distributions for the traditional and non-traditional text items for ELA teachers in the top-left panel of Figure 2).

These findings reveal a persistent tension: While teachers recognize the importance of working with a wide range of texts, their confidence with multimodal forms is uneven. If the ultimate goal is for students to be exposed to a wide range of ideas, topics, subjects, skills, and identities while also gaining the foundational knowledge, concepts, and skills needed to be productive and critical members of a democratic society, then we need to rethink how we are posing instruction through "real world" problems and inquiry-based learning (Cinnamon et al., 2021; Ippolito et al., 2024; Lesh, 2023; Morrison, 2018; Thomas & Drew, 2021; Wolsey & Lapp, 2024). This reframes the learning in ways that focus on the vocabulary, language, skills, epistemologies, conventions, competencies, and habits of mind associated with particular disciplines but does so in ways that reflect the types of situations individuals within a field may encounter (Croce & McCormick, 2020; Gabriel, 2023; McLean Davies et al., 2022; Monte-Sano & Thomson, 2022). However, transitioning instruction in this way may

require ongoing professional learning that incorporates the expertise of all stakeholders.

Collaborative and Codesigned Professional Learning

This brings us to the second purpose of our study: to amplify the scholarship of others who advocate for collaboration and codesigning professional learning with disciplinary scholars and educators, thereby forming multimember communities of practice using an asset-based lens.

While our study was limited by the small yet representative sample of teacher-reported data, the results are essential to consider when assuming what subject area teachers perceive to know about DL. While we, as literacy scholars and educators, possess immense expertise in literacy, we also have varying levels of expertise in each discipline (Elish-Piper et al., 2016; Ippolito et al., 2024; Savitz et al., 2024). This is acceptable, as our combined expertise matters most for learning (Hinchman & O'Brien, 2019; McLean Davies et al., 2022). Each educator has varying expertise in knowing each discipline's unique ways of engaging with content, constructing knowledge, and using language, so there needs to be an understanding that literacy is part of engaging in the discipline and not viewed as a separate entity (Brock, Robertson, et al., 2021; Kane & Saclarides, 2022; Puig & Froelich, 2022) by outsiders (Chandler-Olcott, 2017).

As the research showcased earlier notes, having a mix of perspectives is critical for success, as each person's perspective brings a new vantage point to the learning process. Therefore, learning opportunities should be created with teachers' voices included, ongoing, and tailored to meet teachers' needs, informing their instructional practices (Chandler-Olcott et al., 2016; Hayden et al., 2020). For instance, teachers may want to start with foundational learning (e.g., Aguirre-Muñoz et al., 2024) or jump right into enacting DL within units of instruction (e.g., Lee et al., 2021), or professional learning may need to begin with teachers' strengths, such as our teachers' high self-efficacy with vocabulary or their most significant area of need, such as disciplinary writing. Through professional learning and engaging together, this provides a way to determine if perceived efficacy aligns with actual efficacy, ensuring that teachers are genuinely equipped to do what they believe they can.

Supporting teachers' enactment of DL is essential and aligns with the 2017 International Literacy Association standards for K–12 reading/literacy professionals (i.e., specialists, coaches, and district coordinators) (ILA, 2019; Kerns et al., 2018). However, this work requires vulnerability from all involved (Kelly & Cherkowski, 2017) and sustained collaborative reflection (Brock, Robertson, et al., 2021) to understand how teachers are *already* embedding literacy in their classrooms and how they might further develop DL practices. If DL enactment is truly the goal, then professional learning must begin by privileging and leveraging teachers' subject-specific identities, expertise, and ways of knowing (Hinchman & O'Brien, 2019; McLean Davies et al., 2022; Siebert et al., 2016). Only by honoring these disciplinary foundations can we, as literacy scholars, contribute to more equitable, sustainable, and teacher-centered models of PL that genuinely support DL enactment across all subject areas.

Practical Implications

Our results suggest three high-leverage directions for practice. For teacher educators, course modules should explicitly apprentice candidates into teaching disciplinary writing (the lowest area of self-efficacy overall) and non-traditional/multimodal texts, with direct modeling (see Figures 1–2 for cross-disciplinary trends). For professional learning designers, co-designed professional learning can start from teachers' strengths (e.g., consistently high efficacy with vocabulary) and then extend into writing and multimodality through discipline-specific tasks, rubrics, and exemplars. For school and district leaders, data-informed decisions should prioritize time for professional learning communities that examine how teachers define "texts" in their disciplines and plan authentic genre tasks (e.g., lab reports, data commentaries, historical analysis) so that writing and multimodality are routinely assessed, not added on. These implications follow directly from the observed pattern of high vocabulary efficacy and comparatively lower writing efficacy across our participants.

While our results highlight potential directions for practice, they also underscore the limits of making decisions without teacher input. Teacher self-efficacy and perceived expertise vary across disciplines, schools, and regions, indicating that professional learning cannot be effectively designed based on generalized assumptions alone. We urge teacher educators and school leaders to gather the voices of their own teachers before determining what support is needed, ensuring that the support is aligned with those who will receive it. Using our results as a reference point is valuable, but centering teacher voice in each local context is essential for designing responsive, sustainable disciplinary literacy professional learning.

Limitations and Future Research

Although we conducted cognitive interviews with subject-specific teachers during the development of the survey instrument, the wording of some items may have favored the language of literacy and ELA teachers. These cognitive interview questions probed teachers' discipline-specific views of literacy and text to gauge whether we had captured high-quality examples of discipline-specific literacy practices, strategies, vocabulary, and genres commonly used in each subject area. After conducting 19 cognitive interviews, we reached saturation in terms of feedback.

Though a sample size of 165 teachers is moderate, the surveyed teachers represented the state concerning many factors potentially related to the measured aspects of DL. Several elective subject areas (i.e., PE and the arts) had smaller sample sizes. However, given the primary goal of comparison across subject areas, this is less of a concern, as the conditional proportions being compared take the differing group sizes into account. Any confidence interval calculation accounted for the relative group sizes in determining standard errors. However, as with any sample survey, it is possible that the trends observed in our sample could be due to random chance and not indicative of a genuine effect on the population. It is also possible that some participants may have elected to complete the survey because they were fairly confident in DL, whereas others who were contacted chose not to respond because they were less confident in DL. However, we hoped that assuring anonymity and confidentiality would encourage honest responses from a wide range of individuals.

Finally, this survey represents self-reporting about teachers' self-efficacy related to their knowledge of DL strategies and instructional practices. However, the survey does not provide insight into teachers' specific instructional practices or why subject-area teachers may rate themselves as they did in specific areas. Future research could incorporate qualitative components, such as open-ended questions or interviews, to provide clarification and depth to survey responses and potentially probe teachers' decision-making related to DL. Future studies with larger samples across disciplines or replication studies in other states would also strengthen the generalizability of these findings.

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Open Practices

Study instrumentation, data, and code available at: https://www.openicpsr.org/openicpsr/project/239165/version/V1/view

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