Project-Based Learning, Transdisciplinary Literacy, Equity Lens - A Mixed Method Study Facilitated to Examine Teacher Identities and Student Impact

by

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Abstract

The study reported a mixed-methods research of transdisciplinary literacy (TDL) within a kindergarten through 3rd grade project-based learning (PBL) unit design. This study has important implications as it analyzed how elementary teachers' identities impacted how they approached text selection, evaluated PBL lessons through a transdisciplinary lens, and shifted their teaching strategies within a Community of Practice (CoP). Through a convergent parallel mixed method design, the researcher provided evidence to support how a transdisciplinary approach informed instructional knowledge and the development of innovative practices as twenty teachers created rigorous PBL units that engaged students to generate authentic products. The quantitative portion of the research involved pre- and post-survey comparisons from teachers within the CoP and an examination of benchmark data from student English Language Arts/Reading and Math percentile achievement scores from the *Measurement of Academic Progress* (MAP) testing. The student population consisted of up to 73 male and female children kindergarten through third grade who attended a Title 1 school in rural Southwest Georgia. In the qualitative portion of this study, researcher conducted an inductive analysis of data gathered from twenty certified elementary teachers from the same school. Data included field notes, observations, and interviews about how learners of all abilities interacted and engaged with texts, and how their achievement was shaped by instruction focused on transdisciplinary literacy and PBL frameworks. Results could inform future studies about the role of TDL as teachers created PBL lessons with a focus on recognizing how learners need different approaches, resources, or supports. Moreover, this study furthered the quest for educators to select texts responsive to all learners within the U.S. educational systems.

Acknowledgments

Two times a day, I receive a reminder notice on my phone. One daughter set it to chime- *remember to breathe* and the other daughter suggests that I *be grateful for something*. Each day, I know these reminders are headed my way, but each day, they are a surprise, an uplifting moment on days filled with the pursuit of this degree. In acknowledging those who have supported me over the past few years, I am humbled. As I take that breath of gratitude, I realize the expanse of support that has been thrown around me. It is an orange and blue blanket of grace that covers all the cracks and creases that formed as I worked. I also discovered that knowing more does not always bring more joy. My true source of joy in this journey came from people who believed in me and reminded me each day of a sustaining faith and peace that passes all understanding.

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Mama- My cheerleader. When I was a child, she insisted that I read everything so that I could spend my life seeing everything, feeling everything, and sharing all the talents He gave me with others. Like this incredible woman, I plan to finish this life as she did, coming in sideways, body and mind thoroughly used up, totally worn out, having fulfilled all of my dreams.

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Elise, Dallas, and Ella- For so many years as you grew up, my faith nurtured yours. Now, your faith sustains me. Raising you three will remain my greatest achievement. Sam and Slaton, you two fill me with the lightest, fluffiest joy. Matt and Ashleigh, thank you for supporting me.

Johnnie- You are loved. So many beautiful words between us, but that's all that's needed.

Missy- Thank you for telling me almost fifteen years ago that this dream was possible, that I could do it. You are the rockstar.

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Malcolm- Hearing your story was the paradigm shift I needed and never saw coming.

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List of Abbreviations

CoP	Community of Practice
EIP	Early Intervention Program
EL	Experiential Learning
ELL	English Language Learners
ESOL	English for Speakers of Other Languages
FRAME	Expanded Framework for Reporting Adaptations and Modifications to Evidence-Based Interventions
LETRS	Language Essentials for Teachers of Reading and Spelling
M	Mean
MAP	Measurement of Academic Progress
PBL	Project-based learning
PRISM	Practical Implementation Sustainability Model
RIT	Rasch Unit Score
STEAM	Science, Technology, Engineering, Arts, Math
SD	Standard Deviation
SPSS	Statistical Package for the Social Sciences
SoR	Science of Reading
TDL	Transdisciplinary Literacy

Definitions of Key Terms

Key terms and phrases relevant to the present study are as follows:

Agency. The ability of teachers and students to take initiative and proactively making choices or changes in their learning or academic identity (Bandura, 1980).

Adoption. The intention, initial decision, or action to try or employ an innovation or evidence-based practice.

Community of Practice. Communities of practice are groups of educators who use collaborative settings to draw on experiences to address a concern or an endeavor with the goal of collective learning and shared resources to address identified recurring topics (Wenger, 1998).

Cultural Competence. The bility of students to draw on their own backgrounds, languages, histories, customs, and experiences as they gain fluency and facility in at least one other culture (Ladson-Billings, 2006).

Diverse Learner. Differences among students based upon socioeconomic status, ethnicity/race, learning style, cognitive ability, gender, and ability to process and store knowledge (National Education Association, n.d.)

Experiential Learning. Experiential learning is a process of learning that exists when a person cognitively, affectively, and behaviorally processes knowledge, skills, and/or attitudes through experiencing, reflecting, thinking, and acting in a learning situation characterized by a high level of involvement (Kolb, 1984).

Equity. Quality of being fair or impartial; every child receives what they need to develop to their full academic and social potential and recognizes that learners start from different places, and so different approaches, resources, or supports are needed (Ladson-Billings, 2006).

Feasibility. The extent to which a new treatment, or an innovation, can be successfully

used or carried out within a given agency or setting.

Fidelity. The degree to which an intervention was implemented as it was prescribed in the original protocol or as it was intended by the program developers.

Measurement of Academic Progress. MAP is a nationally recognized assessment for K/12 that assesses growth and achievement in language usage, math, science, and reading from the Northwest Evaluation Association.

Project-based Learning. A student-centered approach and teaching method that engages students in an active and meaningful real-world project (Kolb, 1984).

Rasch Unit Scale. An equal-interval scale is used to measure academic growth in a discipline such as English Language Arts or mathematics from a designated period to another.

Science of Reading. This is an evidence-based approach to teaching reading which has garnered national attention with its renewed focus on phonics instruction that teaches students grapheme-to-phoneme relations, decoding, blending, and building their knowledge base for reading-spelling skills.

Sustainability. The extent to which a newly implemented treatment is maintained or institutionalized within a service setting's ongoing, stable operations.

Teacher Identity. Teachers' belief systems influence their instructional approaches, and discursive practices of dialogic self-reflection and collaboration allow them to navigate tensions and shifts in development of positionalities (Luguetti et al., 2018; Paulus et al., 2020).

Transdisciplinary Literacy. An approach to literacy instruction that moves beyond disciplinary and interdisciplinary approaches to become a convergence of disciplines that thrive in multisensory learning environments (Puig & Froelich, 2022).

Chapter 1. Introduction

Regardless of the discipline,
language is a tool for thinking. - Enrique Puig

The challenges and tensions of teaching in today's educational settings are often met with passionate educators who can effect positive change. As educators provide literacy initiatives for students who thrive in a learning-by-doing process, they also create opportunities for collaboration and open forums for sharing ideas with other educators. When education is curated within engaging environments, sounds of language and literacy emerge as students interact with each other in motivating ways (Hughes, 2011; Puig & Froelich, 2022). Transdisciplinary literacy (TDL) moves beyond disciplinary and interdisciplinary approaches to become a convergence of disciplines (Puig & Froelich, 2022) that thrive in multisensory learning environments. When paired with an inquiry-based approach, TDL promotes effective and efficient learning that transcends traditional tenets of disciplines (Puig & Froelich, 2022). It also provides the flexibility to create an infrastructure that sustains and expands literacy as a process or framework for guiding learners (Puig & Froelich, 2022). Educational institutions that value inquiry-based pedagogies and research-based literacy methods enable children to develop their metalinguistic abilities, transfer knowledge across languages and disciplines, and develop executive functions (Spelorzi et al., 2022). Moreover, experiential learning can further enhance student success (Serry et al., 2021).

High-impact practices such as a community of practice (CoP) function to support teachers through collaboration and professional innovation while addressing a common goal (Ko et al., 2023). When teachers gather to examine evidence-based methods, they can uncover advances in teaching strategies, analyze equitable content reforms to meet the needs of all

learners and discover innovations in their fields (Anderson et Olivier., 2022; Ko et al., 2023). As a result, research indicates that shifts in teacher identity routinely occur as a result of this type of collaboration and exposure to a continuum of theories that guide teaching and research (Truscott & Barker, 2020). Furthermore, TDL has the potential to act as a bridge between several theories by providing opportunities for a convergence of various disciplines to thrive (Stewart et al., 2021). Using an intentional and coherent implementation of a TDL framework, teachers create flexible, multisensory learning environments, promote curiosity, and collaborate with students to foster global citizenship (Puig & Froelich, 2022).

Researchers define literacy as making meaning across languages, cultures, modes of communication, and hierarchical positions that are influenced by a society's language values as they addressed the marginalization of the ways of making meaning through reading, writing, listening, speaking, viewing, composing, and critical thinking (Stewart et al., 2021). This study will examine how social interaction of language and literacy might successfully engage teachers and students in learning across various disciplines (Anderson & Olivier, 2022). It will analyze how teachers and students use learning spaces to make meaning of particular disciplines, be it by infusion of strategies or convergence of disciplines (Stewart et al., 2021; Puig & Froelich, 2022).

Statement of the Problem

Jennifer Serravallo (2019), a leading author of reading conferencing strategies, stated, "All children are ready to learn but are starting from different places… it is the teachers who need to know how to create appropriate instruction for where each child is" (p. 29). The study of the Science of Reading (SoR) remains a significant conversation among the nation's reading experts and stakeholders, highlighting a renewed focus on how children learn to read and how educators recognize reading difficulties (Duffy et al., 2024). Uncovering reading difficulties and

planning interventions that seek positive engagement from students can significantly increase the reading experiences and growth of these students (Ehri, 2022). When students develop greater vocabulary from a wide selection of texts, they are empowered to interact with other students, caregivers, and community members and learn how to access various disciplines more effectively (Dixon et al., 2023). Innovative and collaborative professional development for educators can transform literacy instruction, address the particular needs of learners who demonstrate reading difficulties, including continuity of intervention, and encourage engaging interactions that lay the foundation for fostering intrinsic motivation and positive attitudes for learners (Brown et al., 2021; Henry, 2020).

Often, educators report positive professional development experiences but feel overwhelmed as they re-enter their classrooms and are unsure of how to implement innovative practices that address the needs of their student population (Truscott & Barker, 2020). The assumption that the transmission of this new knowledge will quickly transfer from experts to teacher participants in the classroom persists; however, teachers require ongoing support, using methods that give participants active learning and reflection, allowing them a chance to develop or adapt new ideas to their discipline (Girvan et al., 2016). Prior research does indicate that shifts in teacher identity routinely occur due to meaningful professional development with educators from different disciplines (Truscott & Barker, 2020). Furthermore, there is a gap in research addressing the viability of CoPs comprised of elementary educators from a variety of disciplines (Moltchanov, 2021). CoP as a type of professional development supports people who connect with the purpose to share a concern as well as resources, expertise, and innovative practices to learn how to do something better (Wenger-Traynor & Wenger-Traynor, 2015). This relevant issue of meaningful professional development exists among teachers of different disciplines.

CoPs in education enhance opportunities for people to develop a network of supportive educators willing to attempt new practices and take risks over a sustained period (Anderson & Olivier, 2022; Ko et al., 2023). In professional development collaborative settings, teachers can work together to examine their awareness of the teacher's role in selecting texts using an equity-based lens (Neubauer & Wesley, 2023).

Puig and Froelich (2022) write, "The overarching questions now are: How do we support strong, vital, intense, energetic, and mindfully vigilant teacher-colleagues in supporting strong, vital, intense, energetic, and mindfully vigilant student learners?" (p.24). Teacher knowledge of instructional practices that interrogate standards and disciplines with an equity lens will dramatically benefit students and impact teacher identity (Dyches, 2022). Such practices as dialogic self-reflection, think-aloud, and reflexivity allow teachers to investigate their personal lens and provide a basis for teacher growth (Dyches, 2022, Josselson, 2011; Luguetti et al., 2018). When educators have opportunities to constructively examine texts containing potentially biased material, they can reflect on potentially negative impacts within a classroom setting and create lessons that more adequately address student needs (Girvan et al., 2016). In the process, the strength of teacher efficacy becomes balanced with the development of the teachers' critical consciousness (Kirmaci et al., 2021) and can transform the understanding of transdisciplinarity and scaffold literacy and instruction "to support learning within a coherent K-12 literacy framework to support all learners over time" (Puig & Froelich, 2022). Moreover, creating contextualized and innovative literacy initiatives would seek to address the needs of all students within the classrooms (Charner-Laird et al., 2016; Neubauer & Wesley, 2023). This research can explore how teachers use an equity-based lens to examine their awareness of their role in selecting texts and creating lessons across all disciplines (Puig & Froelich, 2022).

In addition, this study will address a quest for evidenced-based research that guides teachers through collaboration to identify educational gaps or issues, engage students at the point where reading gains stall, and teach all learners using various proven methods using developmentally and culturally responsive approaches (Ehri, 2022) such as an equity-based focus on transdisciplinary literacy (Puig & Froelich, 2022). Definitions of equity vary across disciplines and fields of study. By addressing equity in terms of inputs, outputs and action, this research investigates how teachers respond to all children within a classroom and provide what children need to develop to their full academic and social potential, recognizing that learners start from different places, and so different approaches, resources, or supports are needed (Ladson-Billings, 2006). A comprehensive review of the scientific and educational research grounds this discussion in the prospective power of multidisciplinary professional development of CoP and the potential gains an examination of this focus on literacy might yield for all learners within classrooms (Dyches, 2022; Puig & Froelich, 2022; Truscott & Barker, 2020).

Purpose of the Study

In the present two-stage convergent parallel mixed-methods study research (Sera & Gasparrini, 2022), the purpose is to investigate the self-reported perceived benefits for educators within a CoP whose primary purpose is to build knowledge about equity in literacy that seeks to use texts that reach all student groups. This study of teaching practices examines multiple perspectives about how teacher participation in the high-impact practice of multidisciplinary CoP evolves (Anderson & Olivier, 2022; Wenger-Traynor & Wenger-Traynor, 2015) and consequently shapes teacher perspectives of transdisciplinary literacy planning (Puig & Froelich, 2022). Through the integration of quantitative and qualitative data collection that is gathered both concurrently and sequentially (Creswell et al., 2018), the researcher will use the flexible and

efficient framework of a two-stage design (Sera & Gasparrini, 2022) to investigate and describe individual teacher identity shifts (Charner-Laird et al., 2016) as educators reflect on the convergence of disciplines, create lessons with a focus of addressing learners who have learning gaps, poor background knowledge, or identified educational needs (Puig & Froelich, 2022), and consider its impact on student learning.

CoP within our educational system support teachers as they examine best practices and advances in teaching strategies, reforms in content, and innovations within their fields (Anderson & Olivier, 2022). This research will investigate research-based methods for educators within a CoP to shift their focus to students with identified needs as they examine their awareness of transdisciplinary literacy and their pivotal role in selecting texts and text features for learners of varying abilities (Wenger, 1998; Neubauer & Wesley, 2023). Furthermore, prior research indicates that shifts in teacher identity routinely occur due to professional collaboration among teachers (Truscott & Barker, 2020). The study addressed emerging themes from both quantitative and qualitative instruments designed to provide robust data from teachers and students. Data analysis across two populations and two phases will increase the strength of findings and provide multiple perspectives within one study (Creswell et al., 2018; Mertler, 2022). The researcher examined a robust and rigorous collection of two data sets, one embedded within the other and framed by quantitative and qualitative procedures (Mertler, 2022) that might deepen understanding of how educators use a CoP to reflect on their current practices and evaluate the various needs of students and potential impact on student literacy achievement (Puig & Froelich, 2022).

Research Questions

1. How have teacher identities impacted the application, execution, and evaluation of

project-based learning aligned with transdisciplinary literacy?

2. How does a transdisciplinary literacy approach inform teachers' instructional knowledge and development of best practices when designing and implementing a project-based learning unit that is responsive to all learners?

    a) In what ways do teachers talk about the nature of transdisciplinary literacy and its role in the design of curriculum and instruction?

    b) In what ways do teachers talk about the nature of project-based learning and its role in the design of curriculum and instruction?

    c) In what ways do teachers use a transdisciplinary lens to make instructional decisions in consideration of diverse learners?

3. How are diverse learners' interactions, engagement, and achievement shaped by instruction informed by transdisciplinary literacy and project-based learning?

    a) What student noticings have teachers identified to support project-based learning aligned with transdisciplinary literacy using an equity lens?

    b) How does the development of transdisciplinary literacy within project-based learning affect student performance?

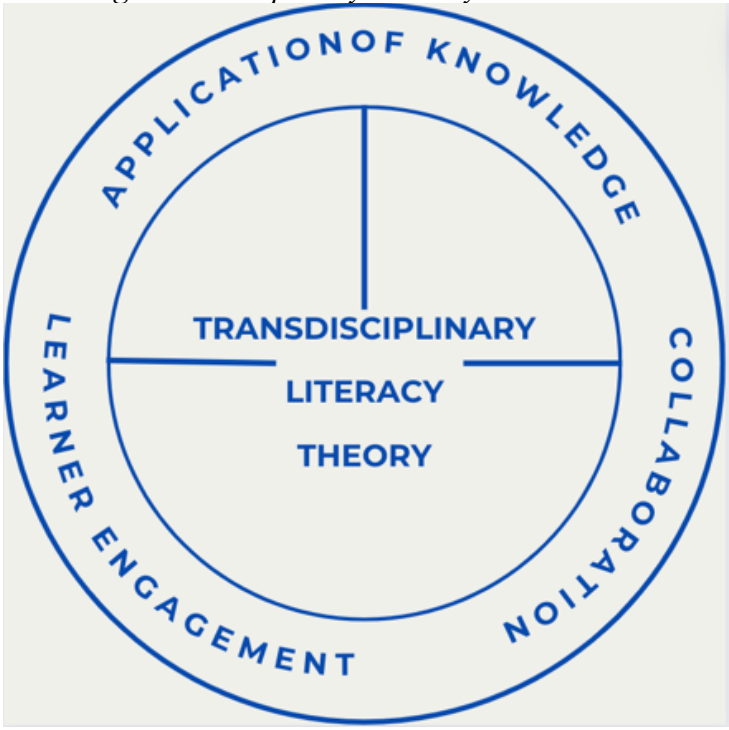
Theoretical Framework

Transdisciplinary literacy is the central feature of the theoretical framework of learner engagement, collaboration among teachers, and application of new knowledge (see Figure 1). These include critical literacy, constructivism, social constructivism, experiential learning theory, and project-based learning theory. The research design will include knowledge about the purpose of CoP, which is dedicated to using TDL instruction to create innovative best PBL practices that seek to reach all student groups (Puig & Froelich, 2022). This examination of

teaching practices inspects how teacher participation in the high-impact practice of multidisciplinary professional learning evolves within a CoP (Neubauer & Wesley, 2023; Wenger, 1998). Consequently, these experiences shape teacher perspectives and the application of new knowledge about transdisciplinary literacy planning. In addition, this research will also address the efficacy of collaboration on individual teacher identity shifts, learner engagement, and potential literacy achievement (Charner-Laird et al., 2016; Puig & Froelich, 2022).

Figure 1

Centering Transdisciplinary Literacy



Learner Engagement

Transdisciplinary Literacy

TDL allows teachers and students to self-correct in one discipline using strategic activities and strategies reemployed in another (Puig & Froelich, 2022). This intentional and coherent approach to instruction is one in which various disciplines converge to address a

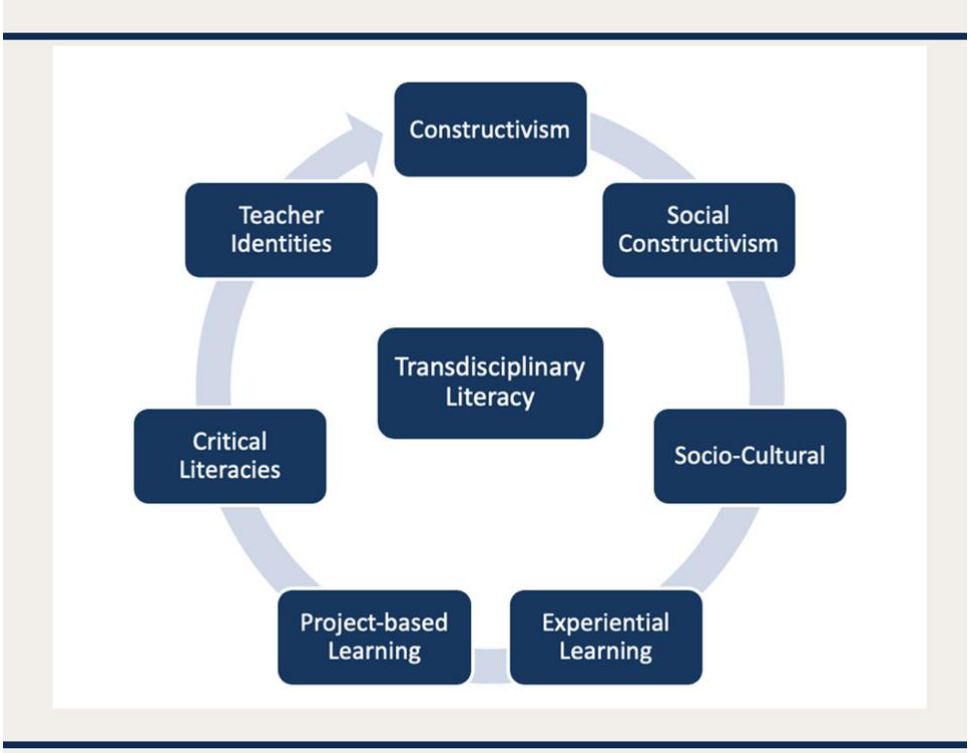
common goal (Puig et Froelich, 2022). Moreover, TDL, a shared conceptual framework that transcends the standards of two or more disciplines to provide a new perspective of a dynamic system, surpasses the boundaries of disciplines that previously have been interactive but from a discipline-specific base (Puig & Froelich, 2022). Transdisciplinary approaches are characterized by their systematic and explicit approach to instruction, based on dynamic student assessment that reveals ideal zones of proximal development for active and efficient learning (Puig & Froelich, 2022). It aims to provoke curiosity, collaboration, and accountability using multimodal interactions and temporary scaffolds designed from knowledge of students' zones of proximal development (Alkhudiry, 2022). The TDL framework often focuses on determining what a learner brings from their funds of knowledge, what a text will demand from the learner, and what insight the context will provide (Puig & Froelich, 2022). When conditions for learning include a multisensory environment with flexible spaces for engagement, a student experiences the transactional nature of learning (Rosenblatt, 1978) and a climate of trust in which the student is willing to take risks (Puig et Froelich, 2022).

Furthermore, TDL extends several key theories (see Figure 2) that enhance teachers' abilities to meet the needs of students (Puig & Froelich, 2022; Stewart et al., 2021). Vygotsky's socio-cultural theory (1978) posits teaching by encouraging social interaction as learning is acquired through participant co-construction (Alkhudiry, 2022). The study is also supported by experiential learning theory (Kolb, 1984), promoting the potential for student gain in an active educational environment in which the student builds on previous knowledge and socially constructs learning. With the emergence of the high-impact practice of developing CoP for professional development, educators gather to discuss their increased desire for new approaches to TDL (Moltchanov, 2021; Wenger, 1998). They will recognize that their positionality and

subjectivity shape how they approach text selection and lesson design (Dyches, 2022; Emerson et al., 2011).

Figure 2

Theoretical Framework



Critical Literacy Theory

Critical language theories postulate frameworks for "renewed calls to question, examine, interrogate, and indeed, wrestle uncomfortably with previously taken-for-granted norms regarding literacy and language" (Stewart et al., 2021, p. 200). Both transdisciplinary literacy and critical literacy theoretical constructs are appropriately complex to support a critical approach (Bhattacharya, 2017; Tracy, 2020). This study will reveal positive implications for future elementary TDL initiatives that will sustain students' capacities to improve expressive vocabulary and intercultural awareness through language acquisition (Puig & Froelich, 2022; Seery et al., 2021). By implementing an innovative curriculum approach to blending disciplines,

educators provide meaningful opportunities for elementary students to improve expressive vocabulary and learn how to solve real-world tasks in more than one language (Stewart et al., 2021). The capacity to successfully collaborate within established group norms balanced with teachers' willingness to collaborate over extended time frames reveals the potential for viable outcomes for students of all languages within all classrooms (Gurzynski-Weiss et al., 2021). Moreover, supportive institutional structures that acknowledge and implement experiential learning models with TDL frameworks provide the basis for further student growth and achievement (Coyne-Foresi & Nowicki, 2021).

Collaboration

Constructivist Theory

Grounding the research within a constructivist paradigm (Creswell et al., 2018), the researcher uses this theoretical lens for a mixed-methods approach and data collection that searches for multiple perspectives from participants. Constructivism posits that individual knowledge is constructed through personal experience and participants will speak from their understanding which is shaped by their social interaction with others (Kenselaar, 2002). This worldview is a bottom-up approach for the researcher to analyze data for broad patterns that emerge from the multiple forms of the reality of participants (Creswell et al., 2018). Gellof Kenselaar (2002) discusses constructivism as it implies

> "that learners are encouraged to construct their own knowledge instead of copying it from an authority, be it a book or a teacher, in realistic situations instead of decontextualized, formal situations such as propagated in traditional textbooks, and together with others instead of on their own" (p. 1).

Furthermore, constructivism is a complex series of concepts that address sets of epistemological, psychological, and educational beliefs in which Piaget specifically expressed that adaptation and assimilation of knowledge are centered upon action (Kenselaar, 2002). Both personal experiences and social engagement of participants will impact the learning processes studied in this research.

Socio-Constructivist Theory

The learning theory of socio-constructivism promotes the potential for student gain in an active educational environment in which the student builds on previous knowledge and constructs his/her learning (Fairbanks, 2021). Furthermore, it promotes the same potential for educators who use individual and group reflection within a CoP to understand content, retain new information, and provide innovative teaching methods to their students (Paulus et al., 2020). Lev Vygotsky's socio-cultural theory (1978) has long been used as a fundamental concept in teaching literacy acquisition by encouraging social interaction as language is acquired; however, this theory describes the process of co-construction because it provides a framework in which students participate in their learning by collaborating with other students (Alkhudiry, 2022). This research will investigate how teacher perspectives and practices shift when teachers are confronted with research that challenges traditional methods of selecting texts, designing units, and providing students who traditionally get pushed out of lessons opportunities to explore how disciplines intersect and co-construct knowledge (Kenselaar, 2002; Lemieux et al., 2023). As students and teachers internalize new learning, they will alter their practices and approaches to learning (Paulus et al., 2020). The resulting outcomes impact students' and teachers' self-efficacy and outcome expectancy. Social constructivist learning theory supports productive

learning experiences for participants that are further enhanced when a shift to experiential learning occurs (Paulus et al., 2020).

Lev Vygotsky (1978) posited that language is an agent for altering the powers of thought and giving thought new means for explaining lived experiences. Furthermore, this theory emphasizes a zone for proximal development for students and highlights the need for teachers to create lessons and scaffolding that match the student's level for optimal learning (Kolb, 1986). A core descriptive feature is that this zone reflects achievable work that is neither hard nor easy, so the student is not bored or demoralized (Alkhudiry, 2022). Professional learning opportunities from communities of practice have the potential to help educators investigate and gather research-based methods that inform instruction, uncover gaps, focus efforts on what students need next to learn with support and teach within these zones of proximal development (Paulus et al., 2020). An active reader is best described as someone who makes meaning of a text by using an integration of strategies, accessing prior knowledge, and attending to new knowledge to regulate accuracy and fluency while sustaining comprehension (Alvermann & Wilson, 2011). Sociocultural theory in language classrooms is relevant when educators teach students that their literacy will develop through interactions. Ideally, students should be literate in multiple ways, such as understanding various texts in media, politics, health, and culture.

Application of Knowledge

Experiential Learning Theory

Kolb's experiential learning theory (1986) provides essential support for designing professional learning communities investigating teacher attitudes and approaches to developing new methods of analyzing texts (Paulus et al., 2020). Experiential learning provides a framework for educating students through learning by doing, using various discipline skills to analyze and

confront authentic, real-world problems (Kolb, 1986; Paulus et al., 2020). The transition from the theoretical foundations of constructivism to experiential learning provides a context for the research about this study's CoP design. Project-based learning, experiential learning, and the reconceptualization of cultural competence mean breaking traditional learning expectations in that they depart from standardized formats of instruction and assessment. Teachers develop innovative units and cross-curricular activities that identify problems and offer solutions. Through high-impact practices such as PBL, collaboration among teachers allows them to prioritize and maintain literacy goals through contextualized instruction (Latta, 2019).

Teachers require professional learning communities developed through experiential learning theory to create space and opportunities to collaboratively examine their discipline, reshape their approach to selecting texts, and change their teaching methods and practices (Girvan et al., 2016). While educators need to learn about revisions and reforms of inaccurate or biased content, the concept of teacher agency (Anderson & Olivier, 2022) is not fully realized until those teachers are willing to change how they teach and reflect with other educators about the significant impact this might have in their classrooms. Girvan et al. (2016) state:

> "Experiential learning in teacher professional development is not a novel concept, and its reported use has focused on the experience of teachers developing their practice in the classroom: experimenting, reflecting, and adapting new and content they have been introduced to in their professional context…However, these types of professional development activities cannot fully address the demands of initial professional development in the context of radical national curriculum reform" (p. 129).

Kolb stresses that effective implementation of experiential learning by teachers must consider how learners construct knowledge and learn new content through observation, active, engaging

experimentation, and reflection (Paulus et al., 2020). Furthermore, learner participants modify old ways of conceptualizing and approaching a problem while developing critical thinking skills and a desire for active experimentation (Paulus et al., 2020). A student becomes an information processor, receiving and putting input in memory (Fairbanks, 2021). However, implementing authentic tasks will not only sustain projects in empathy building across all disciplines but also allows learners to develop social and civic skills across groups of people, resulting in a more inclusive classroom and equitable learning environment. Inclusive classrooms are safe spaces for journals and conversations in which students can freely express authentic reactions to situations occurring in the world around them (Rockquemore & Schaffer, 2000).

In response to a national call for integrating culturally responsive pedagogy and culturally responsive teaching, experiential learning is poised to promote cognitive development and the emotional and social well-being of all those involved (Jager et al., 2018). For this reason, teachers need appropriate training and literature to develop inquiry and reflection skills (Truscott & Barker, 2020), such as a CoP. Ko et al. described a CoP (2023) as "a heuristic framework to understand teachers' knowledge by emphasizing the relationship between knowledge and the situations in which it is acquired and employed" (p. 2). Expert teacher-leaders who foster professional resilience generally lead a CoP (Suh et al., 2020) through social interactions focused on a common goal and including innovative best practices in curriculum and methods (Paulus et al., 2020). Reflection, collaboration, and professional support are the foundations of this experiential learning practice in which teachers attend to discursive practices that can foster teacher efficacy and shifts in the development of teacher identity (Luguetti et al., 2018; Paulus et al., 2020). Teachers' identities and beliefs influence their instructional approaches (Truscott & Barker, 2020). A thorough examination of various educational theories addresses how teaching

practices are developed and shaped. In this way, experiential learning theory works with a CoP professional development model to provide a theoretical foundation supporting TDL, linking experiential learning and literacy for young developing readers to demonstrate gains in all levels of the reading process (Stewart et al., 2021). PBL as a teaching method incorporates a participatory approach and inquiry-based methods to investigate authentic problems or tasks. Experiential learning and PBL models provide opportunities for our future workforce with hands-on practical experience in engineering and science career-related fields and guide student participants to imagine themselves as scientists, technology experts, engineers, artists, or math-related professionals (Alkhudiry, 2022).

Significance of the Study

The potential benefits of this research include the prospective power of student gains in reading with a TDL approach with a specific focus on text selection for learners of varying abilities and the strength of teacher efficacy and shifts in teacher identity.

First, students might realize gains in reading achievement with an innovative transdisciplinary approach that pushes beyond conventional approaches. Research presented in this study indicates how TDL and experiential learning provide opportunities for students to make positive gains in cognitive and social flexibility and metalinguistic awareness (Spelorzi et al., 2022). As educators provide students with opportunities to work through practical problems based on real-world scenarios, they can inspire creativity and encourage the creation of a workforce of resourceful, insightful, and motivated students. Through experiential learning, students learn to work successfully with others using a combination of soft and hard skills learned best through experience (Kolb,1984).

The study of the Science of Reading (SOR) remains a significant conversation among the nation's reading experts and stakeholders. A renewed focus on phonics has emerged for this form of instruction that teaches students grapheme-to-phoneme relations, decoding, blending, and building their knowledge base for reading-spelling skills (Ehri, 2022). Interventions that seek positive engagement from students can significantly increase their reading experiences. Groundwork of phonics instruction that addresses the particular needs of young learners includes continuity of intervention. Also, it encourages peer interactions within small group work that lays the foundation for fostering intrinsic motivation and positive attitudes for learners and their gains in reading accuracy and fluency (Brown et al., 2021; Henry, 2020). This study will address a fundamental educational goal of equipping stakeholders and caregivers with evidence-based research, including proven tools and expertise that successfully support the investigation's purpose and engage learners of all abilities in a developmentally responsive manner. Further research for students would include opportunities for them to benefit from TDL instruction that provides lessons and texts that are more equitable (Neubauer & Wesley, 2023), as well as add their self-reported benefits stemming from new methods of literacy instruction. Teachers committed to searching for and using a variety of texts will build meaningful instruction that meets the educational needs of their population of students (Charner-Laird et al., 2016). The impact of the changes and shifts in teacher identity will influence instructional decisions.

Secondly, stakeholders such as administrators and educators can examine the potential benefits of an equity-based focus on TDL. The study will explore how teachers examine their awareness of their role in selecting texts and creating lessons across all disciplines and strengthen teacher efficacy with the development of the teachers' critical consciousness (Kirmaci et al., 2021). This study could add to the expanding body of research about the teacher identity shifts

within literacy initiatives (Truscott & Barker, 2020). It highlights the need for this issue of unbiased learning among different age groups and disciplines for further review. As teachers harness the prospective power of multidisciplinary professional development and examine their approach to text selection, they might learn emerging practices that provide potential positive literacy gains for learners within all classrooms (Neubauer & Wesley, 2023; Truscott & Barker, 2020). Professional benefits and collective efficacy can be uncovered through the collaboration of educators from different disciplines **(**Neubauer & Wesley, 2023). In addition, the study examines the potential gains and positive impacts for educators by investigating and developing new approaches to transdisciplinary literacy and instructional practices on learning (Truscott & Barker, 2020).

In her research about the need for reframing professional development, Moltchanov (2021) writes, "Substantial and sustainable professional development... ensures that teachers at all levels and from all training backgrounds are keeping pace with best practices in their field" (p.46). This study will assess the potential effects of creating spaces for teachers of various disciplines as they collaborate on expanded topics of how teachers select, integrate, and teach a variety of texts to address varying literacy needs of each learner. The results from this research can inform future studies about the role of communities of practice committed to the examination and creation of lessons with a focus on transdisciplinary literacy. Moreover, this study furthers the quest for educators to provide innovative, research-based practices by researching and selecting texts that will resonate with all student groups within our schools.

Finally, this study might reveal additional valid implications for administrators, teachers, and stakeholders as they develop future CoPs. This research will provide educators seeking enhanced professional development opportunities to transform teachers' understanding of TDL

and PBL into meaningful educational initiatives (Charner-Laird et al., 2016; Kogtikov & Bochenina, 2016). Project researchers will investigate how teachers within a CoP might translate viable outcomes into strategies that impact teaching across many disciplines at different levels (Anderson et Olivier, 2022), thereby creating a sustainable vertical alignment that more profoundly supports students who are pushed out of lessons from the earliest stages through high school (Hensley, 2021). Given that the data might suggest that teachers as leaders are deeply invested in professional development goals that directly support a review of current literacy methods and text selection using a lens that considers the varying needs of each learner (Truscott & Barker, 2020), teachers can use this desire to positively impact collaboration and foundational work of innovating teaching strategies within their disciplines. Building teacher efficacy through the development of robust PBLs empowers teachers to build collections of primary and secondary sources and various text selections to engage students of all abilities.

Findings might show how this study could be replicated or generalized for various educational levels, especially in schools located in rural settings in the United States. This research aims to stimulate conversations about how teachers understand TDL, the creation and implementation of PBL instructional practices that incorporate a wide variety of texts and the educators' abilities to meet the needs of their students. The study will investigate the role of TDL within PBL learning units committed to considering and creating lessons with an equity-based focus on literacy.

Positionality

The researcher, a veteran K-12 educator at a rural charter school in the southeastern U.S. specializing in K/12 language and literacy education, acknowledges that her positionality and subjectivity shape my research. The researcher understands that teachers encounter tensions of profound disequilibrium and professional challenges that emerged from CoP. This relevant issue exists among a range of disciplines, and it is becoming essential to enhance opportunities for educators to examine their awareness of their role in selecting texts and creating units (Neubauer & Wesley, 2023).

The researcher acknowledges the potential bias and must be mindful of her assumptions throughout her research. She aims to make space for multiple perspectives, recognizing whose stories count and are heard (Dyches, 2022). Her experience of thirty years teaching students from many cultural backgrounds and world languages includes connecting students with meaningful service opportunities. She acknowledges how these previous experiences and biases can shape her work and research. Still, she strives to recognize these limitations and overcome any negative impacts that this might have on her work by developing a wide range of writing styles and perspectives of field writing (Emerson et al., 2011). She will guard against evaluative wording and framing accounts to a specific audience (Emerson et al., 1995).

Her lived experiences working with students of all abilities have fueled her passion for equitable classroom practices and developed her self-awareness that shapes fundamental interactions with students, families, and educators. She believes in fair learning opportunities for all students and frames the focus of her research by striving to understand teachers' knowledge, perspectives, and practices.

Assumptions

The following assumptions applied to this study:

1. Frameworks and expectations for PBL are established within school protocols and charter agreements.
2. Teacher participants will answer the survey and interview questions honestly and factually.
3. Funds from an implementation grant will cover the cost of teacher stipends, professional development, and supplies for student-created PBLs.

Overview of Chapters

Chapter One includes an introduction and outline of theories that ground the research in transdisciplinary literacy. Chapter Two is a review of the literature. Chapter Three reports on research design methods. Chapter Four presents an analysis of quantitative and qualitative data for Stage One and Stage Two. Chapter Five provides a summary of findings, interpretations, future research and implications for teachers, administrators, and educational stakeholders.

Chapter 2. Review of Literature

Research is formalized curiosity.
It is poking and prying with a purpose. - Zora Neale Hurston

This research aims to assess how teachers collaboratively examine various disciplines, reshape their approach to selecting texts, and develop their teaching methods and practices (Girvan et al., 2016). The research will reveal the professional benefits and collective efficacy beliefs uncovered through communities of practice (CoP) of educators from different disciplines. The concept of teacher self-efficacy is not fully realized until those teachers are willing to change how they teach and reflect with other educators about the significant impact this might have in their classrooms (Girvan et al., 2016). In their research about the need for reframing professional development, Nobel et al. (2020) write,

> "For disciplinary literacy to be effective, the boundaries that separate the skills of each discipline must be blurred for students to apply their skills across disciplines. Being disciplinary literate and merging this knowledge between disciplines is, in essence, transdisciplinarity" (p. 2).

Through this proposed research, educators can examine the potential effects of creating multiple spaces for teachers to collaborate on expanded topics of how teachers select texts, integrate standards and pedagogies, and teach across disciplines to reach all learners using transdisciplinary literacy (TDL) (Bess et al., 2004; Mertler, 2022; Puig & Froelich., 2022). A comprehensive evaluation of the capacity of collaboration among these educators will also reveal how educators use professional development such as a CoP to reflect on their current practices, evaluate the literacy needs of students in their classrooms, and create project-based learning (PBL) units that reflect these initiatives. Potential gains of this focus on literacy reach all

students within classrooms (Truscott & Barker, 2020). Professional learning opportunities function to support teachers as they examine practices that promote positive student impact and advances in teaching strategies, reforms in content, and innovations within their fields (Anderson & Oliver, 2022).

Multi-disciplinary Community of Practice

Etienne Wenger (1998) defined a CoP as "a group of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (p. 1). This form of situated learning engages participants to establish a network of support (Ko et al., 2023). For educators, this heuristic framework allows them to define the community, design its purpose, grow within this vision as they meet regularly, and transform through growth intentionally or incidentally (Ko et al., 2023; Lupton et al., 2017). Ko, Lee, and Wallhead (2023) reported that "sustained use of a CoP, which is based upon three central concepts of domain, community, and practice, will encourage teachers to take risks, challenge discussions through sustained interactions, and develop a culture of support that supports teacher efficacy" (p. 2). Suh & Jenson (2020) revealed from their study that

> "Shared professional identity would allow developmental educators to band together across disciplinary divides to better enact their mission of student success, to advocate for their students and their profession, and to strengthen their sense of professional resilience in the face of external reform pressures (p. 52).

Stewarding the knowledge of educators within a CoP strengthens collective responsibility and increases productivity.

According to several empirical studies, a multidisciplinary CoP can empower educators to share their voices within creative spaces and positive environments that are conducive to

promoting agency within the constructive group dynamics. In this respect, educators nurtured their capacity to collaborate successfully within established group norms. Educators from various disciplines have created a collective efficacy (Neubauer & Wesley, 2023; Wenger, 1998) that builds a consensus of behaviors and norms that contribute to positive action resulting from these collaborations (Anderson & Oliver, 2022). In recent research with similar results, educators reveal that they are empowered to try innovative methods because they also have opportunities to share their perspectives about their disciplines, experiences, and insights (Brodin et Avery, 2020; Neubauer & Wesley, 2023; Truscott & Barker, 2020). In two similar studies, data revealed that strong emotional connections developed among educators who participated in learning communities (Charner-Laird et al., 2016; Hensley, 2021). More importantly, Brodin et al. (2020) specifically characterized this connection as a sense of belonging. The data also indicated that an increase in intellectual exchanges among educators from different disciplines provided a basis for the continued success of these influential networks (Anderson & Oliver, 2022; Hensley, 2021). As this capacity to collaborate strengthened, several important studies provided data to support the sustainability of multi-disciplinary CoP for future professional development (Brodin & Avery, 2020; Wenger-Treynor & Wenger-Treynor, 2015).

When teachers have access to ongoing innovative professional development opportunities such as a CoP, they need time and space to thoughtfully implement new methods and ideas of active learning and reflection (Ko et al., 2023). The transmission of knowledge from experts to teacher participants must be scaffolded to ensure that teachers adequately develop and sustain new practices (Girvan et al., 2016). CoP are often divided into four distinct categories of learning (Wenger, 1998): Learning by doing (practice), learning by belonging (community), learning by experiencing (meaning), and learning by becoming (identity). By addressing the capacity to

collaborate in terms of capital, one study describes the concept of economic capital driving the access to human and social capital that sustains successful CoP engagement that ensures the professional growth of teachers (Bouchamma et al., 2018). Bouchamma et al. (2018) state,

> "Individuals are encouraged to learn within different formats, namely, alone, as part of a team, and even within larger CoPs as part of a fluid, hands-on learning experience… For these activities to occur, collaboration and access to economic, human, and social capital are vital" (p. 93).

Teachers indicated that their willingness to collaborate over extended time frames had not diminished (Moltchanov, 2021). More recent studies indicate that teacher investment in viable outcomes within the classroom improved and increased (Anderson & Oliver, 2022). These outcomes directly impact the teaching strategies that participating professionals gained from collaboration and implemented with fidelity within their classrooms (Hensley, 2021; Neubauer et Wesley, 2023). Luguetti et al. state,

> "Such projects lead to change in professional confidence, awareness of classroom events, dispositions towards reflection, broadened views of teaching, teacher beliefs about themselves, their roles as teachers, and attitudes towards students" (p. 856).

Furthermore, when supportive educational structures acknowledge and support this implementation of new ideas that came directly from professional development, relationships between educators and their administrators are strengthened (Anderson & Oliver, 2022; Moltchanov, 2021).

Educators within a CoP have shared goals and identities (Wenger, 1998). Research from both qualitative and quantitative studies also expressed dependence upon participants' willingness to play an integral part in the creation of goals (Paulus et al., 2020). In addition,

studies report important positive implications such as the creation of collective efficacy, the capacity of professional educators to successfully collaborate, and the sustainability of communities of practice (Bouchamma et al., 2018). The nature of these dynamic professional development opportunities creates three distinct areas of focus for this research: text selection within transdisciplinary literacy, equity-based focus on assessing standards within a range of disciplines, and implementation analysis of literacy instruction (Brodin & Avery, 2020; Neubauer & Wesley, 2023).

Equity-Based Focus for Transdisciplinary Literacy

Professional communities conveyed the benefits and struggles for educators of creating learning spaces to interrogate standards, develop scaffolds with a specific focus on cross-disciplinary initiatives, equity-based literacy, and the application of new knowledge and on the future development of educators' personal growth in their fields (Moltchanov, 2021). Consequently, the research disclosed that teacher participants expressed the significance of fidelity as educators employ tools and practices from professional development. Teachers reflect and balance: When does fidelity to the student become more important than fidelity to the implementation of an initiative? From similar studies, data revealed that educators of different disciplines fostered a shared vision for successful collaboration despite the differences in educational standards being addressed (Hensley, 2021; Truscott & Barker, 2020). Teachers establish spaces to examine their bias, express their positionality, and grapple with conversations that are messy and often unresolved (Freire, 1985). However, a study with a different perspective reported issues in maintaining accessibility to professional development platforms that retained a focus on how students if a variety of abilities receive access to inputs as well as outputs (Charner-Laired et al., 2016). In addition, an important focus of the studies indicates that

promoting active learning experiences remained a high priority, especially when innovative educational experiences challenged teachers' definitions of current practices that do or do not reach students with a variety of educational needs (Brodin & Avery, 2020; Neubauer & Wesley, 2023).

TDL lends itself to multidimensional and multifaceted constructs of sustained inquiry through PBL and incorporates the nuances of collaboration through agency, interdependence, and building a positive affective classroom culture between teachers and students (Nobel et al., 2020). Experiential learning and PBL models provide opportunities for the future workforce with hands-on practical experience in engineering and science career-related fields that guide student participants to imagine themselves as scientists, technology experts, engineers, artists, or math-related professionals (Alkhudiry, 2022). The high-impact strategies typical with PBL include driving questions that address an authentic problem, sustained inquiry incorporating student voice and choice, peer critique, revision, and reflection (PBL Learning Strategies, 2022). It provides a space for every student, regardless of exceptionalities. By rejecting traditional methods of memorization and turning to learner-centered career readiness skills that celebrate curiosity, critical thinking, and cognitively demanding tasks, educators fully engage students within authentic scenarios (Noble et al., 2020). To accomplish this, educators are required to have significant knowledge of different disciplines and standards and be competent to manage a complex instructional framework that requires pedagogical skill (Kavanagh et al., 2024).

PBL posits that as students make connections across disciplines that are aligned to standards and applied to real-world content, they build skill proficiencies, strength in cognitive flexibility, and address collaboration abilities such as adaptability when communicating with students, teachers, and community members (Noble et al., 2020). An additional study reports

that the integration of disciplines through a transdisciplinarity approach allows students to seek a solution through the study of various disciplines that could not be found by using one discipline by itself (Kogtikov et al., 2016).

Disciplinary expansiveness, grounded in transdisciplinary literacy, questions traditional methods of maintaining siloed disciplinary instruction (Lemieux et al., 2023). In one study, researchers describe the centering of learners in inclusive learning environments that also highlight cognitive flexibility within the convergence of math, science, arts, engineering, music, languages, history, and technology (Puig & Froelich, 2022). Through the use of TDL, educators note an equity-based focus of literacy has more recently emerged and become highly relevant among the range of disciplines represented in some professional learning communities (Lemieux et al., 2023). Recent studies also indicated that developing new TDL approaches to instruction with an emphasis on selections of various texts that better reach all students can greatly benefit students and could also positively impact instructional practices (Neubauer & Wesley, 2023; Truscott & Barker, 2020).

Research by Lemieux et al. (2023) revealed that teachers who adopt culturally responsive pedagogies and implement multimodal methods play pivotal roles in creating safe classroom spaces that shape metacultural, meta-racial, and metalinguistic awareness. Moreover, educators who value the creation of contextualized and innovative literacy initiatives prioritize addressing the needs of all student groups within the classrooms (Charner-Laird et al., 2016). In their research about culturally responsive pedagogies, Kolano, Lewis, and Kissau (2012) explored the critical examination of how elementary educators' beliefs and practices contribute to either additive or subtractive bilingualism and highlighted the struggle with aesthetic caring described as the incongruence of teachers' spoken beliefs and their actions. This study that posits

the need for innovative curriculum integration revealed how educators could provide academic advantages that promote the language development of students; they emphasize a need for critical examination of teaching practices that will aid these teachers in creating more culturally responsive classrooms (Kolono et al., 2012). Data from research from Stewart et al. (2021) detailed the researcher's desire to address research-based teaching methods for emerging bilinguals; they describe how teachers allow writing and composing in L1 and restructured seating so that bilinguals could collaborate on assignments in their native language more easily.

As teachers build inclusive environments so that students begin to shift away from deficit thinking, students engage in critical thinking and begin to interrogate texts at a higher level (Dyches, 2022). In research that showed with intense training in translingual literacy pedagogy, teachers reported emerging or strengthening heteroglossic language ideologies, including a greater desire to support language and literacy engagement and disrupt monolingual approaches by promoting a variety of texts and resources for reading and viewing; purposeful multimodal engagement of bilingual students other than Spanish speakers encouraged multilingual reading and ensured resources were available to all language students (Stewart et al., 2021). This study's findings express the essential nature of supporting the teacher creation of equitable learning spaces and resources for bi/multilingual students as a safe and accessible means of shifting from monoglossic to heteroglossic language ideologies (Stewart et al., 2021). For example, students who know another language other than English can flourish under TDL practices when their crosslinguistic influences are coupled with their metacognitive resourcefulness (Puig & Froelich, 2022; Spelorzi et al., 2022). Equitable transdisciplinary approaches in classrooms where educators understand the importance of collaborative and respectful atmospheres provide all learners with a dynamic space for sustainable literacy engagement (Stewart et al., 2021).

Implementation Feasibility and Adaptability of Innovative Literacy Instruction

From an important study, data revealed that educator participants desire to apply the abundance of new knowledge from a CoP as quickly and as meaningfully as possible (Charner-Laird et al., 2016). Professional development provides post-conference platforms for collaboration so that teachers have support for the implementation of these effective new practices (Luguetti et al., 2018; Moltchanov, 2021). Sustaining a high level of productivity was not always feasible even when the desire to accomplish the goals was sincere (Joseph et al., 2018). Important studies also outlined the need to analyze the feasibility, adaptability, and implementation of transdisciplinary literacy initiatives using communities of practice (Kogtikov et al., 2016; Hauk & Kaser, 2019).

By creating a comprehensive vision of the implementation process and identifying how services are offered and why decisions and activities are accepted in the manner that they are, researchers identify key functions of CoP (Giancola, 2021). Interpreting and summarizing data through extensive monitoring addresses the consistency, quality, and participation of the teachers through interviews of a CoP, observational field notes, surveys, student data, and resources to determine if the program has been implemented as intended (Bess et al., 2004). Using a rubric-based tool to determine the feasibility of implementation (Hauk & Kaser, 2019), researchers can measure the challenges and implications of initiating the TDL initiatives. Rubrics designed to address potential barriers can address teacher enrollment, retention, attendance, data completion, and engagement. It will present vital evaluative criteria and detailed descriptions of the implementation research. In determining the likelihood that the program will be feasible to implement at other educational institutions, research teams can investigate the essential

components such as technical, organizational, support, and usability factors (Hauk & Kaser, 2019).

Proposed innovations can be modified, tailored, or refined to fit local contexts or needs (Stirman et al., 2019). By creating a logic model and detailed timeline of the implementation process for several months, researchers established phases that provide opportunities for discovering potential challenges or constraints (Giancola, 2021). The FRAME process model provides an expanded *Framework for Researchers to Analyze Modifications and Enhance outcome*s (Stirman et al., 2019). Proposed innovation can be initially piloted on a small scale but provides for generalizability with other school systems, including those that value inquiry-driven teaching practices. Educators, who are already committed to searching for and using a variety of texts across disciplines, will build meaningful instruction that meets the educational needs of their students of all abilities (Charner-Laird et al., 2016). Teachers, especially veteran educators, who resist changing teaching methods or adopting a science of reading approach will encounter spaces within a CoP that allow for safe discussions about promising practices that will aid them as they navigate changes and tensions uncovered in the CoP (Brodin & Avery, 2021).

The impact of the changes and shifts in teacher identity will influence instructional decisions; teachers reflect on the relationship between how their positionality as an educator might be reshaped or redefined as they are challenged to reflect on their lived experiences in their classrooms (Stewart et al., 2021). STEM/STEAM programs and schools using PBL or other experiential learning methods could benefit from new knowledge of methods reflecting a convergence of disciplines. Further research for students would include opportunities for them to benefit from TDL instruction that provides lessons and texts that are more equitable (Neubauer

& Wesley, 2023), as well as add their self-reported benefits stemming from new methods of literacy instruction (Puig & Froelich, 2022).

Barriers to the implementation of a transdisciplinary literacy CoP include first-order and second-order barriers (Paulus et al., 2020) and can include teacher attitudes, buy-in, and unforeseen complications from school-wide scheduling. The Practical Implementation Sustainability Model (PRISM) is a tool that discerns ways in which the implementation of TDL positioning equity at the center of the framework might be improved for generalizability and future use in other schools across the United States. Implementation tools aid in the development of a proposed CoP, subsequent professional development, and school-approved processes to contact and recruit students and their guardians (Hauk & Kaser, 2019).

Teacher Identity Shifts

Moreover, research reveals that shifts in teacher identity are positively impacted in large part due to professional development opportunities. In recent studies with similar results, the principle of self-efficacy is enhanced as educators perceive their roles in learning communities as critically important (Anderson & Oliver, 2022; Brodin et al., 2020). Professional learning communities impacted the educator's range from collective efficacy to self-efficacy as they gained knowledge, matured within disciplines, and embraced literacy initiatives within his/her discipline (Truscott & Barker, 2020). Charner-Laird et al. (2016) expressed,

> "Given the inclusion of teacher leaders in the initiative's design, we sought to understand how their work shaped the learning experience for members of each disciplinary team and how the work of teacher leadership itself played out within the initiative" (p. 977).

More importantly, goal setting is highlighted as a strategic step from studies with different perspectives (Luguetti et al., 2018; Truscott and Barker., 2020). Several research studies posit

that teacher inquiry and teacher leading through this model were effective in producing a sense of shared success among the participants (Charner-Laird et al., 2016).

One study reported how the examination of the critical consciousness of individual teacher participants evolved as they analyzed their role within their respective disciplines (Kirmaci et al., 2021). For example, Luguetti et al. (2018) reported dialogic self-reflection was reported as a means of investigating a teacher's personal lens and providing a basis for teacher growth. Structured methods of dialogic self-reflexivity can be found in field notes, diaries, reflections, and journals and contain examples of thick descriptions (Bhattacharya, 2017; Tracy, 2020). Furthermore, as teachers draw on personal experiences and revisit tensions in teaching and learning that come from interrogating texts, standards, and methods that have historically driven their disciplines, they gain insight into the multiple perspectives of all students in their classrooms (Dyches, 2022). Consequently, the process of employing critical literacy in CoP means teachers must engage in thoughtful and intentional pedagogical work as well as thoughtful and intentional identity work. Stewart et al. (2021) report a

> "renewed call to question, examine, interrogate, and indeed wrestle uncomfortably with previously taken-for-granted norms regarding literacy and language (p. 200).

The process of engaging in discussion and self-reflection is transformed into valuable and constructive action so that students benefit from lessons that give them a voice and a means to connect with the material they are learning (Machost et al., 2023). Teachers, students, and literacy researchers can benefit from a user-centered approach (Waltz et al., 2019). This method provides significant insights and potential shifts in literacy and language ideologies as well as instructional pedagogies.

While complex in theory, critical literacy is most effective when applied with three simple questions to identify *who is* in relationship to a text (Dyches, 2022). When investigating teaching perspectives and practices that shifted in response to critical literacy, teachers are asked who is centered, who is missing, who is pushed out of the center, and what this means (Dyches, 2022). Examination of the reactions and reflections of participants when they are confronted with these questions and research provide insight into the process that challenges their current methods of selecting texts, designing lessons, and providing students with various educational needs opportunities to explore how disciplines intersect and co-construct knowledge (Lemieux et al., 2023). From a study with similar results, these changes in teacher philosophy were described as dynamic because they marked a significant divergence from previous practices (Dyches, 2022). Furthermore, Luguetti et al., (2018) state,

> "A key aspect of collaborative self-study is that helps teachers describe and analyze their practice, allowing them to draw conclusions about the nature of specific pedagogical situations while developing deeper awareness of future pedagogical possibilities. We argue that a CoP can support teachers taking on new positions and negotiating old and emerging identities (p. 856).

In this key study report by Lemieux et al. (2023), researchers report that the selection of a variety of text sets should respect, acknowledge, and address the needs of learners. Robust text sets not only vary in complexity, but they are analyzed as considerate or inconsiderate by first addressing individual student strengths and needs and then the curricular demands (Puig & Froelich, 2022). Through TDL, the disciplines are no longer siloed and can positively impact student gains through the selection of texts of all types such as books, newspapers and magazines, articles,

photos, artifacts, directions, infographics, pictures, journals, photos, paintings, diagrams, and videos. Luguetti et al. (2018) state,

> "The analysis of the collaborative self-study revealed that the negotiation of a teacher's pedagogical identity- the combination of his/her beliefs, values, and professional background- is challenged and developed through participation in a community of practice (p. 860).

However, educators can effect positive change through opportunities to constructively examine texts that contain potentially biased material, reflect on negative impacts that persist within a their classroom settings, and create lessons that address the needs of all student groups (Girvan et al., 2016).

Similar studies provided an analysis of teachers' desires to develop into leaders within professional learning communities (Kirmaci et al., 2021; Truscott & Barker., 2020). All in all, participants in the research expressed that the meaningful connections and role models encountered in the course of their professional development instilled in some of them a desire to lead within their schools and also with future professional development opportunities (Moltchanov, 2021; Truscott & Barker, 2020). Charner-Laird et al. (2022) drew from multiple data sources to gain an in-depth understanding of teacher identity shifts toward leadership and initiatives that embraced transdisciplinary literacy instruction reflecting a culturally responsive environment and are scaffolded to reflect intentional high-quality, multisensory learning (Puig & Froelich, 2022).

Summary

Some educators agree that the challenges and tensions of teaching in today's changing educational setting are daunting, and they feel powerless to make a difference in a greater issue of transforming traditional teaching methods to meet the needs of all learners. Mehtap Kirmaci et al. (2021) speak to the roles of teachers in addressing society's sociopolitical or sociohistorical struggles and their desire for spaces that allow them to grapple with the evolving struggles within the U.S. education system. As educators gather for meaningful professional development grounded in social constructivism and experiential learning theory, they can have opportunities to constructively and critically examine texts that contain potentially biased material, reflect on negative impacts that persist within classroom settings, and create lessons that address the needs of students with varying educational needs (Girvan et al., 2016). The strength of collective efficacy fortified with the development of the teachers' critical consciousness (Kirmaci et al., 2021) transforms teacher collaboration into meaningful TDL initiatives (Charner-Laird et al., 2016).

Chapter 3. Methods

It's not whether people want to do something or not.
It's whether they understand the value of it. – Malcolm Mitchell

Introduction

The proposed study reports a two-stage convergent parallel mixed-methods research. The researcher developed and evaluated the implementation of TDL within elementary classrooms' project-based learning (PBL) lesson design. This study's important implications inform (1) how elementary teachers' identities are impacted and consequently shift their teaching strategies within a Community of Practice (CoP), (2) how educators approach equitable text selection and evaluate literacy through a transdisciplinary lens, and (3) how K-3 student achievement in math and ELA is shaped as a result of these potential shifts in teacher identity and approach to literacy education. Furthermore, the purpose of using a convergent mixed method design merging both quantitative and qualitative data to corroborate conclusions, strengthened the research design, and developed a more complete picture of the research from statistical and personal viewpoints (Creswell et al., 2018).

This innovative approach to conceptualizing the role of TDL potentially indicated a paradigm shift in how teachers approached text selection and the creation of PBL lessons across disciplines. Additionally, this study furthers the quest for educators to select texts in an equitably responsive manner for all learners within U.S. educational systems. The following questions reflect each point of focus of this research:

Research Questions

1. How have teacher identities impacted the application, execution, and evaluation of project-based learning aligned with transdisciplinary literacy?

2. How does a transdisciplinary literacy approach inform teachers' instructional knowledge and development of best practices when designing and implementing a project-based learning unit that is responsive to all learners?
    a. In what ways do teachers talk about the nature of transdisciplinary literacy and its role in the design of curriculum and instruction?
    b. In what ways do teachers talk about the nature of project-based learning and its role in the design of curriculum and instruction?
    c. In what ways do teachers use a transdisciplinary lens to make instructional decisions in consideration of diverse learners?
3. How are diverse learners' interactions, engagement, and achievement shaped by instruction informed by transdisciplinary literacy and project-based learning?
    a. What student noticings have teachers identified to support project-based learning aligned with transdisciplinary literacy using an equity lens?
    b. How does the development of transdisciplinary literacy within project-based learning affect student performance?

Research Design

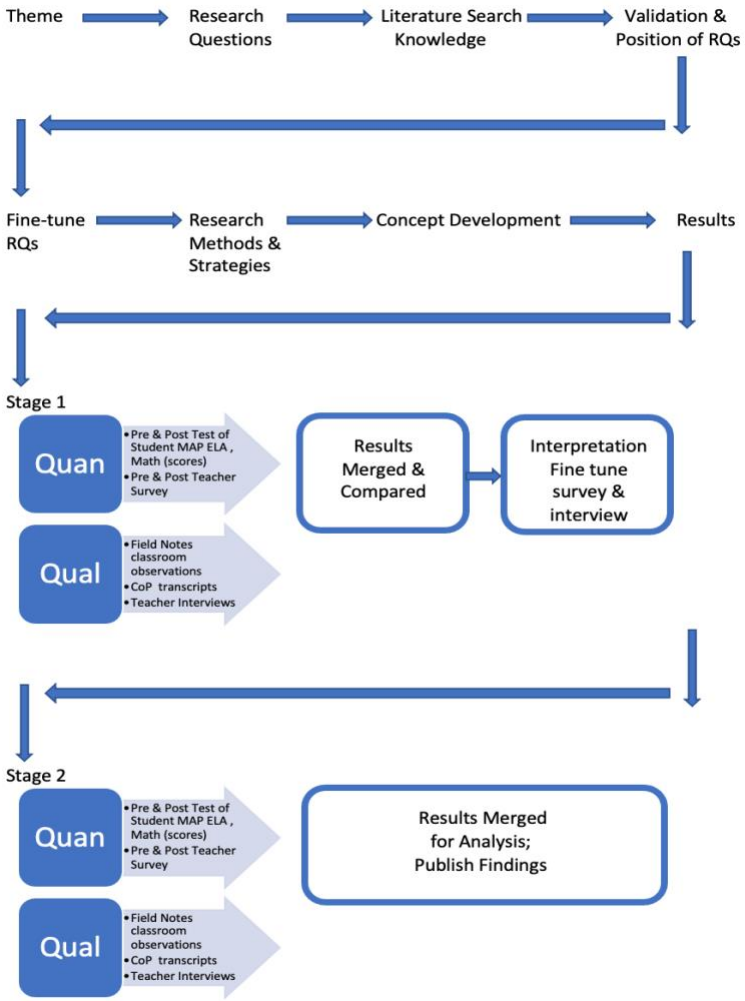
Mixed-Methods

Through a convergent mixed method design (see Figure 3) the researcher provided a parallel study seeking quantitative and qualitative data to support how a transdisciplinary approach informs instructional knowledge and the development of innovative teacher practices (Creswell et al., 2018). Teacher participants from Stage One used both quantitative and qualitative data results from stage one to revise and redesign elements of the teacher interview or survey for Stage Two data collection and analysis (Sera & Gasparini, 2022). The quantitative portion of the

research involved pre- and post-survey comparisons from teachers within the CoP and an examination of benchmark data from students' English Language Arts and math achievement scores based on the *Measurement of Academic Progress* (MAP) testing. In the qualitative portion of this study, the researcher conducted an inductive analysis of data gathered from certified elementary teachers from a small, rural K-12 charter school in the southeastern United States. Data included field notes, observations, and interviews about how all learners' interactions, engagement, and achievement were shaped by instruction informed by a TDL framework.

Figure 3

Methodological Two-Stage Research Design



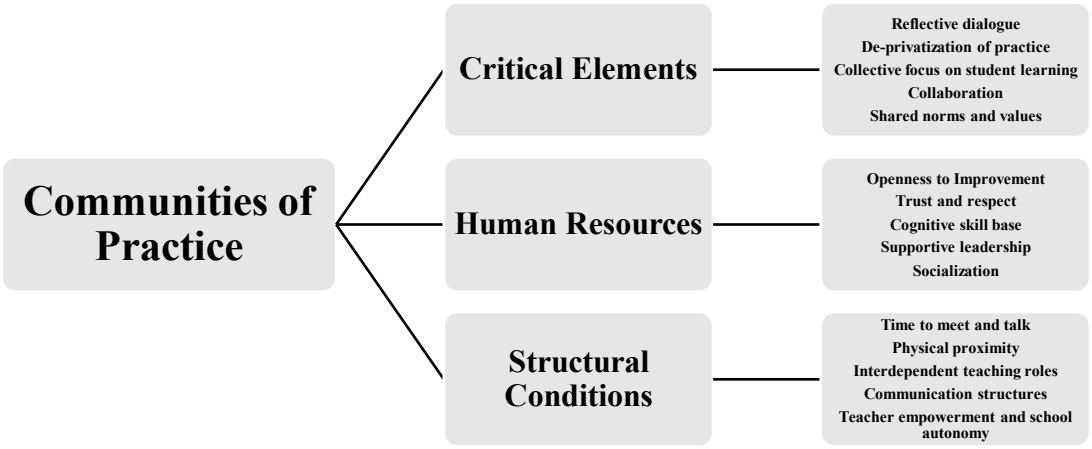
Note. This design is adapted from a methodological model proposed by Poggenpohl & Sato (2003).

Quantitative

Two quantitative instruments used in this research were teacher surveys and student MAP data for ELA/reading and math. The first instrumentation for teacher data collection was obtained through a Professional Learning Communities Survey (see Figure 4) from the *National School Reform Faculty* (2009). (see Appendix A). This survey blueprint is based on the format of examples from the Patterns of Adaptive Learning Scales (Levesque-Bristol et al., 2014), and reflects the belief or construct followed by level two and level three subconstructs. The four essential areas that are targeted in the survey blueprint most closely align with the factor structure that specifically targets these areas. Outside the use of demographics, this survey includes three sublevels: critical elements, human resources, and structural conditions. Under critical elements, participants answered five questions that explored the level three categories of reflective dialogue, privatization of practice, collective focus on student learning, collaboration, and shared norms and values. Five level three categories for human resources include openness to improvement, trust and respect, cognitive skill base, supportive leadership, and socialization. Finally, the level three categories for structural conditions comprise of time to meet and talk, physical proximity, interdependent teaching roles, communication structures, teacher empowerment, and school autonomy.

Figure 4

Survey Blueprint for Teacher Survey



To establish the reliability of the survey, the researcher made every effort to minimize situation-centered and person-centered influences by creating an environment in which the participants received instructions that are clear, free from errors, and stated as succinctly as possible. To establish the consistency of the quantitative data from the survey, the researcher made every effort to give the survey repeatedly but under identical circumstances. Using test-retest reliability established stability. Internal consistency reliability can be established by looking at single items and measuring their consistency by themselves or with the whole test. The researcher created a professional presentation and appearance of the survey via Qualtrics to strengthen face validity. To determine if the survey measured what it is intended to measure, the researcher determined if questions address the underlying constructs and have item validity so that each item on the survey was relevant to the research questions 1, 1A, 1B, AND 1C. Kruse, Louis, & Bryk (2009) conducted a thorough literature review involving these constructs, allowing experts in the field of service learning to evaluate survey items, and then piloting the survey with a group of participants who can provide detailed feedback about how they interpreted the items and responded. Sampling validity ensured that the survey items represented

the total content, and that one construct did not include more questions than the others in the design of the survey. The internal structure of the survey was established as questions or subsets that aligned with the identified construct.

In a professional community's study involving the Center on Organization and Restructuring of Schools, Kruse, Louis, and Bryk (2009), examined resources and conditions to support professional development that empowers teachers committed to fundamental change in instructional practices. This topic addressed how the integration of three main sublevel constructs contributes to a successful CoP. In this noteworthy examination of professionally sustaining environments, data suggests that while structural conditions are valuable, human resources are a more critical component. The researchers cited several theoretical constructs that were appropriately complex to support a quantitative approach and analysis. Furthermore, these researchers emphasized within the study the concept that human and social resources outweigh the historically respected sublevel construct of structural conditions that have dominated school improvement.). The researchers gave due diligence to the impact of school size, gender composition, and diversity within the schools studied. The research team demonstrated fidelity to their subject matter and collected sufficient data to support their findings (Tracy, 2020). Even though the researchers admitted that the sample size was insufficient to provide results that are generalizable on a large scale, they did address issues of bias by acknowledging the small sample while providing interesting implications from the results (Kruse et al., 2009).

The researchers provided concrete examples to support their descriptions of necessary resources and conditions that should be present for successful professional development and school success (Kruse et al., 2009). This served to reinforce their strengthening heteroglossic language ideologies following the university courses. The trustworthiness of the article and study

was further validated as researchers shared the concrete details that emerged from the gathered data. Tangible data included quantitative surveys that addressed both elementary and secondary schools and revealed critical elements of sustained professional communities. (Kruse et al., 2009). This study provided data and findings that resonate with educational specialists and administrators in elementary and secondary education. The researcher efficiently organized these findings in sections that support the importance of teacher empowerment and critical elements that thrive when teachers are empowered. The influence of this study offered educators encouragement and meaningful data analysis to inspire communities of practice initiatives. Kruse, Louis, & Bryk stipulated findings "that serve as a guide for educators to create more influential opportunities and spaces for teachers to collaborate" (p. 159). Data supported simple and detailed practice shifts such as teachers becoming more open to improvement and fostering trust and respect for supportive leadership roles.

Finally, the article succinctly stated how the study effectively achieved what it implicated through the literature review and research design. Conceptually and theoretically, their research built a robust body of data and findings to support the implementation of viable professional communities of practice. Moreover, the research team justified and described the selected population, methods, data collection, and analysis. The research also provided its readers with meaningful coherence and reported important findings that highlighted the value of teacher professional competence and efficacy (see Table 1). The conclusions were based on the reported findings and rationally stated. The research questions and objectives for the present research are supported by the design and use of the quantitative instrument from the study by Kruse, Louis, & Bryk (2009).

Table 1

Description of Subscales and Survey Items

Subscale L2	Subscale L3	Total	Type of Items
Demographics	State, Discipline(s), Level of education, age, number of years teaching, attendance	6	Multiple choice; yes/no; closed-ended checklist
Critical Elements	Reflective dialogue (1) De-privatization of practice (1) Collective focus on student learning (1) Collaboration (1) Shared norms and values (1)	5	4-point Likert
Human Resources	Openness to Improvement (1) Trust and respect (1) Cognitive skill base (1) Supportive leadership (1) Socialization (1)	5	5-point Likert
Structural Conditions	Time to meet and talk (1) Physical proximity (1) Interdependent teaching roles (1) Communication structures (1) Teacher empowerment and school autonomy (1)	5	5-point Likert

The second instrumentation for quantitative data collection involved student test results. The elementary school administers the MAP, a nationally normed reference assessment tool, three times a year for math and English Language Arts/reading. All data collection from this benchmark was handled through the administration, which provided this data to the researcher. The pre-and post-benchmark testing results provided relevant student data concerning achievement and growth in reading and math. Student participants who consented to be in the study received lessons with the PBL unit and took two benchmark assessments as scheduled by the administration at the elementary school.

Qualitative

Three qualitative instruments are included in this study: CoP transcripts and observational data, a set of open-ended teacher interview questions, and classroom observational field notes (see Table 2).

The first qualitative instrument included transcripts and observational notes from a CoP. The researcher presented professional development in the form of a CoP for project-based and transdisciplinary learning was presented to all teacher participants. The researcher oversaw and audio recorded the CoP sessions of participant educators and transcribed the meetings verbatim.

The second qualitative instrument was a teacher interview. The interview questions were presented in English, reviewed by an expert panel of educators, and aligned to the research questions for this study. (See Appendix B). This illustrates how each interview question is aligned with research questions. A multidisciplinary group of peer educators and participants reviewed the qualitative instrument. Each interview was audio recorded upon the participant's consent and lasted thirty minutes to one hour in person or via Zoom. The researcher asked the teacher participants to reflect on their experiences throughout this research. The researcher transcribed the information verbatim from the participants. The researcher asked teacher participants to join a CoP to reflect and answer interview questions after attending at least two professional development sessions and creating and implementing a PBL unit.

The third qualitative instrument included field journaling with observational notes. The researcher took descriptive field notes during visits to classrooms two times a week for twenty minutes each and describe teacher interactions and presentations of the new lessons.

Table 2

Data Sources and Methods Alignment

Research Questions	Data Sources	Data Analysis Methods
1.How does a transdisciplinary literacy approach inform teachers' instructional knowledge and development of best practices when designing and implementing a project-based learning unit that is responsive to all learners?	CoP meetings, transcripts Observational field notes Teacher interview	Content analysis (categorization, tagging, thematic analysis) Deductive Coding with a priori themes (transdisciplinary literacy, teacher identity shifts, equity in text selection, Inductive Coding member checking, peer debriefing
1a. In what ways do teachers talk about the nature of transdisciplinary literacy and its role in the design of curriculum and instruction?	CoP meeting, transcripts Teacher interview Observational field notes	Content analysis (categorization, tagging, thematic analysis) Deductive Coding with a priori themes (transdisciplinary literacy, teacher identity shifts, equity in text selection, Inductive Coding member checking, peer debriefing
1b. In what ways do teachers talk about the nature of project-based learning and its role in the design of curriculum and instruction?	CoP meeting, transcripts Teacher interview Observational field notes	Content analysis (categorization, tagging, thematic analysis) Deductive Coding with a priori themes (transdisciplinary literacy, teacher identity shifts, equity in text selection, Inductive Coding member checking, peer debriefing
1c. In what ways do teachers use a transdisciplinary lens to make instructional decisions in consideration of diverse learners?	CoP meeting, transcripts Teacher interview Observational field notes Teacher survey	SPSS repeated measure t-tests
2.How have teacher identities impacted the application, execution, and evaluation of project-based learning aligned with transdisciplinary literacy?	CoP meeting, transcripts Teacher interview Observational field notes	Content analysis (categorization, tagging, thematic analysis) Deductive Coding with a priori themes (transdisciplinary literacy, teacher identity shifts, equity in text selection, Inductive Coding, member checking, peer debriefing
3.How are diverse learners' interactions, engagement, and achievement shaped by instruction informed by transdisciplinary literacy and project-based learning?	CoP meeting, transcripts Teacher interview Observational field notes	Content analysis (categorization, tagging, thematic analysis) Deductive Coding with a priori themes (transdisciplinary literacy, teacher identity shifts, equity in text selection, Inductive Coding, member checking, peer debriefing
3a.What student noticings have teachers identified to support project-based learning aligned with transdisciplinary literacy using an equity lens?	CoP meeting, transcripts Teacher interview Observational field notes	Content analysis (categorization, tagging, thematic analysis) Deductive Coding with a priori themes (transdisciplinary literacy, teacher identity shifts, equity in text selection, Inductive Coding, member checking, peer debriefing
3b.How does the development of transdisciplinary literacy within project-based learning affect student performance?	Pre- and post-test from MAP data of ELA/reading and math portions	SPSS repeated measure t-tests

Stage One

Participants

The population consisted of teachers and students within a Title 1 school in rural Southwest Georgia. The researcher used probability sampling for the quantitative and qualitative portions. Cluster random sampling allowed the researchers to target an existing group of educators who were part of a CoP. Both student and teacher populations were small and already considered intact groups. The researcher was the critical study personnel assigned to consent participants.

The teacher population was an intact group of professional educators in the elementary school setting at a rural charter school. They held current elementary education, art, music, physical education, and world languages certifications. The educator group of participants who agreed to contribute to the research and sign consent forms consisted of up to ten teachers employed by the charter school who teach third graders.

Student participants were an existing group of forty-eight students already assigned to a third-grade classroom and teacher. All students had the option to participate, and parents were able to review, had the option to participate, and provided parent consent and student assent. Students within the population who were enrolled in third-grade classes and took the first school benchmark assessment were eligible to be included in the research. The researcher excluded any student in this population who enrolled in the school after the first date of this benchmark assessment. The study included students of all abilities were included in this research. The researcher did not exclude children with exceptionalities. There was no risk of public identification or embarrassment to any individual participants. From this list of potential student participants, the principal investigator provided a paper copy of the informed consent document,

including permission to use student scores from the Measure of Academic Progress (MAP) testing for 2023- 2024 testing and a video release to teachers and parents to sign and return. Upon receipt of parent consent, the principal investigator read the paper copy of the student assent document and video release to each potential student participant. All participants received copies of their signed forms. If a student chose not to participate, data were not collected. They were not impacted by their decision to not participate in the research project. The researcher did not include testing data or take videos that contained this child during the research time frame. Member checking of data collection from participant teachers provided additional assurance that a child who was not a participant was not included in any video, observational data, or CoP discussions.

Data Collection

Quantitative

The researcher transcribed and formatted the first quantitative data measure, Professional Learning Communities Survey (2009) for teachers, on Qualtrics, a Duo-Authenticated online secure survey system provided by Auburn University. During the first four weeks of phase one, the researcher distributed cover letter via email to the population pool of ten elementary educators of various disciplines, including art, music, physical education, English Language Arts, Social Studies, French, and Spanish, who were employed by the elementary school. It was a forced-choice survey with eighteen items, and the researcher added seven questions referring to demographic information. Peer review conducted by multidisciplinary teachers evaluated the instrument. The survey was anonymous, and the data were aggregated before professional presentations or publications. The researcher distributed teacher surveys two times to ensure teacher participants have an opportunity to respond. Data analysis was descriptive, but

researcher asked respondents demographic questions. The researcher sent this e-mail invitation to the targeted population with information explaining the request to participate in the research and a copy of the consent form. If the teachers chose to participate, they received a survey link using Qualtrics. The survey took approximately ten minutes. The data were automatically recorded in Qualtrics once participants completed the survey. Furthermore, the researcher sent emails to these educators once every four weeks from the beginning of week one through week sixteen. The researcher distributed electronic surveys for the teacher participants via Qualtrics to participants' email and accessible via a digital device (e.g., phones, laptops, and desktops). All data collection occurred before the first professional development workshop began and upon the completion and implementation of the PBL unit. The survey research study examined teacher attitudes toward TDL and PBL. Data analysis informed revisions to this instrument for Stage Two.

The second quantitative data set came from student MAP testing in achievement and growth in ELA/Reading and math that was scheduled to be collected two times over the research period. The student population comprised forty-eight third-grade students enrolled in the elementary school who agreed to participate by signing parental consent and student assent. One teacher was present with the minor participants during all research procedures as this is standard procedure under the code of ethics for professional educators. Administration from the elementary school was responsible for the administration and collection of data for this benchmark assessment.

Qualitative

The first qualitative instrument for gathering data came from observational notes and transcribed notes from the meetings of the CoP. The members of the CoP engaged in collective

learning (Wenger, 1998) and met at least three times during the first six weeks of the research. This occurred at the elementary school in the classrooms of the members of the CoP. The researcher disseminated information for the CoP schedule and goals via email or text. The researcher used protocols to gather qualitative data as the group discussed collective responsibility to manage their learning process and steward gained knowledge (Wenger, 1998). Lupton et al. (2017) identified a CoP by three characteristics as groups of people (domain) who share their promising resources, experiences, and tools (practice) to build relationships and joint activities (community) to pursue a passion for something they wish to improve. The researcher recorded and transcribed each meeting, allowing for frequent member checking (see Table 3).

Table 3

Stage One: Protocol for Community of Practice

Phase	Action Steps	CoP Member Role	Researcher Role
I. Define	primary purpose		**X**
	shared interests	**X**	**X**
	community members	**X**	
	practices and topics	**X**	**X**
II. Design	activities	**X**	**X**
	communication plan		**X**
	contributions	**X**	
III. Grow	culture	**X**	**X**
	brand	**X**	
	membership	**X**	**X**
IV. Perform	cycle of participation	**X**	
	performing benefits		**X**
V. Transform	sustainability	**X**	**X**
	feasibility	**X**	**X**
	outcomes	**X**	**X**

The goals for meeting one were to define the purpose and format and design the roles of members and discuss logistical concerns. The group discussed logistics and scheduling as well as next steps for professional development and the second meeting. The goals for meeting two involved how the CoP would grow and perform using think aloud methods to establish a relational approach to discussions. CoP members examined standards across disciplines to see in which ways the standards or disciplines center students. They looked for opportunities within

these standards to integrate more than one discipline as they created a PBL unit using TDL. The think-aloud method served as a model for discussions that enabled teachers to examine standards, disciplines, and texts in terms of the needs of learners within their classrooms (Dyches, 2022). In addition, teacher reflections from professional development sessions about TDL and PBL and data from teacher interviews were collected. The third meeting focused again on text selection for all learners, revisions, and reflections of the PBL unit, as well as analysis of survey items, interview questions, and the rubric for feasibility.

The researcher scheduled observational note-gathering to avoid disruptions to the daily educational plan and curriculum (Emerson et al., 2011). The researcher met with the participants before the first observation to explain the purpose and routine of the visits and ask questions. The researcher and teacher participants selected different established placements for observation around the room to allow the researcher access to various activities without distracting participants from task performances and interfering with knowledge acquisition. The researcher visited all classrooms that the third-grade participants attended such as English Language Arts, science, social studies, math, music, art, and physical education. During each visit, the researcher took descriptive field notes and accurately recorded details about the physical setting, activities, and how students and teachers interact formally and informally (see Table 4). She also recorded what was not happening and detailed her reflections and interpretations of these noticings (Emerson et al., 2011). The researcher used in-process memos to develop insight and direction of any analytic leads that might emerge (Emerson et al., 2011). The researcher attended and explicitly acknowledged her perspective through reflexivity in an intentional choice to mitigate bias and reveal participant voices through systematic writing and ongoing production of observations (Emerson et al., 2011). Ruthellen Josselson (2013) defines reflexivity as

"an attempt to recognize your own assumptions or preconceived ideas about the person or narratives that the interview will encounter" (p. 27).

Member checking allowed opportunities for teacher participants to read and respond to collected observational data.

Table 4

Stage One: Protocol for Taking Field Notes

Observational/Descriptive field notes while visiting classrooms	**Reflections following classroom visits**
• Begin daily, immersive note-taking process with consistent and agreed upon location, date, and time. • Accurately describe the setting and activities. • Use jottings to record the sequence of actions and behaviors and to preserve accuracy and detail. • Describe the people and actions that precisely correspond to observations. • Record relevant quotes or comments. • Describe positive or negative impact of researcher presence and any reactive effects in which participants might alter how they talk or behave.	• Emphasize impressions. • Use in-process memos. • List questions that arise. • Describe what surprised, intrigued, & disturbed. • Clarify / correct mistakes and misunderstandings. • Include insights or speculations. • Analyze assumptions and expectations.

The third data instrument used for qualitative inquiry and data collection was teacher interviews that will occur during week six of the stage one study (see Table 5). Using a relational approach for interviewing (Josselson, 2013), the researcher adhered to protocols.

Table 5

Protocol for Relational Approach Interviewing (*Josselson, 2013)*

Before	During	After
• Take an ethical attitude of knowing and treating rules with respect, tact. • Using reflexivity, identify personal assumptions, preconceptions, and context of the relationship between interviewer and interviewee. • Address Big Q and little Q to frame interview for interviewee. • Review relational dynamics of interview. Plan ahead for ideal space, seating, and equipment.	**Do:** • Create informal but private space. • Match parlance of participants and assume an empathic listening response and questioning. • Ask when you don't understand. • Open with warm and friendly conversation and directions that address the unfamiliar territory. • Review IRB protocols for consent. • Orient participant, inviting thick descriptions and elaboration when needed using reflective pauses. • Place focus on participant's story with follow-ups such as "Tell me about..." **Don't:** • Take a stance of power relation or formality that may be intimidating. • Set up an ask/answer format. • Talk more than interviewee. • Answer your own question. • Interrupt, interject, or sidetrack with excessive clarification. • Confront, criticize, excessively praise, reassure or cross ethical boundaries.	• Express gratitude. • Be transparent. • Ask interviewee about how they felt about interview. • Transcribe as soon as possible. • Conduct analysis.

For the research study to occur, a minimum of two educators will provide sufficient quantitative and qualitative data to analyze meaningful results. A minimum of twenty students is expected because this school has an atmosphere conducive to research and the implementation of innovative teaching methods. The following table shows the timeline of procedures (see Table 6).

Table 6

Stage One: Timeline of Quantitative and Qualitative Procedures

Weeks 1-3		**Weeks 4-6**		**Weeks 7-8**
Quantitative	*Qualitative*	*Quantitative*	*Qualitative*	*Analysis*
Teacher participants recruited via email and placed into a CoP. Teacher participants complete the survey. Student data first benchmark testing is retrieved from charter school administration.	Researcher gathers field notes from observations. 1st teacher CoP conference is conducted and the PBL design is written, revised, and implemented. Two professional developments for participants held. One is for project-based learning and the second is for equity in transdisciplinary literacy. Researcher audio records CoP meetings and professional development sessions. Teacher participants are scheduled for interviews. The researcher gathers field notes from observations. 2nd teacher CoP conference conducted and researcher audio records meetings. PBL design is revised if needed.	Post-survey is distributed to teacher participants. PI conducts data analysis of teacher participant surveys.	3rd teacher CoP conference conducted. Students present projects to an authentic audience. Fourth CoP conference is conducted. Teacher-participant interviews are conducted. The PI transcribes interviews and recordings. The PI conducts data analysis of field notes, interviews, and CoP recordings.	Teacher participants review data analysis of CoP and member checking. Student participant data from MAP testing is retrieved from the school administration. Data analysis of both data sets to determine student growth in reading. The researcher finalizes content analysis and triangulation of data with Dr. Cardullo. CoP makes recommendations for changes to survey or interview questions based upon the data.

Data Management

Quantitative

The researcher formulated a data management plan to identify and address potential threats to data. Once participants complete the surveys, teacher data were automatically recorded in Qualtrics. Paper data and forms were locked securely within the researcher's locked office. In addition, the researcher will securely retain confidential electronic and paper for up to three years. The researchers collected data from surveys as proposed that those were distributed electronically. The data are stored in digital format. Each teacher participant was assigned a code (A, B, C). In addition, the corresponding number was based on the order in which the participant submits the information. All data are currently stored through BOX, the university's secured platform for data management. This provided maximum security with the university's password-protected duo-authenticated portal. The data are currently backed up according to university data management system protocols. The master list will be destroyed at the end of the research period, but data will be kept in a locked closet in the researcher's office for three years.

Each student participant was assigned a code (A, B, C, AA, BB, CC). In addition, the corresponding number was based on the order in which the participant submits the information. Student reports from student testing will be kept securely stored on BOX for three years. Hard copies will be kept in a locked closet in the researcher's locked office. If a child withdraws from the study, all information related to that participant will be excluded from research, and forms, documents, and electronic copies coded for that participant will be redacted and/or destroyed. Only the researchers will have access to the master list that associates student participants' names with the code that protects their identity.

Qualitative

The researcher collected data in the form of audio recordings from CoP sessions and interviews as well as observational notes from time in classrooms. The data were stored in a digital format. Identifiable data collected or retained from the students were coded. The researcher generated and stored the list of codes for each teacher and student participant (A, B, C, AA, BB, CC). In addition, the corresponding number was based on the order in which the participant submits the information. All data, including transcribed text files, are currently stored through the university's secured platform for data management (BOX). This provides maximum security with the university's password-protected portal. The data are currently backed up according to the protocols of the university's data management system. Only the researcher has access to the master list that associates participants' names with the code that protects their identity. Data included transcripts from audio, video recordings, surveys, interviews, observational notes, and PBL units. All paper copies of this data will be stored in a locked cabinet in the PI's office for three years. If a teacher withdraws from the study before the end of the research, all information related to that participant will be excluded from the research, and forms, documents, and electronic copies coded for that participant will be redacted and/or destroyed.

Data Analysis

Quantitative

Using statistical software, Statistical Package for the Social Sciences (SPSS), repeated measure t-tests were run to determine descriptive levels of statistical differences between pre- and post-survey results of teacher knowledge and pre- and post-tests for student participants in

MAP Assessment for ELA/Reading and Math. Data analysis by researchers and members of the CoP informed stage two protocols for data collection, management, and analysis.

Qualitative

Content analysis (Bhattacharya, 2017) allowed the researcher to employ categorization, tagging, and thematic analysis. First, the researcher transcribed audio recordings of interviews verbatim and used deductive coding with a priori themes to analyze this data. Furthermore, the researcher used this coding to identify categories that were then used to label themes that emerged from the data. The coding transitioned to inductive as the researcher discovered and defined additional categories from data. The researcher analyzed each transcript independently through peer debriefing by the researcher. The researcher offered each participant the opportunity to review and cross-check the data during the draft phase to ensure accuracy. Following the observations of classroom implementation, the researcher employed multiple methods to triangulate the data from field notes. Following the CoP interviews, the researcher triangulated the data with peer review and participant review/ member checking. Deductive coding using a priori themes was selected in advance to analyze data. This included TDL, teacher identity shifts, and equity in text selection. From here, inductive coding provided the researcher with an opportunity to identify emerging themes and categories from the data. The researcher analyzed each transcript independently through peer debriefing and offered each participant the opportunity to review and cross-check the data during the draft phase to ensure accuracy.

In addition, the researcher conducted an in-depth analysis of data from teacher interviews. First, the researcher transcribed audio recordings of interviews verbatim and used inductive coding used to analyze this data. The researcher searched for the pre-established a

priori codes for transdisciplinary literacy, shifts in teacher identity, and the use of text features to meet the needs of learners. Furthermore, after the researcher applied this coding to identify these categories, she used inductive coding to label new themes that emerged from the data. The researcher analyzed each transcript independently through peer debriefing by researchers. The researcher offered each participant the opportunity to review and cross-check the data during the draft phase to ensure accuracy.

Following the observations of classroom implementation, the researcher employed multiple methods to triangulate the data from field notes. The researcher used inductive coding to analyze this data to also search for a priori codes of TDL, shifts in teacher identity, and the use of texts to meet the needs of all learners. Additionally, the researcher applied this coding to identify categories that would then be used to label themes that emerged from the data. The researcher used inductive coding to establish any additional emergent themes. The researcher analyzed each transcript independently through peer debriefing, and she offered each participant the opportunity to review and cross-check the data during the draft phase to ensure accuracy.

While the analysis of quantitative and qualitative data happened separately, the researcher used various strategies to merge and synthesize two sets of results before interpreting them (Creswell et al., 2018). These strategies included comparing and contrasting results based on content areas represented in both, creating a graphic that displays data sets, and identifying similarities and differences from one data based on dimensions of the other set (Creswell et al, 2018). Furthermore, the researcher created interpretations of merged results through discussions about how the data sets converge and relate to one another, highlights of instances of divergence, and a summary of the need for further analysis (Creswell et al., 2018). The purpose

of the convergence of data and its analysis was to inform any revisions that might be needed to data collection protocols or tools and the final analysis that occurs in Stage Two.

Stage Two

Participants

As Stage One collection, analysis and merging of data ended in the spring of 2024, the teacher participants and their recommendations informed Stage Two. The population also consisted of the same pool of teachers and students within a Title 1 school in rural Southwest Georgia. Probability sampling was used for the quantitative and qualitative portions. Cluster random sampling allowed the researchers to target this existing group of educators for an extended research phase. Both student and teacher populations were small and already considered intact groups.

Stage Two included Stage One teacher participants who desired to continue the research as leaders within the CoP. The teacher population was limited at the elementary school setting for a rural school. The participants also held current certifications in elementary education, art, music, special education, English as a second language, physical education, and world languages. The educator group of participants who agreed to contribute to the research and signed consent forms consisted of up to thirty teachers employed by the school who teach kindergarten through third grade. These educators within the Stage Two group were emailed surveys indicating their willingness to participate in the CoP and professional development.

Student participants from Stage One were not eligible for Stage Two. The student population for Stage Two was an existing group of approximately two hundred and four students who were assigned teachers and classes from kindergarten through third grade. All students and parents had the option to participate and were provided parent consent and student assent.

Students within the population who were enrolled in kindergarten through third-grade classes and took the first school benchmark assessment within the research time frame were eligible to be included in the research. The researcher excluded any student in this population who enrolled in the school after the first date of this benchmark assessment from the research. The researcher included students of all abilities in this research; the researcher did not exclude children based on exceptionalities. If a student chose not to participate, data were not collected. They were not be impacted by their decision to not participate in the research project. Likewise, the researcher excluded testing data and videos that contained this child during the research time frame. Member checking of data collection from participant teachers provided additional assurance that a child who was not a participant was not included in any video, observational data, or CoP discussions. Ten educators provided sufficient quantitative and qualitative data to analyze meaningful results, and a minimum of fifty students were expected because this school maintains an atmosphere conducive to research and implementing innovative teaching methods.

Data Collection

Quantitative

The researcher transcribed and formatted the first quantitative data measure, Professional Learning Communities Survey (n.d.). for teachers on Qualtrics, a Duo-Authenticated online secure survey system provided by Auburn University. During the first four weeks, the researcher distributed the cover letter one via email to the population pool of thirty elementary educators of various disciplines, including art, music, physical education, English Language Arts, social studies, French, and Spanish, who are employed by a rural charter school. The forced-choice survey contained eighteen items, and the researcher added seven questions referring to demographic information. Peer review conducted by multidisciplinary teachers evaluated the

instrument. The researcher aggregated data before professional presentations or publications. The researcher distributed teacher surveys two times to ensure teacher participants had an opportunity to respond. Data analysis was descriptive, but the researcher asked respondents demographic questions. The researcher sent this e-mail invitation to the target population with information explaining the request to participate in the research and a copy of the consent form. If the teacher still chose to participate, they received a survey using Qualtrics. The survey took approximately ten minutes. The data were automatically recorded in Qualtrics once participants completed the survey. Furthermore, the researcher sent emails to these educators once every four weeks from the beginning of week one through week sixteen. Electronic surveys for the teacher participants were distributed via Qualtrics to participants' email and accessible via a digital device (e.g., phones, laptops, and desktops). All data collection occurred before the first professional development workshop begins and upon the completion and implementation of the PBL unit. The survey research study examined teacher attitudes toward TDL and PBL. Data analysis informed revisions to this instrument for Stage Two.

The second quantitative data set came from student MAP testing in achievement and growth in ELA/Reading and Math that was collected two times over the research period. The student population consisted of two hundred and four kindergarten through third-grade students enrolled in the charter school who agreed to participate by signing parental consent and student assent. One teacher was present with the minor participants during all research procedures as this is standard procedure under the code of ethics for professional educators. Administration from the charter school was responsible for the administration and collection of data

Qualitative

The first qualitative instrument for gathering data came from observational notes and transcribed notes from the meetings of the CoP. The members of the CoP engaged in collective learning (Wenger, 1998) and met at least three times during the first six weeks of the research. This occurred at a rural school in the classrooms of the members of the CoP. The researcher disseminated information for the CoP schedule and goals via email or text. The researcher used protocols to gather qualitative data as the group talked about collective responsibility to manage their learning process and steward gained knowledge (Wenger, 1998). Lupton et al. (2017) identify a CoP by three characteristics as groups of people (domain) who share their promising resources, experiences, and tools (practice) to build relationships and joint activities (community) to pursue a passion for something wish to improve. The researcher recorded and transcribed each meeting allowing for frequent member checking (see Table 7).

Table 7

Stage Two: Protocol for Community of Practice

Phase	Action Steps	CoP Member Role	Researcher Role
I. Define	primary purpose		**X**
	shared interests	**X**	**X**
	community members	**X**	
	practices and topics	**X**	**X**
II. Design	activities	**X**	**X**
	communication plan		**X**
	contributions	**X**	
III. Grow	culture	**X**	**X**
	brand	**X**	
	membership	**X**	**X**
IV. Perform	cycle of participation	**X**	
	performing benefits		**X**
V. Transform	sustainability	**X**	**X**
	feasibility	**X**	**X**
	outcomes	**X**	**X**

The goals for meeting one were to define the purpose and format and design the roles of members as well as discuss logistical concerns. The goals for meeting two involved how the CoP might grow and perform. CoP members thoughtfully examined standards across disciplines to see in which ways the standards or disciplines center students. They looked for opportunities within these standards to integrate more than two disciplines as they designed a PBL unit using TDL. The think-aloud method served as a model for discussions that enable teachers to examine standards, disciplines, and texts in terms of the various needs of learners within their classrooms (Dyches, 2022). In addition, the researcher collected teacher reflections from professional development sessions about TDL, PBL, and data from teacher interviews. The third meeting focused again on text selection for all learners, revisions, and reflections of the PBL unit, and analysis of survey items, interview questions, and the rubric for feasibility.

The researcher scheduled observational note-gathering to avoid disruptions to the daily educational plan and curriculum (Emerson et al., 2011). The researcher met with the participants before the first observation to explain the purpose and routine of the visits and ask questions. The researcher and teacher participants selected different established placements for observation around the room to allow the researcher access to various activities without distracting participants from task performances and interfering with knowledge acquisition. The researcher visited all classrooms that the kindergarten through third-grade participants attended such as English Language Arts, science, social studies, math, music, art, and physical education. During each visit, the researcher took descriptive field notes and accurately recorded details about the physical setting, activities, and how students and teachers interacted formally and informally. She recorded what was not happening and wrote her reflections and interpretations of these noticings (Emerson et al., 2011). The researcher used in-process memos to develop insight and

direction of any analytic leads that emerged (Emerson et al., 2011). The researcher attended and explicitly acknowledged her perspective through reflexivity in an intentional choice to mitigate bias and reveal participant voices through systematic writing and ongoing production of observations (Emerson et al., 2011). Ruthellen Josselson (2013) defines reflexivity as "an attempt to recognize your assumptions or preconceived ideas about the person or narratives that the interview will encounter" (p. 27). Member checking will allow opportunities for teacher participants to read and respond to observational data (see Table 8).

Table 8

Stage Two: Protocol for Taking Field Notes

Observational/Descriptive field notes while visiting classrooms	**Reflections following classroom visits**
Begin daily, immersive note-taking process with consistent and agreed upon location, date, and time. Accurately describe the setting and activities. Use jottings to record the sequence of actions and behaviors and to preserve accuracy and detail. Describe the people and actions that precisely correspond to observations. Record relevant quotes or comments. Describe positive or negative impact of researcher presence and any reactive effects in which participants might alter how they talk or behave.	Emphasize impressions. Use in-process memos. List questions that arise. Describe what surprised, intrigued, & disturbed. Clarify / correct mistakes and misunderstandings. Include insights or speculations. Analyze assumptions and expectations.

The third data instrument used for qualitative inquiry and data collection were teacher interviews that were scheduled in advance and occurred following the implementation of the PBL unit and student testing. Using a relational approach for interviewing (Josselson, 2013), the researcher adhered to protocols set forth in Table 9. These specific protocols served as an instructional guide for the researcher to maintain an interpersonal confidentiality and respect during interviews, but it also provided structure so that she could mitigate bias throughout the process. The sections specifying actions to be taken before, during, and after the interview process were clearly delineated to avoid confusion. These transcripts were analyzed through Nvivo.

Table 9

Stage Two: Protocols for Relational Approach Interviewing (Josselson, 2013)

Before	During	After
• Take an ethical attitude of knowing and treating rules with respect, tact. • Using reflexivity, identify personal assumptions, preconceptions, and context of the relationship between interviewer and interviewee. • Address Big Q and little Q to frame interview for interviewee. • Review relational dynamics of interview. Plan ahead for ideal space, seating, and equipment.	**Do:** • Create informal but private space. • Match parlance of participants and assume an empathic listening response and questioning. • Ask when you don't understand. • Open with warm and friendly conversation and directions that address the unfamiliar territory. • Review IRB protocols for consent. • Orient participant, inviting thick descriptions and elaboration when needed using reflective pauses. • Place focus on participant's story with follow-ups such as "Tell me about..." **Don't:** • Take a stance of power relation or formality that may be intimidating. • Set up an ask/answer format. • Talk more than interviewee. • Answer your own question. • Interrupt, interject, or sidetrack with excessive clarification. • Confront, criticize, excessively praise, reassure or cross ethical boundaries.	• Express gratitude. • Be transparent. • Ask interviewee about how they felt about interview. • Transcribe as soon as possible. • Conduct analysis.

Ten educators provided sufficient quantitative and qualitative data to analyze meaningful results. A minimum of forty students was expected because this school has an atmosphere conducive to research and the implementation of innovative teaching methods. The following table shows the timeline of procedures (see Table 10). The researcher deductively and inductively generated codes. Next, these codes were used to generated themes. Through the use of Nvivo and paper memos, the researcher analyzed themes over time, frequently reviewing or revisiting the process and discussing it with peers.

Table 10

Stage Two: Timeline of Quantitative and Qualitative Procedures

Weeks 1-8	**Weeks 9- 12**	**Weeks 13-16**	**Weeks 17-21**	**Weeks 21-24**
Quantitative	*Quantitative*	*Quantitative*	*Data Analysis*	*Final Report*
Teacher participants recruited via email and placed into a CoP. Teacher participants complete the pre-survey. Fall Benchmark testing from charter school administration occurs; data retrieved.	Fall Benchmark testing from charter school administration occurs; data retrieved.	Post-survey is distributed to teacher participants. (Week 16) Winter Benchmark testing from charter school administration occurs; data retrieved.	Student participant data from MAP testing is retrieved from the charter school administration. Data analysis to determine student growth and achievement in reading and math. Researcher conducts data analysis of teacher participant surveys.	Teacher participants review final analysis of findings; member checking.
Qualitative	*Qualitative*	*Qualitative*	*Data Analysis*	*Final report*
The researcher gathers field notes from observations. 1st teacher CoP conference is conducted, and the PBL design is written, revised, and implemented. Two professional developments for teacher participants held. One is for project-based learning, and the second is for equity in transdisciplinary literacy. PBL lessons are written and revise. The researcher gathers field notes from observations. Second teacher CoP conference conducted; researcher audio records meeting & transcribes.	Third teacher CoP conference conducted. Researcher audio records CoP meetings and professional development sessions. The PI transcribes interviews and recordings. PBL lessons are written, revised, and implemented. Students present projects to authentic audience. Third PD for teacher participants held. Optional CoP conference is conducted. Researcher audio records CoP meetings and professional development sessions. The researcher transcribes data.	Teacher participants are scheduled for interviews. Teacher-participant interviews are conducted.	The researcher conducts data analysis of field notes, interviews, and CoP transcripts. Teacher participants review data analysis of CoP and member checking. The researcher finalizes content analysis and triangulation of data with Dr. Victoria Cardullo.	Teacher participants review final analysis of findings, member checking.

Data Management

Quantitative

The researcher formulated a data management plan to identify and address potential threats to data. Once participants completed the surveys, Qualtrics automatically recorded teacher data. The researcher locked paper data and forms securely in her office. In addition, the researcher will securely retain confidential electronic and paper data for up to three years. The researchers collected data from surveys distributed electronically. The data are currently stored in digital format. The researcher assigned each teacher participant a code (A, B, C). In addition, the corresponding number was based on the order in which the participant submitted the information. All data will be stored through BOX, the university's secured platform for data management. This will provide maximum security with the university's password-protected duo-authenticated portal. The data will be backed up according to university data management system protocols. The master list will be destroyed at the end of the research period, but data will be kept in a locked closet in the researcher's office for three years.

Furthermore, the researcher assigned each student participant a code (A, B, C, AA, BB, CC). The corresponding number was also based on the order in which the participant submitted the information. Student participant reports from student testing will be kept securely stored on BOX for three years. Hard copies will be kept in a locked closet in the researcher's locked office. If a child withdraws from the study, all information related to that participant will be excluded from research, and forms, documents, and electronic copies coded for that participant will be redacted and/or destroyed. Only the researchers will have access to the master list that associates student participants' names with the code that protects their identity.

Qualitative

The researcher collected data in the form of audio recordings from CoP sessions and interviews as well as observational notes from time in classrooms. The data were in a digital format. Identifiable data collected or retained from the students was coded. The code list was again referenced and the information stored as each teacher and student participant were maintained these codes (A, B, C, AA, BB, CC). All data, including transcribed text files, was stored through the university's secured platform for data management (BOX). This provided maximum security with the university's password-protected portal. The data will be backed up according to the protocols of the university's data management system. Only the researchers have access to the master list that associates participants' names with the code that protects their identity. Data from audio, video recordings, surveys, interviews, observational notes, and PBL units. All paper copies of this data from will be stored in a locked cabinet in the PI's office for three years. If a teacher withdraws from the study before the end of the research, all information related to that participant will be excluded from the research, and forms, documents, and electronic copies coded for that participant will be redacted and/or destroyed.

Data Analysis

Quantitative

Using statistical software, Statistical Package for the Social Sciences (SPSS), repeated measure t-tests were run to determine descriptive levels of statistical differences between pre-and post-survey results of teacher knowledge and pre-and post-tests for student participants in MAP testing for ELA/ reading and math.

Qualitative

Content analysis (Bhattacharya, 2017) allowed the researcher to employ categorization, tagging, and thematic analysis. First, the researcher transcribed audio recordings of interviews verbatim, and used deductive coding with a priori themes for analysis. The researcher deductively and inductively generated codes. Next, these codes were used to generated themes. Through the use of Nvivo and paper memos, the researcher analyzed themes over time, frequently reviewing or revisiting the process and discussing it with peers.

Furthermore, over several months, the researcher continued to refine coding to identify additional categories that were then used to label themes that emerged from the data. The coding moved to inductive as the researcher discovered and defined additional categories from data. The researcher analyzed each transcript independently through peer debriefing. The researcher offered each participant the opportunity to review and cross-check the data during the draft phase to ensure accuracy. Following the observations of classroom implementation, the researcher used multiple methods to triangulate the data from field notes. Following the CoP interviews, the researcher triangulated the data with peer review and participant review/ member checking. The researcher selected deductive coding using a priori themes in advance to analyze data. This includes transdisciplinary literacy, teacher identity shifts, and equity in text selection. From here, inductive coding provided the researcher with an opportunity to identify emerging themes and categories from the data. The researcher analyzed each transcript independently through peer debriefing, and the researcher was offered each participant the opportunity to review and cross-check the data during the draft phase to ensure accuracy.

In addition, the researcher analyzed data from teacher interviews. First, audio recordings of interviews were transcribed verbatim, and inductive coding was again used to analyze this

data. The researcher searched and identified the pre-established a priori codes for TDL, shifts in teacher identity, and the use of text features to meet the needs of learners. Furthermore, the researcher used this coding to identify these categories, inductive coding was then used to label new themes that emerged from the data. Each transcript was analyzed independently through peer debriefing by researchers. The researchers offered each participant the opportunity to review and cross-check the data during the draft phase to ensure accuracy.

While the analysis of quantitative and qualitative data occurred separately, the researcher employed strategies to merge and synthesize two sets of results before interpreting them (Creswell et al., 2018). These strategies included comparing and contrasting results based on content areas represented in both, creating a graphic that displays data sets, and identifying similarities and differences from one data based on dimensions of the other set (Creswell et al, 2018). Furthermore, the researcher created interpretations of merged results through discussions about how the data sets converge and relate to one another, highlights of instances of divergence, and a summary of the need for further analysis (Creswell et al., 2018). The purpose of the convergence of data and its analysis will inform any revisions that might be needed for data collection protocols or tools and the final analysis.

Trustworthiness

Initially, the researcher provided examples of thick descriptions that included teacher responses (Tracy, 2020) that enriched the credibility of this robust study (Bhattacharya, 2017). The trustworthiness of the research is further validated as the researcher shared the concrete details that emerged from the gathered data. Tangible data included in-depth and informal open-ended interviews, and natural conversations through the CoP sessions (Bhattacharya, 2017). The researcher designed these natural conversations to be bidirectional and allow for equal exchange between researchers and participants (Tracy, 2020). The notes from researcher observations, transcriptions from the CoP, and interviews were triangulated (Bhattacharya, 2017). The explication of the tacit knowledge of the participants included data gathering of teacher insights and descriptions of identity shifts. These three data sets provided the triangulation needed to confirm nuances of future results. Furthermore, inductive data analysis provided the researcher with opportunities to examine raw data sources and assess chunks of information from observations (Bhattacharya, 2017; Tracy, 2020). As the researcher began to group information and look for commonalities, she identified emerging themes and used a comparative method to link segments of one data set with others (Stewart et al., 2021).

Ethics

Mitigating bias is most effective when the researcher creates a research plan, design, and implementation that addresses these concerns before the research begins (Pannucci & Wilkins, 2010). Participant recruitment was a potential concern for bias within this study. This research provided sufficient details to establish the ethical treatment of the participants and how the researcher preserved confidentiality. The researcher clearly outlined recruitment scripts, surveys, and consent letters with IRB approval so that there was a limited need for the researcher to

discuss recruitment with members of the participant pool. Additionally, the researcher addressed risks, timelines, and future use of the research project in clear, everyday language. Interview protocols in place emphasized a standardized approach to interactions. Finally, the researcher acknowledged how potential bias will influence data analysis and was mindful of her assumptions throughout her research that might influence one outcome over another (Emerson et al., 2011). In addition, the researcher engaged in reflexivity in which she journaled throughout the research. She guarded against evaluative wording and framing accounts to a specific audience. In terms of relational ethics, participating teachers who were recruited and observed throughout the duration of the research received a stipend for resources that supported their learning and training as teacher-leaders. The researcher shared data analysis results with the participants throughout the study and conducted several participant reviews of the data.

Summary

Through the use of a convergent parallel mixed method design, the researcher gathered compelling data that evaluated the effectiveness of a transdisciplinary approach informing instructional knowledge and facilitating the development of innovative practices. The study involved observing educators as they created challenging PBL lessons that encouraged students to produce authentic products. By combining these findings with quantitative analysis of student achievement data, this research served as a valuable resource for future studies exploring the significance of transdisciplinary literacy in PBL units that prioritize inquiry-based pedagogies. Furthermore, this study contributed significantly to educators' ongoing efforts of educators to choose a wide range of texts that address the needs of all learners in the U.S. educational system. Chapter Four contains data analysis and a discussion of Stage One and Stage Two findings.

Chapter 4 Findings.

Je n'ai fait celle-ci plus longue que parce que
je n'ai pas eu le loisir de la faire plus courte.- Blaise Pascal

Stage One

Stage One of the convergent parallel mixed methods study marked a critical juncture in analyzing how teachers engaged with and reflected on instructional change within literacy-rich, learning environments they created following their time within a CoP. Findings from quantitative and qualitative data were evaluated and validated through member checking with teacher participants, whose thoughtful and insightful reflections confirmed the accuracy of the data, generated concrete, context-specific recommendations to address instructional and structural barriers to the implementation of Stage Two. These teachers emerged as teacher leaders, and their participation was instrumental in building teacher agency in the research. Their insights and recommendations informed the design and goals of Stage Two.

Quantitative

Teacher Participant Survey

Quantitative data were collected using the Statistical Package for the Social Sciences (SPSS). The researcher conducted repeated measures t-tests to analyze statistical differences between pre- and post-survey results on teacher knowledge. The researcher transcribed and formatted the Professional Learning Communities Survey (2009) for teachers on Qualtrics and accessible via a digital device (e.g., phones, laptops, and desktops). Survey data collection that occurred before the first professional development workshop began and the post-survey taken upon completing and implementing the PBL unit, examined teacher identity shifts and attitudes toward their work.

The demographic distribution of teacher participants in both the pre-and post-survey indicated that two of the four participants took the survey and identified as White females (see Table 11). The other two participants reported that they began the survey but failed to complete it. The potential for a response bias exists because there were only two teacher participants.

Table 11

Stage One: Demographic Characteristics of Participants

Category	Variable	Frequency	Percent	Valid Percent	Cumulative Percent
Ethnicity	White	2	100.0	100.0	100.0
Gender	Female	2	100.0	100.0	—

Note. n=2. Cumulative percent applies only to the Ethnicity category.

In order to more clearly understand the teacher participants. The first five questions reflected requests for demographic information. Furthermore, the survey results (see Table 12) were not reliable or statistically significant, yet the responses of the two respondents offered insight, informing and strengthening the design of Stage Two.

Table 12

Stage One: Descriptive Analysis of Survey Responses from Teachers

Item	Pre-Survey *M*	Pre-Survey *SD*	Post-Survey *M*	Post-*Survey SD*
A- Did you attend a CoP for the study of transdisciplinary literacy within a project-based learning unit?	---	---	5.00	0.00
B- Which of the following choices accurately reflects this statement? Teacher voice and input were valued throughout the professional development and professional development sessions.	---	---	5.00	0.00
C- Which of the following choices accurately reflects this statement? Lessons that I co-created during the sessions were implemented with fidelity in my classes.	---	---	4.00	0.00
D- Which of the following choices accurately reflects this statement? Throughout the CoP time frame, I identified students in my classes who would benefit from changes in the texts that I use during my lessons.	---	---	4.00	0.00
E- Which of the following choices accurately reflects this statement? I am willing to participate in future collaborations that emphasize transdisciplinary literacy and project-based learning.	---	---	4.00	0.00
F- CoP members talk with each other about their situations and the specific challenges they face as they navigate the development of a project-based learning unit.	---	---	4.00	0.00

Item	Pre-Survey *M*	Pre-Survey *SD*	Post-Survey *M*	Post-Survey *SD*
H- Which of the following choices accurately reflects this statement? Teachers share, observe, and discuss each other's teaching methods and philosophies about project-based learning and transdisciplinary literacy through an equity in literacy lens.	4.00	0.00	4.00	0.00
I- Teachers work together to develop shared understandings of students, curriculum, and instructional policy, but also to produce materials and activities that improve instruction, curriculum, and assessment.	4.00	0.00	4.50	0.71
J- Through words & actions, teachers affirm their common values concerning critical educational issues and in support of their collective focus on student learning.	4.00	0.00	4.00	0.00
K- Teachers take risks in trying new techniques and ideas and make efforts to learn more about their profession.	5.00	0.00	4.00	0.00
L-Teachers feel honored for their expertise within the school as well as within the district, the parent community, and other significant groups.	4.00	0.00	2.50	0.71
M- Within the school, there are formal methods for sharing expertise among faculty members so that marginal and ineffective teachers can improve.	4.00	1.41	2.00	1.41
N- The school leadership keeps the school focused on shared purpose, continuous improvement, and collaboration.	4.00	0.00	4.00	0.00
O- The staff imparts a sense that new teachers are an important and productive part of a meaningful school community.	4.50	0.71	4.00	1.41

Note. n=2.

Description of Findings from a Comparison of Teacher Survey Items

The following section provides an analysis of patterns in responses on selected survey items to examine shifts in teacher attitudes, knowledge and instructional practices during Stage One. Through the convergence of the data sources and member checking, the teacher participants provided valuable input that enriched the robustness of this stage of the study.

Survey items A through F. Two respondents provided positive feedback about the nature and impact of CoP and the study of transdisciplinary literacy that is supported with qualitative data from teacher interviews. The data indicates that teacher voice and input were valued during a CoP and professional development sessions ($M = 5.00$; $SD = 0.00$). Furthermore, the teacher participants indicated their willingness for future professional development and that their collaboration led them to intentionally identify students within their rooms who would benefit from TDL.

Survey item G. The slight increase in mean from pre-(*M* = 3.00*; SD* =1.41) to post survey (*M* = 3.50*; SD* = 0.71) report a positive shift in perceptions about teacher collaboration for the purpose of sharing teaching methods. The shift in standard deviation indicates that responses became more consistent and consensus, though not dramatic, could indicate that collaboration within the CoP led to a more cohesive understanding of transdisciplinary literacy.

Survey items H, J, and N. The data reported no change from pre- to post survey mean (*M*= 4.00*; SD* = 0.00*)* with zero variability. As the responses remained unchanged, this could indicate that there was no measurable change in perception that teachers and school administration share a common focus. Either the respondents had strong pre-existing agreement with these three ideas or there was a lack of impact from the research.

Survey question I. A slight positive increase of scores from pre-survey *(M* = 4.00*; SD* = 1.41) to post-survey (*M* = 4.50*; SD* = .071) reflects increase in positive interactions among teachers. Pre-survey score for standard deviation reported a high degree of variability between the two respondents indicating differing perceptions or experiences. The shift in post-survey standard deviation indicates that responses became more consistent, indicating positive reactions to the CoP intervention.

Survey Items K and O. A shift or decrease in agreement between respondents reflects a decrease in perceptions about a teacher's abilities to take risks. The data reports (*M* = 5.00*; SD* = 0.00) no variation in responses from pre-survey scores and each respondent provided the highest possible score from a 5-point Likert scale; however, there was a decrease in post-survey (*M* = 4.00 with *SD* = 0.00*)*. Possible interpretations of this data are that teachers engaged in a more critical review of their perceptions of new teachers and reported a decline in confidence to be recognized for taking risks.

Survey Item L. Before the research began, the respondents agreed (pre-survey $M = 4.00$; $SD = 0.00$) with no variation with the statement that they felt honored for their expertise. Post survey mean ($M = 2.50$*; SD* = 0.71) indicates a drop in agreement. The data indicates a strong decline in teachers feeling honored for their expertise. Furthermore, post-survey results show a slight variability that continues to report a downward shift. This drop indicates a decline in teacher perceptions about how the community responds to their expertise. During member checking, teacher participants recommended to researcher that administration acknowledge the need for protected time for Stage Two CoP and professional development.

Survey item M. Perceptions about formal methods for sharing expertise dropped from pre-to post-survey (pre-survey *M = 4.00; SD* = 1.41) and post survey $M = 2.00$*; SD* = 1.41) perhaps suggesting that following Stage One, teachers had much less confidence in the existence or effectiveness of these formal methods. Another possibility is that during the research, the teachers began to more critically examine gaps in existing practices and to consider possible implications for Stage Two. Respondents were divided in their answers before and after the survey with a high degree of variability remaining unchanged from pre-to post survey.

During member checking, teacher participants made recommendations for structuring professional development and incorporating ongoing support throughout the duration of Stage Two research.

Student Assessment Data

Due to changes in protocol beyond the control of the researcher, student participants were given the post-MAP assessment for ELA/Reading during the first week of the intervention. This second quantitative data set would have been derived from student-participant pre- and post-

MAP growth testing in ELA/Reading and Math for winter and spring. Administration administered the exam without notification to the researcher; student scores were invalid.

Qualitative

Throughout Stage One, teachers provided qualitative data through interviews, transcripts of the CoP sessions, and researcher observations of teachers in their classrooms. Following two rounds of deductive and inductive coding of all qualitative data, three themes emerged as four teacher participants engaged in unpacking teacher identity for the first time. These are (a) Evaluating instructional practices and strategies, (b) Reconceptualizing personal views of equity and (re)defining shifts in perspective, and (c) Navigating dialogic self-reflection, tensions, and complexities of shifting pedagogical and professional identities.

Evaluating instructional practices and strategies. Teacher participants identified low-value practices to review and discussed the implementation of high-value practices including the SoR. Discontinuing ineffective practices allowed educators to focus on more evidence-based strategies that better support student learning and development. They experienced a conscious shift away from ineffective or non-research-based teaching activities and strategies while implementing new insights and approaches to PBL using a convergence of disciplines.

Reconceptualizing personal views of equity & redefining this shift in perspective. As teachers were asked to consider the needs of students who are often left or pushed out of lessons in their classrooms, interrogate standards from an equity lens, and verbalize how they addressed lesson planning with those students in mind, they began shifting perspectives towards more nuanced interpretations of equity. Data from researcher field notes and interview transcripts also indicated that each teacher asked for clarification and examples of how teachers might not respond to all student needs before addressing how they approach students within their

educational setting. Their tension and struggle to provide an answer created space for them to consider the terms, including the intentional application of this definition to meet the distinct needs of each learner. These moments allowed teachers to consider how their approach to teaching the standards and text selection might be one straightforward step in showing greater responsiveness to student needs.

Dialogic self-reflection: Navigating tensions and complexities of shifting pedagogical and professional identities. Teachers grappled with shifting from restrictive teacher-centered instructional model to student-centered based, experiential learning approaches. This theme emerged as data reported teacher expressions of frustration and concern over relinquishing control of classroom procedures to allow students to use inquiry-based strategies at a higher level**.**

This study drew on qualitative data from interviews, CoP transcripts, and survey responses to explore the noticings, perceived benefits, experiences, and pedagogical shifts in teacher identity among the participating educators. Although only two of the white female teacher participants completed the survey, all four are presented as individual case studies to illustrate the many ways they engaged with professional learning, negotiated evolving teaching identities, and implemented project-based literacy instruction by considering how to most effectively reach all learners within the classroom. These four cases offer insight into the complexities of instructional decision-making, reflective practice, and responsiveness to equity-focused goals. These findings highlight and center teacher voices as professionals grappling with problems of practice within a CoP as they developed and implemented a PBL unit using transdisciplinary literacy. The data analysis of teacher data across the research time and framed around three priori themes reported another level of emerging themes and individualized paths

across their contexts. The following cases tell the story of teacher participants Polly, Tina, Diane, and Mary. The data was transcribed verbatim.

Case Study I: Polly

Polly, a 29-year-old White female educator, served as a third-grade homeroom teacher with nine years of experience teaching first through third grades. The research site followed a looping model in which teachers moved with the same students for two years. Additionally, the school is committed to the systematic implementation of two PBL units per academic year, beginning in kindergarten. At the time of the research, Polly had completed the two-year looping cycle with her students, during which they had collaboratively engaged in three PBL units. When Polly began to critically reflect on her awareness and understanding of social, cultural, and educational issues within her classroom, she also began to adopt new ways of thinking about epistemological frameworks. This process of reflection and action allowed her to continuously refine how she addressed literacy instruction in ways that promoted meaningful and transformative learning experiences for her students.

> I'm naturally a person that wants it no gray area, black or white. I strive for perfection in almost everything I do. I changed my definition of what perfection is. I base it off the students and what they need. What's perfect for this kid or what's perfect for that kid. So, my idea of perfection is not black or white anymore; a lot gray area based off what my kids need, my classroom needs, and sometimes it is not about just one kid, it's about what this group need to be successful. They are working hard and they need it; it's just … it's always been student based but it is a lot deeper now.

Polly critically engaged with her own beliefs and instructional strategies to improve her teaching practices and reach all students in her classroom. As she began to unpack the concepts

of teacher identity, she also committed to the study of developing and applying evidence-based high-impact strategies gained from professional development about text selection in order to design a PBL unit. Implementing various strategies in which the teacher intentionally empowered students to take ownership of their learning and independently engage with the material.

> Response to reading with writing, interactive read-alouds, and making it meaningful whether it's text to self or text to world. I feel like we are doing that. Handing the kids the responsibility. Shared reading, independent reading, the listening. Them with expectations with writing. We started handing them rubrics. Getting them to be self-reliant. They have to read the rubric. Let's see. I don't know. I'm going to buck you on that. I think we have started integrating aspects of transdisciplinary literacy. I'm not saying I'm an expert at it, but I feel like we have done pretty well… Social studies, writing cause first thing Monday they are going to practice picking a candidate for president who they are going to pick. It's an opinion piece and why. Then and then, they are going to write a campaign paper like their speech. So that's the writing part, ELA part is going to come with listening skills and speaking skills. Grammar is going to come in being able to use some of those techniques with their writing. Social studies is coming in. Math can come in once we get the votes in because we are doing data right now.

This process, highlighted by teacher enlightenment through acquiring and implementing knowledge, emphasized student autonomy and active participation in constructing knowledge. The data indicates how Polly consistently used asset-based language to communicate these goals to her students.

> They went from doing it in classrooms to presenting in the library in front of the parents. They really talked about what they wanted to improve and I saw it. I mentioned before letting the kids have more control; there shouldn't be an idea of perfection in PBL. Needs to be the outcomes of what the kids attained and what they are able to achieve based off the skill set they have. Did we build them up and build their confidence? …
>
> Generally, when I am more relaxed, and I know that have more control they are too. I feel that that's where we are at. I'm not trying to put a focus in 500 different areas. That is where the understanding of PBL has really gotten into me. I have learned to breathe through it and not overcomplicate it. I'm not saying I'm perfect at it by any means, because I'm not, but I think I have gotten better at it.

Polly critically reflected on her beliefs and teaching strategies to improve her practice and ensure she reached all students in her classroom. As she explored the concept of teacher identity, she committed to learning and applying evidence-based, high-impact instructional strategies—particularly in text selection—through professional development. She then designed a PBL unit using these strategies. Throughout the process, she intentionally empowered students, encouraging them to take ownership of their learning and independently engage with the material. This emphasizes the importance of reflective teaching, evidence-based strategies, and student empowerment in the learning process.

Case Study II: Tina

Tina, a White female and veteran music educator who retired at the end of this research and school year, primarily served kindergarten through eighth grades at the research site. Her schedule allowed her to teach the third-grade student participants for one hour each day over two separate school weeks during the research period. As Tina supported and engaged in a

collaborative PBL with the third-grade homeroom teachers, scheduling conflicts made it difficult for her to participate in common planning or the CoP. Consequently, Tina spent time engaged in dialogic self-reflection with the researcher.

> (Music is) language- development of language skills. For them it is a collaborative effort. Literacy-helping with language. You have connection with other scholars as well as connections with people outside of our school. For music, a lot of what we do is giving that gift to others. It's making them go outside of themselves it is not all about what "I can do for me" it is about "what can I do for others."

The study revealed that Tina's ability to identify the skills and abilities of her students translated to practical application. She leveraged these skills and provided direction for students so that they might have meaningful contribution to the group work. Her concern for their well-being as well as their cognitive development indicated her responsiveness to the unique needs of her students.

> When we are designing a program and I'm asking those (driving) questions, they are helping me figure what we are going to do and how this is serving others; how we are going to take it out. Let's reflect on it; let's envision how could we make it better… Did we create today? Did we perform today? Did we respond? How did we respond? How did we connect?

Through this purposeful use of asset-based language, the educator provides a classroom space in which each individual provides intentional application of unique talents in a way that benefits others and fosters a sense of service in the community.

> One thing that has changed is that I give the kids more input. Negotiate. What do you (students) want to see happen? Even with other homeroom teachers, "What do you want

this to look like?" Lots more negotiation. More input. More choice … then it becomes let's all work together.

Tina thoughtfully and intentionally reflected on her own beliefs and instructional strategies to improve her teaching practices and reach all students in her classroom. When asked about who is centered versus those who are not centered in her classroom, she responded,

> The ones who are centered are the ones who like it. Like Mark, he's not always centered. It is not his thing. It could be a cultural thing or it could be a motivation… he is a boy and music is not his thing. But someone like Caleb is all in because he's smarter but it also more his thing…He is not as athletic. A lot of the boys are, like if they are all athletic, it (music) just is not as interesting to them.

From here, Tina described her intent again to make the music about serving others rather than a reflection of only what motivates students in her music class. The data indicated that she was adept at creating spaces for students to build community, establish ways to serve each other, and engage with the lessons. Tina easily articulated her abilities to structure her classroom in a way that inspires students to take risks and develop their unique skills and abilities within group dynamics.

Case Study III: Diane

Diane, one of the two homeroom third grade teachers, was a White female educator with nearly ten years of elementary teaching experience. At the time of the research, Diane (like Polly) had completed the two-year looping cycle with her students, during which they had previously engaged in three PBL units. Diane's exploration of teacher identity was deeply intertwined with her role as a co-teacher and co-developer of the PBL units alongside her grade-band partner, Polly. The data indicated that Diane's deference to Polly's expertise and

collaborative approach often disrupted her critical self-reflection on instructional practices. While evaluating her teaching strategies, she frequently relied on Polly's plans for PBL implementation, making adjustments primarily in response to student request rather than through autonomous instructional decision-making. Mutual respect and trust were evident in Polly and Diane's professional relationship, fostering a highly collaborative and effective co-teaching dynamic.

> I don't feel like I changed anything. I did exactly what my partner teacher told me to do. I worked as a team, but I didn't change anything. Wait, yes, I did. I think originally there were going to originally only supposed to vote in one new thing into the classroom and I let mine vote in three new things. That is one new thing that I didn't stick to.

Furthermore, the data suggests that Diane's conceptualization of PBL prioritized structuring student collaboration and assessing the final product, rather than emphasizing strategies for deepening formative assessment and fostering critical thinking throughout the learning process.

> I guess I have gained a better understanding of how to make certain content areas and standards hands-on or give (the) how to create lesson plans that are not just lecture, paper. It's hands-on and it gives them the opportunity to see what they are doing and why they are doing it. I still try to make learning fun, I always try to do hands-on activities as much as possible. I always try to have a visual aspect, a hands-on aspect. For auditory learners, I do use lectures. Sometimes I'm doing all three at the same time…

PBL encourages a multifaceted approach beyond evaluating a project's outcome; the inquiry-driven model emphasizes the complexities of integrating continuous reflection. During the CoP, Diane again shared her willingness to try innovative teaching methods. She provided a reflection time for a whole-group student community circle following the product phase of the

PBL. The data also indicated she has concerns about student abilities to negotiate inquiry-based activities and her response to potential student tensions.

> Some of mine are going to freak out. I'm going to leave them where they are. Their nerves are already high because of milestones. One has completely shut down because of milestones. He's not thinking anything through right now because of milestones stress. There's a lot of stress.

Diane expressed surprise at their ability to engage in respectful discussions regarding areas for growth and revision, effectively balancing strengths and areas for improvement.

> I think we have a lot of different, diverse students in our class, so they had to learn to work together and come to a common decision on the rules that they wanted to nix and those they wanted to implement. And then also when they voted on who the president was going to be, how they delt with the loss or the win…

Data reports that Diane provided nuances of the definitions of how she impartially addressed student needs and made conscientious efforts to move from deficit-based to asset-based language when addressing inappropriate behaviors while implementing the PBL unit.

Moreover, Diane described the tensions and difficulties she encountered when relinquishing control of work time to the students to allow them sufficient time to use the inquiry-based methods that align with PBL.

> Right yeah. They struggle a lot with that. In all the PBLs I've done over the last two years, there is always somebody crying. They are arguing constantly. That's a struggle. I think that if we could make it to where PBLs did more individualized work, that it would work better. But a lot of PBL, it's all about the collaboration of learning…The ones who get pushed out are the gifted ones. I feel like my gifted students are not focused on as

> much as my other students. Do you see what I'm saying? I feel like I focus more on the ones who are struggling in other areas because those are the ones I am more worried about.

Diane remained part of Stage Two of the research because she moved to second grade homeroom and wanted professional development and support for building PBLs for a different grade band.

Case Study IV: Mary

Mary, a White female educator, served as the primary instructor for English Language Learner (ELL) services at the research site. With seven years of experience as an elementary homeroom teacher and two years specifically focused on providing services to students with English language needs, Mary demonstrated advanced levels of agency and autonomy in her teaching practices. Her active participation in a CoP alongside two homeroom teachers created opportunities for her to mentor these collogues, fostering collaborative professional growth. Notably, Mary had received the most extensive prior training in PBL and was adept at articulating an understanding of equity, particularly in term access to resources and student success.

> I'm working on a PD to do with all teachers. On my PD there's actually a science portion. My PD is mainly showing while these kids are very, very smart, we have to have academic vocabulary. Like the kids have to know the academic vocabulary. When you are adding in any social studies or adding in science, you have to understand ok they probably don't know what … something sciency…like scientific method…that means… scientific method… they don't know academic vocabulary when it comes to any of this. When they integrate all the disciplines throughout, they (teachers) have to think about ok

how are they going to teach them this though. Are we going to have pictures? I use pictures for everything.

The data reveals that Mary recognized and celebrated the diversity of her students, leveraging their unique skills throughout the implementation of the PBL. She emphasized the importance of acknowledging the varied linguistic and cultural backgrounds within her classroom. Mary viewed these differences as valuable contributions that enriched the learning environment.

> I don't think people mean to do it. I think they hear ESOL and automatically (assume) they are non-English learners. It's not their first language. I think that is the most beautiful part. Because it is not their first language but they can …. So might be put into a category but they are multilingual. That's beautiful, a beautiful thing. People look at it, not in a mean way, as they might have a harder time and that is not true. Not true at all. They learn it differently. My kids are really smart.

The data also indicates that Mary frequently supported her understanding of how to approach and meet the needs of all her students with varying abilities with consistent use of asset-based language in the classroom. She articulated the dynamic nature of each student's contributions to an environment that enhances learning and fosters a broader range of perspectives as she implemented TDL strategies. She recognized the importance of recognizing and accessing background knowledge for her students.

> For my students who did not have the background knowledge like them learning new things about our culture was surprising to them. They were like "OH." A lot of stuff they were not exposed to…That is something we all have to work on. It sounds like there is a lot of tension how to do it versus wanting to or not to. Some people think it's hard but it's

not. If I can just show them…There's a science piece. It shows you how to modify. Another aspect of it too is academic vocabulary, that we automatically assume that they have this academic vocabulary (when they don't). That is my building piece.

Following member checking and triangulation, the researcher used strategies to merge and synthesize both sets of quantitative and qualitative results before interpreting them (Creswell et al., 2018). These strategies include comparing and contrasting results based on content areas represented in both, creating a graphic that displays the data sets, and identifying similarities and differences from one data set based on dimensions of the other set (Creswell et al., 2018). Furthermore, the researcher and the teacher participants again collaborated to create interpretations of merged results through discussions about how the data sets converged and related. They highlighted instances of divergence and summarized the need for further analysis (Creswell et al., 2018). The convergence of quantitative and qualitative data from Stage One resulted in the three recommendations for adjustment to data collection in Stage Two.

The evaluation revealed three potential implementation barriers that, when addressed, could expand the positive progress that the qualitative data provided (see Table 13). Barriers include first include a lack of common language surrounding transdisciplinary literacy and equity that led to confusion on the survey. Next, they identified concerns over infrastructure including administration's approach and response to scheduling conflicts with field trip schedules, testing dates, and classroom planning. A third recognized barrier addressed insufficient professional development in terms of comprehensive and sustained support for TDL, PBL, and student engagement. Furthermore, they requested for this professional development to be delivered at the school so that the expense for substitute teachers and travel is eliminated and more teachers can participate.

Table 13

Overview of Barriers and Recommendations from Stage One Teachers

Barrier	Recommendation	Steps
Survey Language	1. To establish common language of evidence-based educational theories, pedagogy, and practices for research in order to facilitate communication	• Provide teachers with definitions of evidence-based educational theories, pedagogy, and practices in research • Create a skip feature on survey on question referring TDL professional development.
Scheduling	2. To request that administration create optimal environment for CoP	• Provide a calendar of pre-approved dates and times for professional development and CoP meetings • Differentiate the role of CoPs from traditional "Friday PLCs" • Explicitly communicate support for teacher involvement in research • Create a separate protocol for the interview process; convenient sign-up for teachers during planning
Insufficient professional development	3. To create a model of the three- month professional development program to provide sustained, on-site PD engagement	• Ensure dynamic, in-depth training for TDL, PBL, and student engagement • Provide classroom resources for PBL • Provide greater selection of texts of various kinds to accompany each PDs

The first barrier addressed data that revealed teacher participants confusion during the survey; teachers did not fully understand terms such as transdisciplinary literacy. They continued to answer questions about professional development even though they did not attend the professional development, and they reported in interviews that they had no prior knowledge of TDL. During member checking, the teacher participants recommended that the researcher prioritize addressing the lack of a common language of evidence-based educational theories, pedagogy, and practices in order to facilitate communication. For the survey, the consensus among the teacher-participants was to amend the pre-survey to include a "skip" option for TDL professional development question to avoid confusion for first-time participants unfamiliar with TDL. The objective is to maintain clarity of terms within the research and its sustained effectiveness in reaching all student groups.

The second barrier emerged from teacher participant data revealing scheduling barriers prohibiting educator time to develop the CoP fully. Teacher participants identified infrastructure issues such as conflicting testing timetables and classroom planning that required continued coordination in advance so that teachers have designated time to meet for a CoP. The teacher participant recommendation was to create a dynamic and optional learning environment for educators through the CoP design. The research site's administration and the researcher were asked to provide pre-approved dates and times for professional development and CoP meetings at the beginning of Stage Two to establish protected times for CoP and mitigate confusion about teacher participant expectations. Furthermore, based on the teacher participant recommendations, the administration differentiated its understanding of the role of CoPs from their traditional Friday Professional Learning Community meetings and communicated their support for the research for Stage Two modifications. Finally, data suggested that the interview process be conducted as a convenient sign-up for teachers during their planning time. This schedule form was distributed up to one month in advance based on teacher preferences.

The third barrier identified by the four teacher participants in Stage One included the need for the creation of a model of the three-month professional development program for research that could provide sustained, on-site engagement with Stage Two teacher participants. Data suggested that this professional development should include in-depth training with resources for TDL, PBL, and student engagement with multimodal settings and an expanded selection of texts. The goals of professional development for TDL were to provide a common language of educational terms, demonstrate how teacher participants can integrate a variety of texts with PBL, and address problems of practice through continuous consultation. Professional development for PBL from an educator expert established in-depth focus on PBL design,

including driving questions and service projects. Professional development for student engagement by a dynamic nationally renowned speaker provided resources and strategies about asset-based language and high-impact strategies to reach students.

In an effort to determine fidelity to the research design of Stage One, the following areas were considered: teacher participation from four participants (n = 4), site capacity, teacher training, and CoP design for planning and collaboration (see Table 14).

Table 14

Fidelity Findings about Intervention Components for Stage One

Component:	**Criteria**	**Planned**	**Delivered**	**Percent**	**Valid Percent**	**Cumulative Percent**
Survey	Teacher participation	4	2	50.0	50.0	50.0
Professional Development	TDL, PBL, Student Engagement	3	2	66.7	66.7	66.7
CoP with Coaching visits	Four teachers participate	3	3	100.0	100.0	100.0
Interviews	Teacher participation	4	4	100.0	100.0	100.0
Member checking	Teacher participants	4	3	66.7	66.7	66.7
Site Capacity						
Student testing during research	Winter and Spring MAP Growth Assessments	2	1	50.0	50.0	50.0
Teacher Planning	Designated CoP planning time	N/A	N/A	---	---	---
Stipends, Supplies	Funds for texts, stipends	N/A	N/A	---	---	---

Building upon the foundational insights generated in Stage One, Stage Two of the study was designed to enact and evaluate the recommendations made by teacher participants. With the support of an implementation grant, this stage focused on applying newly developed instructional strategies and expanded access to expanded selection of multimodal texts and learning tools. Stage Two research was supported by an implementation grant of $50,000.00 from the Sandra Dunagan Deal Center for Early Language and Literacy. Grant funds were prioritized for a three-month expanded and dynamic professional development plan, including three sessions for PBL, TDL, and student engagement. Furthermore, the grant provided teacher

stipends and funds to curate instructional resources such as trade books, storybooks, fiction and nonfiction texts, art materials, realia, STEAM kits, and tactile learning tools (e.g., molds of animal fossils, maps, and artifacts). Stage Two leveraged the teacher insights and recommendations from Stage One, and resources deepened the instructional impact, providing teacher participants with the opportunity to foster and sustain innovation in literacy instruction.

The next section will present findings and analysis of Stage Two quantitative and qualitative data obtained from teacher and student participants over a period of six months during the fall of 2024. Fidelity checks and implementation science findings are also addressed.

Stage Two Findings

Through the analyses of data from a parallel mixed-methods design, stage one findings informed Stage Two data collection and analysis. To gain a holistic picture of the Stage One implementation process and subsequent identified barriers, the quantitative and qualitative data merged both the examination of the associations contextual and implementation variables to identify areas of overlap and more accurately inform Stage Two. The convergent, integrated approach to analyzing both data sets simultaneously identified three barriers to successful implementation for Stage Two to address. Triangulation strengthened Stage One results. It provided an analytic approach for addressing implementation of Stage Two interventions.

Quantitative

After finalizing the recommended changes to the Professional Learning Communities Survey (2009) for teachers, the researcher formatted the survey on Qualtrics and made it accessible via a digital device (e.g., phones, laptops, and desktops). Survey data collection that occurred before the first professional development workshop began and the post-survey taken upon completing and implementing the PBL unit examined teacher identity shifts within an

elementary school community and teacher attitudes toward these literacy strategies and initiatives. The second quantitative data set was students' pre- and post-MAP Growth Assessments in ELA/Reading and Math, administered according to school site's protocols.

Teacher Participant Survey

This section presents the analysis of teacher survey data collected before and after implementing TDL professional development and PBL initiative. The researcher collected teacher survey data prior to professional development sessions, CoP meetings, and following the design and implementation of newly designed PBL units that addressed the needs of all learners. Responses provided by fourteen of the nineteen teacher participants generated quantitative data concerning teachers' perceived beliefs about equity, instructional practices, and their abilities to reach all learners within a classroom. Furthermore, their insights into their collaboration during a sustained CoP also informed their understanding of equity, literacy, and instructional design. The data revealed that the CoP collaboration influenced their teachers' understanding of TDL and literacy initiatives that support the needs of all learners with innovative teaching strategies across disciplines. The demographic distribution of teacher participants in the pre-survey showed that the majority (92.9%) identified as White, with one participant (7.1%) identifying as Native American (see Table 15).

Table 15

Stage Two: Demographic Characteristics of Teacher Participants

Category	Variable	Frequency	Percent	Valid Percent	Cumulative Percent
Ethnicity	White	13	92.9	92.9	92.9
	Hispanic	1	7.1	7/1	100.0
Gender	Female	14	100.0	100.0	

Note. $n = 14$. Cumulative percent applies only to the Ethnicity category.

All 14 participants were female for pre-survey; however, 15 participants took the post-survey. These participant demographics slightly altered descriptive data (see Table 16). In this

phase, 86.7% of participants identified as White, while the proportion of Native American participants remained the same (6.7%), and one participant (6.7%) identified as Hispanic. Similar to the pre-survey, all participants in the post-survey were female. These findings indicate a slight increase in participant diversity and participation between the pre- and post-surveys.

Table 16

Post-Survey Teacher Participant Frequencies

Category	Frequency	Percent	Valid Percent	Cumulative Percent
Ethnicity				
Hispanic	1	6.7	6.7	6.7
White	13	86.7	86.7	93.3
Native American	1	6.7	6.7	100.0
Gender				
Female	15	100.0	100.0	---

Note. n = 15. Cumulative percent applies only to Ethnicity.

The descriptive statistics for teacher pre-survey responses (see Table 17) highlight each survey item's mean (*M*) and standard deviation (*SD*).

Table 17

Stage Two: Descriptive Analysis of Pre- and Post- Survey Responses

Item	Pre-Survey *M*	Pre-Survey *SD*	Post-Survey *M*	Post-Survey *SD*
A- Did you attend a CoP for the study of transdisciplinary literacy within a project-based learning unit?	---	---	4.00	0.00
B- Which of the following choices accurately reflects this statement? Teacher voice and input were valued throughout the professional development and professional development sessions.	---	---	3.60	0.63
C- Which of the following choices accurately reflects this statement? Lessons that I co-created during the sessions were implemented with fidelity in my classes.	---	---	3.27	0.59
D- Which of the following choices accurately reflects this statement? Throughout the CoP time frame, I identified students in my classes who would benefit from changes in the texts that I use during my lessons.	---	---	3.53	0.52
E- Which of the following choices accurately reflects this statement? I am willing to participate in future collaborations that emphasize transdisciplinary literacy and project-based learning.	---	---	3.73	0.59
Item	*Pre-Survey M*	*Pre-Survey SD*	*Post-Survey M*	*Post-Survey SD*

F- CoP members talk with each other about their situations and the specific challenges they face as they navigate the development of a project-based learning unit.	-	-	4.47	0.64
G- Which of the following choices accurately reflects this statement? Teachers share, observe, and discuss each other's teaching methods and philosophies about project-based learning and transdisciplinary literacy through an equity in literacy lens.	3.57	.94	4.27	0.70
H- Which of the following choices accurately reflects this statement? Teachers assume that all students can learn at reasonably high levels and that teachers can help them.	3.50	1.02	4.33	0.72
I- Teachers work together to develop shared understandings of students, curriculum, and instructional policy, but also to produce materials and activities that improve instruction, curriculum, and assessment.	3.50	0.83	4.47	0.64
J- Through words & actions, teachers affirm their common values concerning critical educational issues and in support of their collective focus on student learning.	3.36	0.47	4.50	0.65
K- Teachers take risks in trying new techniques and ideas and make efforts to learn more about their profession.	3.50	0.76	3.93	0.83
L-Teachers feel honored for their expertise within the school as well as within the district, the parent community, and other significant groups.	3.34	0.93	3.71	0.61
M- Within the school, there are formal methods for sharing expertise among faculty members so that marginal and ineffective teachers can improve.	3.21	0.80	3.57	0.85
N- The school leadership keeps the school focused on shared purpose, continuous improvement, and collaboration.	3.92	0.83	4.14	0.77
O- The staff imparts a sense that new teachers are an important and productive part of a meaningful school community.	3.64	1.22	3.93	1.21

Note. n=14; Questions A-F were not answered in pre-survey because teacher participants had not yet received the TDL training.

Description of Findings from a Comparison of Teacher Survey Items

Notably, items A through F were not answered in the pre-survey, as teachers had not yet received the TDL training. Among the recorded responses, the highest post score (M = 4.47*,* SD = 0.64*)* for item I indicates strong agreement among participants. Similarly, items J (M = *3.36*, SD = 0.47) and N *(*M = 3.92, SD = 0.83) reflected relatively high pre-survey ratings, suggesting positive initial perceptions in these areas. Conversely, item M had the lowest pre-survey score (M = 3.21, SD = 0.80), indicating a comparatively lower level of agreement. Standard deviations varied, with item O showing the highest variability for the pre-survey (M = 3.64, SD = 1.22) and the post-survey (M = 3.93, SD = 1.21) suggesting differing participant perspectives. These results establish a baseline for assessing teacher perceptions before undergoing TDL training.

Student Assessment Data

The second quantitative instrument measured two sets of student participant scores on MAP Growth assessments for ELA/Reading and/or Math to detemine if there were any statistically significant changes in math and reading performance following the research implementation of TDL within a PBL unit. The research site's school administration amended and followed their established testing protocols (see Table 18). The school did not administer fall MAP Growth assessments for ELA/Reading to kindergarten or second-grade students, instead giving state mandated fluency screeners. Because the school chose to use MAP Reading Fluency in the fall and MAP Growth for winter testing, there are no fall testing scores to compare for growth in ELA/Reading in winter. First and third grades received both MAP Growth assessments for ELA/Reading and Math and their scores were compared and analyzed.

Table 18

MAP Growth Assessments, Fall and Winter of 2024

	Fall Testing	**Winter Testing**
Kindergarten	MAP Reading Fluency and Screener	MAP Reading Fluency
	MAP Growth - Math	MAP Growth - Math
First Grade	MAP Growth - ELA/Reading	MAP Growth - ELA/Reading
	MAP Growth - Math	MAP Growth - Math
Second Grade	MAP Reading Fluency and Screener	MAP Reading Fluency MAP Growth ELA/Reading
	MAP Growth - Math	MAP Growth - Math
Third Grade	MAP Growth - ELA/Reading	MAP Growth - ELA/Reading
	MAP Growth - Math	MAP Growth - Math

Note: MAP = Measure of Academic Progress; ELA- English Language Arts

These assesments were administered to student particpants in kindergarten through third-grade students (see Table 19). The demographic information provides essential insight into the academic growth patterns of the students. By askin teachers to approach instruction and consider a different lens for evaluating the effectiveness of TDL within a PBL design, teachers can further reflect and analyze quantitative findings as they address any potential disparity issues.

Table 19

K-3 Population Demographics for Gender, Ethnicity, and Student Groups

		K		1st		2nd		3rd	
		n=22	%	*n*=16	%	*n*=18	%	*n*=17	%
Gender									
	Male	9	41	7	43.8	7	38.9	7	41.2
	Female	13	59	9	56.3	11	61.1	10	58.8
	Total	22	100	16	100	18	100	17	100
Ethnicity									
	Hispanic	2	9.10	3	18.8	0	0	2	11.8
	African American	1	4.55	0	0	5	27.8	3	17.6
	White	16	72.72	10	16.5	12	66.7	9	52.9
	Biracial	0	0	1	6.3	1	5.6	2	11.8
	Indian	0	0	1	6.3	0	0	0	0
	Filipino	0	0	1	6.3	0	0	0	0
	Data not available	3	13.63	0	0	0	0	1	5.9
	Total	22	100	16	100	18	100	17	100
Student Groups									
	Gifted	0	0	3	18.8	4	22.2	3	17.6
	ESOL	0	0	0	0	0	0	1	5.9
	EIP	7	31.8	1	6.3	4	22.2	2	11.8
	Special Education	8	36.4	1	6.3	1	5.6	1	5.9
	Interventions only	0	0	0	0	0	0	1	5.9
	ESOL & Gifted	0	0	1	6.3	0	0	0	0
	No services	7	31.8	10	62.5	9	50.0	9	52.9
	Total	22	100	16	100	18	100	17	100

The following fall and winter testing comparison of percentile scores for MAP Growth ELA/Reading and math (see Table 20) reveal results for kindergarten through third grade. Those percentile scores were analyzed using paired sample t tests and compared to determine the level of student impact that the implementation of this study reached.

Table 20

Pre-Post Comparison Results on MAP Growth Assessments, Fall – Winter, 2024

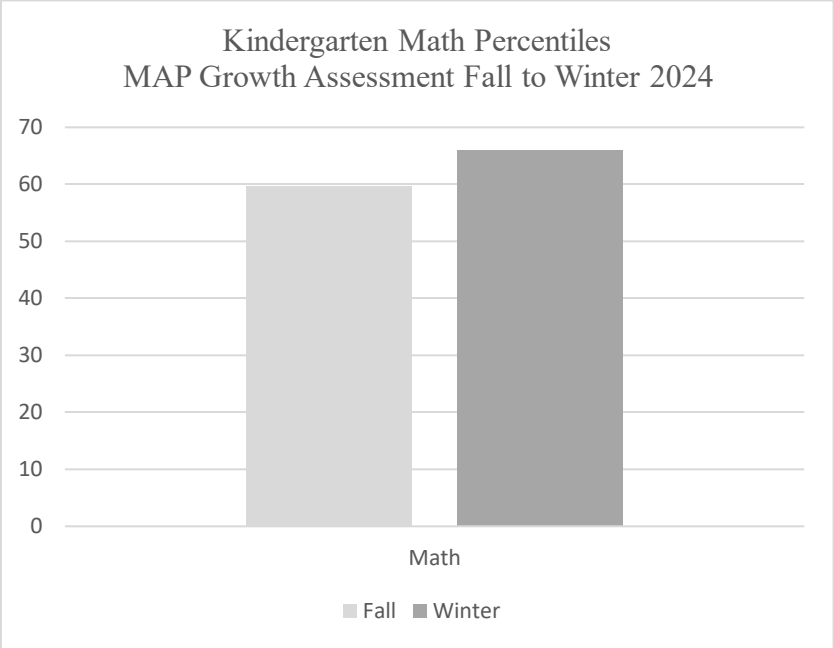
Grade	MAP	Fall *M*	Fall *SD*	Winter *M*	Winter *SD*	*t*	*p*	Cohen's d
Kinder (*n*= 19)	Math	59.68	24.79	65.95	26.05	1.41	.088	0.32
First (*n*=16)	ELA/ Reading	70.06	19.17	60.06	22.46	2.91	.005	0.73
	Math	70.88	19.74	63.81	19.97	2.61	.010	0.65
Second (*n*=18)	Math	70.13	13.67	50.13	21.93	5.02	<.001	1.25
Third (*n*=17)	ELA/ Reading	54.59	29.37	62.00	25.75	1.87	.040	0.46
	Math	47.12	25.60	51.76	28.58	1.85	.041	0.45

Kindergarten

Kindergarten MAP Growth data results (see Figure 5) for math indicate an increase in percentile rankings for students from the fall scores (M = 59.68, SD = 24.79) to winter scores (M = 65.95, SD = 26.05). The t value (1.41) demonstrates a strong and reliable difference between pre-and post- test scores, and Cohen's d value of .323 signify a small to moderate effect size indicating potentially meaningful gains due to the implementation of the research. The p value (<.088) supports the interpretation that these results were statistically not significant and cannot conclusively determine that these gains were due to intervention. Notably, eight of the twenty-three students who showed the most growth scored in high category of 80% or more and four additional students moved from average to hi-average. Three students showed a significant drop to lowest quartile and the test results also reported rapid responses by two of them. Overall, there was growth but not significant enough to eliminate the possibility of random high variation. These results indicate that current strategies should be strengthened and MAP scores analyzed across the year to capture additional data.

Figure 5

Fall- Winter 2024 Percentile Comparison for Kindergarten, MAP Growth Assessment Math

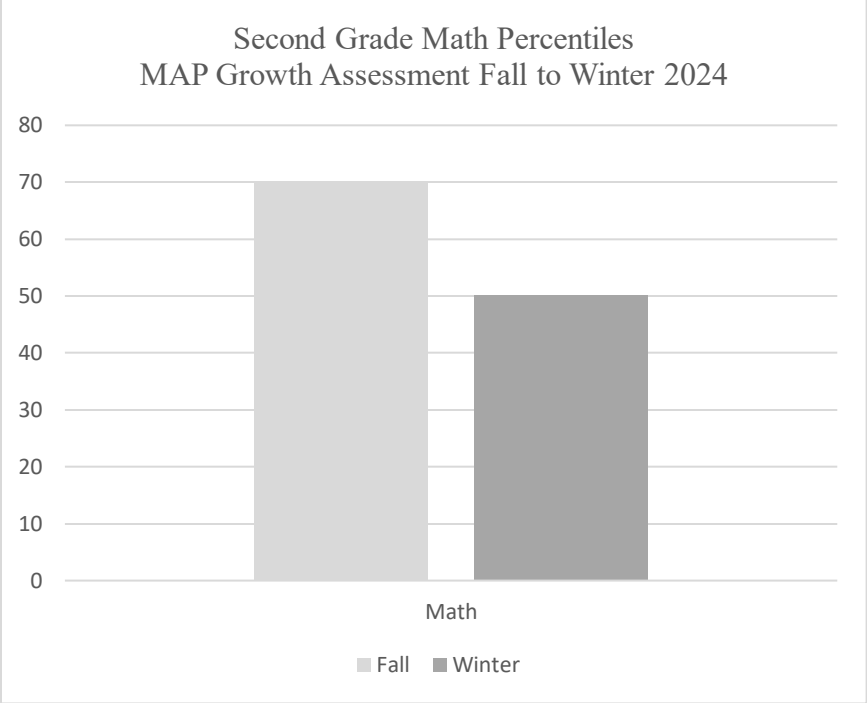


Second Grade

The second grade MAP Growth assessment results for math (n=18) presented substantial findings. In fact, the percentiles (see Figure 6) decreased considerably from fall (M = 70.13, SD = 13.67) to winter (M = 50.13, SD = 21.93). This was confirmed by increase in high variability across student grades and large effect size (Cohen's d = 1.254); however, results also indicate that these scores are statistically significant ($p<001$). Further analysis of this regression that negatively impacted student achievement should be paired with qualitative data results from transcripts of teacher interviews, CoP meetings, and researcher observations might yield insightful findings. Additionally, an evaluation of the instructional changes should be conducted to determine how these disproportionalities impacted second grade students. ELA scores were not available as the fall ELA/reading growth assessment was not given due to changes in testing protocols.

Figure 6

Fall- Winter 2024 Percentile Comparison for Second Grade MAP Growth Assessment Math



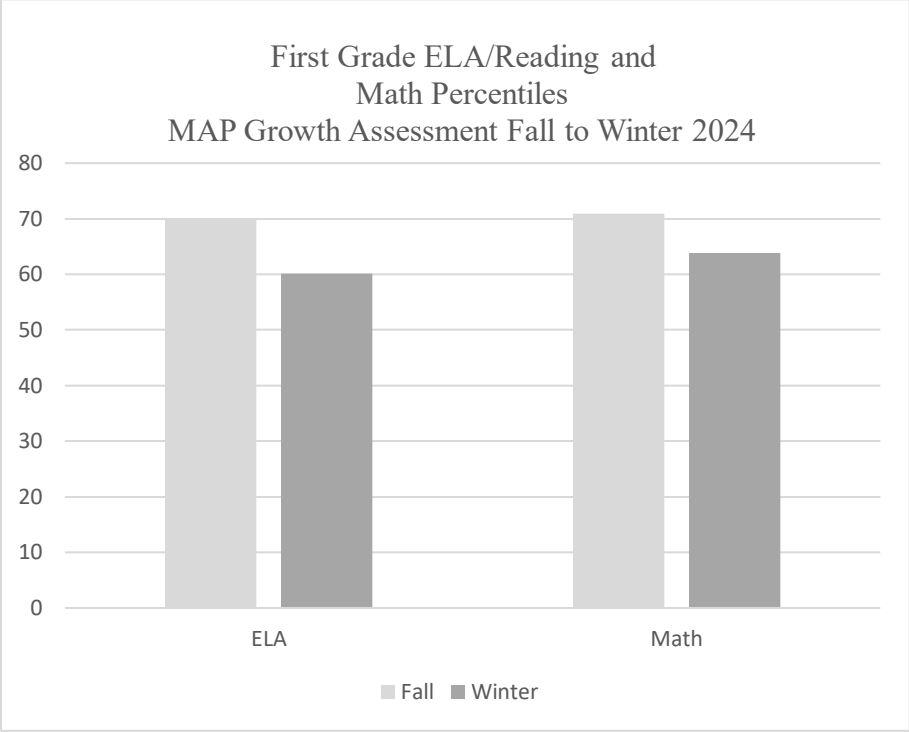
First Grade

The fall and winter assessment comparison results for first grade students (n = 16) on the Measure of Academic Progress (MAP) in English Language Arts (ELA)/Reading reported statistically significant and reliable results in changes to percentile rankings (p = .005) (see Figure 7). The paired sample t-test results reported a decrease from fall (M = 70.06, SD = 19.17) to winter (M = 60.06, SD = 22.46). Cohen's d (0.728) indicated a moderate to large effect and some students were more negatively impacted than others. Looking at specific student data, seven students stayed within three percentile points on both tests, three of these students remained or moved to the highest quartile (80% or higher) and another student made a gain of fourteen points. Three students showed a significant drop of nearly 30 percentile points, while the remaining five students decreased in scores 9 to 16 points. First grade Math MAP Growth Assessment also showed a slight regression. Percentiles fell from fall (M = 70.88, SD = 19.74) to

winter (*M* = 63.81**,** *SD* = 19.97). The paired sample t-test reported a moderate effect size (Cohen's *d*= 0.65) and *p* value (.01) indicated that the results were statistical significance as well.

Figure 7

Fall- Winter Percentile Comparison, First Grade MAP Growth Assessment ELA/Reading & Math



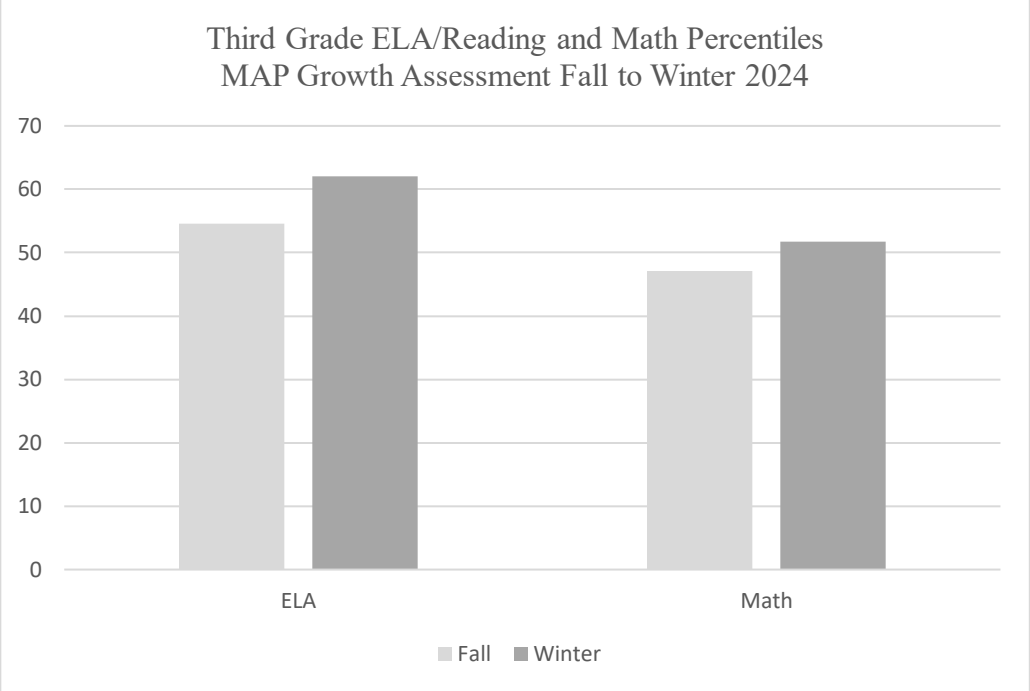
Third Grade

In contrast to younger grades, third-grade student participants demonstrated notable gains, with ELA scores improving from fall (*M* = 54.59, *SD* = 20.37) to winter (*M* = 62.00, SD = 25.75) and demonstrating that scores became more consistent over time. The moderate effect size (Cohen's *d* = .455) indicated practical significance and statistically significant (*p* = .040) and meaningful academic growth. These results suggest that the instructional approach positively influenced student achievement (see Figure 8). The data for third grade math revealed a modest increase in student performance across all student groups. Third-grade math scores improved from fall (*M* = 47.12, *SD* = 25.60) to winter (*M* = 51.76, *SD* = 28.58). Analysis (*p* =.041)

confirmed these gains are statistically significant. The moderate effect size (Cohen's d = .450) indicated a meaningful yet modest impact of the instructional approach on student learning outcomes.

Figure 8

Fall- Winter 2024 Percentile Comparison for 3rd Grade MAP Growth Assessment, ELA/Reading and Math



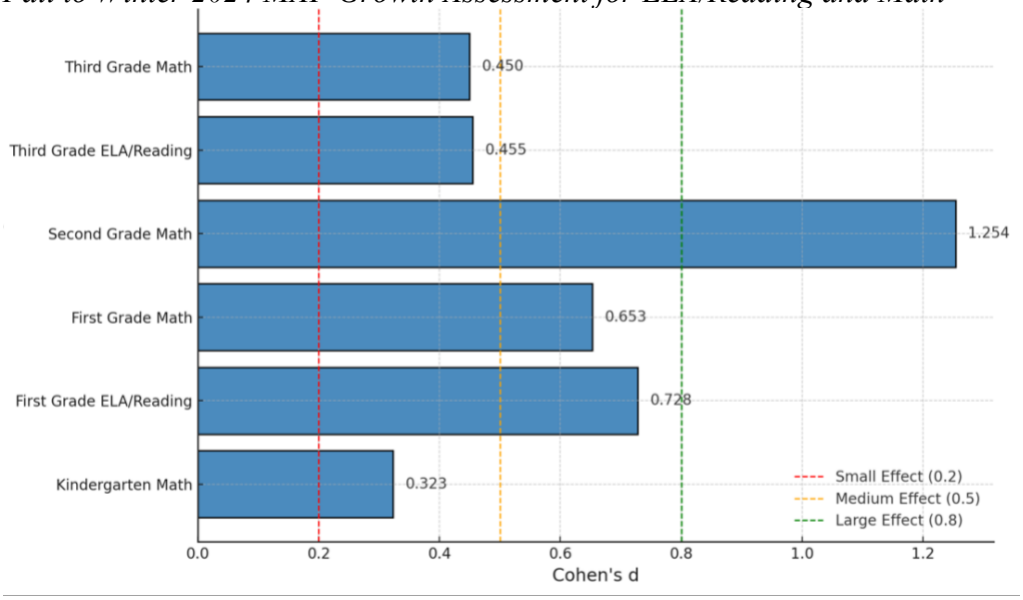
The data representing percentile gains or losses results of this research, predicted growth scores served as valid resource that tracked student progress, informed instructional adjustments, and allowed teacher participants to determine how this progress can be sustained and improved upon over time. Observed growth does not signify that a student will meet grade level expectations; however, further analysis and disaggregation of data uncover emerging patterns or trends that allow the teacher to make instructional changes to identify skills for targeted intervention. With this data, teachers can implement and refine structured, inquiry-based activities that will enable students to transfer skills across disciplines. To enhance reading

stamina, teachers provided students with additional opportunities to build confidence and deepen engagement with the lessons at more robust and complex levels.

Additional quantitative analysis of the cumulative achievement impacts for grades kindergarten through third grade require further consideration in terms of qualitative data reflecting the noticings of the teachers within these grades. Notably, second grade MAP Growth Achievement percentile rankings used for math results provide data that indicates a substantial negative impact and requires consideration of which factors might have contributed to the regression. Qualitative data might reveal concerns over implementation or testing procedures. In contrast, third grade effect sizes (see Figure 9) were modest but indicated potential benefits of the intervention. Large effect sizes generally indicate that an intervention had a substantial impact (positive or negative) on student outcomes. In contrast, modest or limited effect sizes can still reflect practical significance of the intervention on student impact.

Figure 9

Effect Size Comparison of from Paired Sample T Test of Percentile Analysis Based by Grade, Fall to Winter 2024 MAP Growth Assessment for ELA/Reading and Math



The confidence limits or *p* value reported from data analysis from Stage One range from an upper confidence limit of $p = .088$ to a lower confidence limit of $p < .001$. When analyzing the associations between effect size and confidence, the data reveals that growth from kindergarten percentile scores were not statistically significant, and scores from first through third grades were statistically significant for both positive and negative impacts.

Qualitative

An in-depth exploratory analysis of four case studies in Stage One provided robust data and insights into their time in a CoP. As the four teacher participants detailed how their experiences over the course of Stage One influenced their instructional design and teacher identities, they created a foundation for Stage Two analysis. The expanded scope of Stage Two, with twenty participants, allowed for a broader analysis of emerging patterns and themes across multiple collective case studies. Following two rounds of deductive and inductive coding of all qualitative data (observation, teacher interviews, field notes), three themes emerged and were labeled (a) Refining Instructional Proficiency, (b) Curating Dynamic Learning Spaces, and (c) Fostering Open Discourse through Asset-based Language. Quotes from teacher participants are presented to support the themes (See Appendix E).

Refining Instructional Knowledge and Practices. Data reported teacher participants noticings and changes in practice following professional development and CoP sessions that enhanced instructional knowledge and application of innovative teaching methods and approaches to literacy instruction. TDL provided teachers with a distinguishing feature: promoting the construction of learning units that cross conventional borders of individual disciplines. They routinely engaged in the recursive process of integrating theoretical and practical frameworks from professional learning and collaborative communities into pedagogical

practice. Evidence from data implies that teachers strengthened and deepened their knowledge of the PBL theoretical and practical integration of inquiry-driven practices that focus on the learning process more than a specific outcome. Collaborating teacher-participants merged their discipline-specific perspectives into designing, planning, and developing instructional practices that seek solutions to real-world problems that could not be solved solely based on one discipline. Students experienced high-quality instruction and also demonstrated proficiency in academic success skills.

Curating Dynamic Learning Spaces. Teachers' responses suggested in CoP and interviews that teachers did create inclusive and adaptive environments that supported learning needs through evidence-based instruction of the Science of Reading, PBL, and TDL. They enhanced spatial, cognitive, and social aspects of learning for students. Teachers reported how they designed engaging learning environments and intentionally structured physical and digital spaces to optimize student engagement and learning outcomes. By integrating pedagogical principles, environmental factors, and discovery that transformed learning spaces into ecosystems of learning, they optimized grouping to foster critical thinking, collaboration, and inquiry-driven activities**.** Each teacher in the CoPs analyzed, revised, and aligned some level of their instructional strategies with transdisciplinary literacy to enhance how students constructed knowledge and provided evidence that they mastered the content. By scaffolding learning through hands-on, differentiated lessons, they **c**reated structured yet flexible environments that supported student autonomy and mastery of content across several disciplines.

Fostering Open Discourse Using Asset-Based Language. Through interviews and CoP transcripts, teacher and student participants reported that students were actively engaging in discussions that revealed personal and collective ways of thinking. Within the CoP, teacher

participants fostered scholarly dialogue on pedagogical mindsets and contributed to academic discourse by openly sharing conceptual frameworks and personal perspectives. During each CoP, they routinely articulated expressive, intellectual opinions**.** Teachers thoughtfully and regularly voiced personal beliefs, values, and perspectives within these professional and academic discussions. As teachers more freely expressed their frustrations, tensions, and understanding of new frameworks, they began to vocalize their beliefs about education and how knowledge is constructed, fostering their academic dialogue. Teacher participants engaged in reflexive dialogue to share insights, challenges, and evolving perspectives that ultimately supported their collaborative learning within the CoPs. Throughout the study, they revealed in detail how they are learning to embed teacher reflexivity into their scholarly practice. As teacher participants critically examined and communicated their mindsets, they modeled self-awareness in educational settings for their students.

Data from teacher noticings suggested that students began advancing their metacognitive engagement by explicitly articulating their thoughts, processes, methodological decisions, and conceptual frameworks during the PBL process. Teacher participants reported that student participants used asset-based language and exhibited growth mindset by expressing their beliefs and perspectives about their learning. Furthermore, they described how students maneuvered through times of tension and frustration and expressed opinions, praise, and requests to revise their work. They openly voiced or expressed their growth mindset. The data reports that students regularly verbally communicated their thought processes, decision-making, reflections, and celebrations of final products**.**

Teacher participants discussed the resilient nature of students as they relied on peer support to build academic and school competencies such as self-esteem and efficacy as they

engaged in the work. As students navigated each stage of the PBL, they strengthened their behavioral control, emotional regulation, and self-concepts. In addition, students were exposed to a myriad of multimodal activities that enabled them to reinforce gross and fine motor skills. Teachers and students shared celebrations and frustrations together as they fostered a growth mindset about their work. Researcher developed and used codes to investigate patterns in this data that emerged most often. Furthermore, identification and subsequent analysis of patterns along with inconsistencies allowed the researcher to reach a consensus about which themes emerged most frequently within the transcripts of each teacher participant. These themes were used to ascertain and classify teacher participants in cohesive and collective case studies. These are (a) Leveraging CoPs for Evolving Literacy Practices to Maximize Student Impact (b) Navigating and resolving problems of practice through transition from project design to a PBL Framework (c) Dialogic Self-Reflection: Evaluating Tensions in Shifting Pedagogical and Professional Identities to Foster Learner-Centered Spaces, and (d) Reframing Equity and Expanding Notions of Student Potential for Learner Groups.

The data revealed that teacher-participants Polly, Diane, and Mary remained in the same case theme but emerged as CoP leaders and teacher mentors for Stage Two participants. While data could be interpreted to indicate that they emerged as a separate case, their productive roles as leaders within the CoPs overshadowed this.

Part I Collective Case Study

Leveraging CoPs for Evolving Literacy Practices to Maximize Student Impact: Polly, Farah, Sonya, Gail, Isabella, Carey, and Olivia

This case study of seven teacher participants underscores the potential positive impact of teacher identity shifts on transdisciplinary literacy instructional design. Throughout the research,

educators met for three CoP meetings and attended professional development gained knowledge, addressed common problems of practice, and embraced TDL while integrating new literacy curriculums across disciplines. The data reflects how their evolving sense of identities profoundly shaped their collaborative PBL instructional design.

Polly, a 3rd-grade homeroom teacher from Stage One, transitioned to a new role as a K-5 intervention teacher for students with Early Intervention Plans (EIP), enabling her to lead a CoP with kindergarten. Farah served on the leadership team as a K-3 dean and a third-grade homeroom teacher who looped up with her class. Already established as a school leader, Farah also brought eight years of elementary, PBL experience to her CoP. Sonya, a gifted instructor for K-5, has twenty-four years of experience in elementary education experience and serves on the leadership team for the Focus group, which includes all educators providing special services. Gail was another member of the third-grade team; she had taught for four years and served as an EIP teacher and looped with her students. New to the school and to PBL instruction models, Isabella taught elementary Spanish and reading intervention. Like Isabella, Carey, a teacher with five years of experience, was also newly hired at the research site and had never formally studied or implemented PBL in her work. Another new hire, Olivia was a veteran teacher of middle school social studies, elementary art, and reading. Her role as an EIP teacher, along with her background in social studies and art background provided her with valuable experience and insight into merging disciplines as she collaborated with the third grade CoP team.

The data revealed that the transformation in teacher identities influenced their perceived roles as leaders in their classrooms and as literacy teachers across disciplines. Drawing from excepts taken from transcripts of CoPs and teacher interviews; data illustrates both individual and collective reexamination of critical consciousness (see Table 21). This evolution influences

their instructional design, leading to student-centered learning, focusing on inquiry and problem-solving for PBL, merging various disciplinary lessons and seamlessly integrating literacy goals. Through thoughtful revision and student input, the educators created authentic assessments that evaluated reading, writing, and critical thinking across subjects. The data indicates that each of these teachers prioritized creating literacy-rich learning experiences that embedded variety of text selection into all activities. These excerpts from transcripts illustrate how teachers shifted their perceived roles toward more dynamic facilitators of student learning. The researcher transcribed the following quotes from teacher participants verbatim with no edits to their words or writing.

Table 21

Excerpts from Stage Two Codebook, Collective Case Study I

Teacher	Position/ Subjects	Experience
Sonya	1st grade gifted (science, social studies, math, reading, art, writing, presenting)	While we were learning about butterflies, one of the pages in a non-fiction book was about bats and how they are pollinators. The kids started asking like how are they pollinators? I said I don't know. So, we wrote down 'How are bats pollinators' and started doing some research. That led to a two-week unit on bats. I've never done that before in my life. I'm also taking class through Cox Campus ad we're focusing on vocabulary. So, it opened my eyes up to a whole new world of things that I didn't know about bats and they didn't know. Now we are getting a bat box…Bat week was last week… It was really cool because it wasn't even on purpose…they just started asking questions and I started writing…For me personally, it was eye-opening…we get kind of stuck as teachers doing the same thing we've always done and don't let the kids ask questions and be curious, letting their curiosity guide our instruction…I was able to incorporate the literacy aspect that I don't think I always do and then having the time to sit down and plan and evaluate what you've done or collaborate with other people. I was able to filling in some holes that before I didn't realize. It was just me. I'm taking the Cox campus literacy course a and I happen to be on the vocabulary unit or lesson and with the bats with first grade. I incorporated some of those skills in that and it just kind of went right along with each other. Before I would have the word posted, but I wouldn't have a picture or use it in a sentence. It all kind of came together…With the bats, we did use some of the shape bats and we incorporated actual shapes and the tangram pieces and it showed you where the circle was the head and triangle for the ears. It was divided into actual shapes and there was another one that just and the overall shape and you had to figure it out based on which one you got. You were struggling with the more open ended one. So, there was differentiation when I found the shape it had two different ones…kids would get frustrated and I would say hang on, try this one and see.
Gail	3rd grade homeroom (social studies, math, reading, writing,	We decided after the PBL pd with the (expert) that we felt like we needed to make an adjustment because ours was coming across as more of an overarching project as opposed to a PBL. We adjusted our product so that instead of it being a presentation… we going to do it as more of a museum walkthrough… felt like it was more PBL way of going about it…we also talked about them creating more artifacts and things that they felt would represent their Native American regions and be more inclusive of the standard and of the comparison of different things… I think we made changes in the types of books that we use. We used a lot

	presenting, art, technology)	of non-fictions before, but after we went to that PD about it, we used some fiction books. We found some folk tales and those kinds of things and so we combined our fiction and nonfiction…paired texts. We used to do a reading at the beginning and say this is some background knowledge for you this is a nonfiction text and then we would move on. Since we did the paired readings, we did use some throughout and I think it gave them a better background but it was throughout. It wasn't "said it, forget it."
Polly	Kindergarten/ EIP (math, reading, writing, science, art)	The kindergartners surprised me because what they were able to do with their projects. Going from one teacher's room to another teachers' room their creativity was incredible. ideas that they have any, any boundaries that I saw was more so with navigating communication among younger children. They have their ideas and they want to do their ideas and then they had to work on collaboration. Communicating with each other and realizing that it's OK if we take his idea and then morph his with and yours together. And they handled that pretty well. It's just that they had to see it and sometimes what would help would be if you modeled it with another teacher and saw that we both had ideas and go oh OK we can make this work …We ended up doing the rubric midway because I didn't know that it had not already happened. I think it's very important to let the kids know. For one they have to use the language of the standards. They have to use that vocabulary to expose kids to vocabulary because you don't want to hinder them by going oh, they're young, they're not going to get it. Yes. They will. Give it to them… They can hold vocabulary…Give them the language that they are responsible for and they will keep it in their mind. It helps them with future projects, especially when they have to self-regulate… I will refocus and remind them. They do have power and the ability; you just have to show them that they have it.
Olivia	3rd Grade/ EIP (social studies, math, reading, writing, presenting, art, technology)	My shift I think with transdisciplinary literacy… really understanding what that was, what that entailed. It's not this big scary thing. How to implement a PBL also tying in the literacy and how easy it is to tie it in. It's natural. It's not hard. The best part when you talk about it being relatable was when we were making houses and stuff. do y'all have to do the inside? What are your requirements? And they answered yes ma'am. So is that shelter, cooking, sleeping. Like what are we looking for? What are your components? and they were like, yes, I guess cooking. so we went back to pictures, looked at the cooking and then to see them figure out, oh this is a real fire. They have a real fire, not a stove. that was really cute. and then the beds. What are they sleeping on? It was like bunk beds so that was kind of cool for them to go back and look at pictures and then related to how did they sleep…cook?
Farah	3rd Grade homeroom / Dean of K3 (social studies, math, reading, writing, presenting, art, technology)	I think I'm just a mix of it. I don't think I have one philosophy. I do think this project and the way that I did, this general change is going to change the way I do things in the future. It has changed things about my teaching styles. As far as what, I'm not 100% sure. I know that throughout this process, it worked really well for me to let the kids be the experts. Even when they were doing their presentations, I would tell them, "You are the experts" of your exhibits…On the field trip, every question we asked the (guide), she knew the answer. For them it was taking pride that this is my thing, and I'm in charge of it. I don't think I had that mindset before…They were able to just run with it and take control within reason. I think it was very special. I mean was something they're going to remember especially when we do it for families but when we were doing it before, it was strictly, "this is just Native American project we're doing" we weren't integrating things… and now even things I didn't plan still happened. There was math that we put in there. When they were building, they realized they were …if I'm building a house and the side is 2 inches higher than the other side, they need to be even or my roof is not going to sit on the top. Making the teepee and putting their polls together and wrapping their buffalo hide around it, we realized we have to have some kids of shape at the bottom. We're going to have to build a solid structure to something around so they put a lot of thought into it than we have in the past. They were sparking up conversations about it immediately about what they would do differently and how they wanted to make it even better… And they can bring in other disciplines on their own too. Like that math thing was on their own. One student finally said "I need a ruler. This is wrong. It is not gonna work." And once they realized that, they tried it and it didn't work, and they know what the issue was. I would ask, what are you going to do? to prompt them and then they would bring it in on their own.
Isabella	K/5 Spanish (Spanish,	(Spanish/culture, math, history, music, geography, reading, writing) We did Latin dances. We focused on learning merengue because it is the easiest one. Where did it originate? So

	math, history, music, geography, reading, writing)	we had the maps and a geography lesson. I gave samples of music and dances and they had to rate each sample and see what their favorite kind of music was…It wasn't that there was a right or wrong answer, there was not wrong, it was about whatever they liked better. Everybody had a chance…I included "Drum Dream Girl" and we connected it to drumming, beats, and counting, they had to draw and write a sentence about what they could be if they could dream anything…We spoke about how the main character was from Cuba and parents were African and Chinese. We had actual drums, for older kids we talked about the history about where meringue originated. They had to talk about slavery, so I had to talk about slavery. The slave trade to the Dominican Republic which is different than to the US. It was a very different process and a different time. We went over the demographics of DR…most of the natives were killed…no one made jokes. It was serious topic. Not something to joke about…this is what happened.

The collective case study illustrates how vertical alignment extended beyond individual classrooms to create synergy and instructional momentum. As teacher participants, their conversations, and teaching strategies within their CoP shifted and matured, they began to foster strong vertical alignment. This unexpected alignment further enabled educators to leverage their shared knowledge about the standards, merge disciplines, and use instructional strategies to encourage students to embrace an inquiry-driven environment. They collaboratively and collectively began to maximize student impact across the learning continuum. This redefinition of practice enhanced classroom instruction and served as a catalyst for innovative teaching. Evolving shifts in teacher pedagogy profoundly influenced the instructional design of the PBLs. The teachers began investigating and reshaping how they approached literacy, integrated content across subject matter and standards, accelerated student engagement, and discovered their new leadership roles within this work. Through critical self-reflection and a commitment to asset-based language (Hinman et al., 2023), participants adopted a more holistic, equity-driven pedagogy that positioned literacy as the foundation for all learning.

Part II Collective Case Study

Navigating and Resolving Problems of Practice in the Transition from Project Design to a PBL Framework: Diane, Kathy, Julie and Elaine

The following case study explores how this group of four teacher participants navigated and resolved problems of practice when they discovered they were not fully implementing a PBL framework. When extracting qualitative data across time and participants, this case study emerged concerning this theme of moving from projects to PBL. Each of the quotes are from different teacher participants who worked directly with the second-grade student participants.

Diane, a homeroom teacher participant for Stage One, made the decision to move from third grade to second grade and continue to refine her work with PBL and transdisciplinary literacy. The newly hired K-5 music teacher Kathy was a music major without educational experience. As a non-traditional teacher going through the state's alternative certification program, Kathy chose a CoP comprised of art, Spanish, PE, and theatre as they were rotating the students on the same schedule. Julie served third grade through high school as a drama coach and 12th grade English teacher. With two years of educational experience, her role with third grade was new at the beginning of the study. New to the second grade at the school and PBL Elaine, had previously taught as a homeroom elementary teacher in another nearby rural school system. Her years of experience and willingness to learn about inquiry-based pedagogies provided her with a positive attitude toward the CoP.

Several teachers new to the school, their respective disciplines, and the PBL framework encountered difficulties distinguishing between a traditional project and a robust, well-structured PBL unit. While their instructional designs were creative and engaging, they lacked critical elements such as a driving question, academic rigor, service-learning integration, and sustained inquiry. During their time within the CoP and through teacher interviews, the teacher participants recognized and expressed these limitations and their desire to improve future PBLs (see Table 22). These teachers were also hesitant to make mid-course corrections. For example, a second-

grade teacher deferred to her grade-level partner and completed the unit as planned rather than revising it in real-time. However, when examined alongside math student achievement data, findings suggest that extended time spent preparing the project may have come at the expense of measurable academic growth. The drama teacher Julie was able to clearly express her conceptual understanding of transdisciplinary literacy and the positive potential for student growth by merging different disciplines with theatre, but only provided a one-day project for students. This dynamic revealed teacher agency and reflective potential.

Table 22

Excerpts from Stage Two Codebook, Collective Case Study II

Teacher	Position/ Subjects	Experience
Diane	2nd grade homeroom (social studies, math, reading, art, writing, presenting, technology)	I do feel like I learned more about PBL because prior to this round no one has ever explained to me that PBL should start with a problem…I thought it was project-based. I thought you had an essential question but not a problem to be solved…we did PBL during our social studies time and that's when a lot of the pullouts were happening. So, kids were not as involved as the others were…the ones who needed time and were struggling. Our gifted learners are our (group) leaders and they have done their part with research to bring back to the other kids who may struggle with getting some of that information. So they developed that to bring back to them to present to them so they have facts. Then, I paired I tried to divide my groups where I will have a strong learner with a … i don't like to say lower or slower learner… a struggling learner… Ones with IEPs. I've got one who can barely talk. He won't be the one presenting because you can barely understand what he is saying. So that is how I have got them divided up. It is not like all my gifted learners are put together. Pretty divided up.
Elaine	2nd grade homeroom (social studies, math, reading, writing, presenting, art, technology)	We were doing writing, reading, social studies, art, science with climate, and technology. My vision of it changed but it was still about the five regions of Georgia. I feel like we didn't have a problem to solve per se but they did the project and it was hands-on engaging and they learned from it…I feel that the trainings that we went to taught me about what PBL is because I had no experience with PBL prior to this year. It's all new to me…I want for my next PBL to make sure that I have a piece like that (driving question) because I learned from the PD. We didn't want to change anything too much at the point we were at but the next time…That really helped them to learn how to work together as a team and when they presented the project, I was really surprised by that because some of them just didn't seem like they would be but they came up with it and showed their model and then presented…I was proud of them because they did the presentation and they took it seriously…they did a good job of helping each other… I was impressed.
Kathy	K/3 Music (math, reading, writing, science, art)	I really enjoyed meeting with the other teachers because I wasn't just giving my thoughts. The other teachers were able to share input and we were able to collaborate. It wasn't' just me with my thoughts and my own ideas. I as able to reach out to the other teachers and learn what they were thinking too… My biggest concern, I try to include everybody in the lesson but it's a little bit harder for self-contained students to come because they may. Not be as centered in the lesson…so I had a lot of time that we played with instruments with my PBL so that was beneficial for the diverse learners because they got to do hands-on and they weren't just sitting there listening to me talk for an hour… I wasn't sure of a lot of things so she was able to help me out with things I needed and answering my questions. What is

		expected of me for PBL, and how long it should take. Like I wasn't sure over how the course of how long they needed or are actually are spread out? Not just a one week thing, the PBLS are well thought out.. spread out. I had no clue coning but now I do because of (expert).
Julie	3rd Grade/ (Theatre (science, art, reading, writing)	I don't know if my teaching identity changed but my teaching philosophy definitely it changed the way I am going to use other disciplines in class. I wouldn't have ordinarily thought I could include science into my drama classroom. I was more fun and they became more inquisitive and they bought into the drama when I brought up astronomy. Marginalized? I would say it has more to do with socio-economics rather than skin color in my class but unfortunately some of that ties in together in our city…I 've seen the benefits of putting that "annoying kid" with a group of kids that he doesn't normally work with, ones that he doesn't normally feel comfortable with or they don't feel comfortable with…that annoying kid is annoying because sometimes they are from a poorer home or a home where they are getting neglected.

The CoP served as a safe space for grappling with the logistics of shifting from traditional project design to PBL. This transition revealed the challenges encountered and the considerations for future PBL units that should be implemented to align instruction with the core principles of creating driving questions. The data analysis also revealed that the teacher participants expressed their concern that they did not fully implement a PBL unit using TDL. In addition, teacher participants felt that the work the students did was meaningful, but expressed their desire to increase rigor when layering additional disciplines. The teacher noticings also included positive remarks about student motivation, collaboration, and pride in their work.

Part III Collective Case Study

Dialogic Self-Reflection: Evaluating Tensions in Shifting Pedagogical and Professional Identities to Foster Learner-Centered Spaces: Alice, Nancy, Betsy, and Carey

As these four White female teachers examined their role in fostering equitable text selection within literacy initiatives, they engaged in dialogic self-reflection and evaluated tensions, uncertainties, and shifts in practice that arose during their time in separate CoPs. Alice, a non-traditional teacher, began her third year in the kindergarten first grade loop and is pursuing an advanced degree in education rather than applying to the state's alternative certification program for candidates with a four-year degree. Alice was not part of a CoP until two other

teacher participants quickly transferred from their initial CoP to join her because she had the only kindergarten group. This was the only reported instance of movement of teachers within the CoPs. Furthermore, Alice enrolled in LETRS training, Growing Readers, and worked with her team to adopt a new state curriculum mandated by state law.

Casey and Betsy served together on the first-grade team. Casey, new to the school, brought four years of experience in elementary education using informal PBL frameworks within her lessons. She explained in her interview that she was taught PBL in college. Betsy, a veteran educator with over twenty years of experience and ten at the school implementing PBL, most frequently expressed her concerns about over-implementation of programs within the elementary program. She cited the new curriculum adoption based on next year's standards as the greatest hurdle because its learning targets and assessments did not match existing standards. Betsy and Carey also reported tremendous student engagement and enthusiasm from their groups. Nancy, an EIP teacher assigned to the second grade, did not fully engage in a CoP. She reported her concerns in an interview that she noticed issues with implementing the PBL in second grade, but she did not feel comfortable discussing this with the homeroom teachers. Nancy had previously taught second and third grade and in her ten years of experience had received extensive training in PBL.

The data from transcripts of CoPs and interviews reveals that these teacher participants described their professional growth opportunities as strengthening their pedagogical expertise through continuous refinement (see Table 23). The combination of CoP and three professional development (PD) sessions that included ongoing PD support allowed educators to collaborate as they expanded the type of texts students had access to for PBLs. Additionally, the teachers transferred this new knowledge into the curation of dynamic learning spaces that promoted

student agency and engagement. The data findings show how teacher participants reflected on their professional development sessions and described a shared vision for student success. They reported both excitement and concerns as they created unique educational plans embedded with research-based literacy practices that they expressed were responsive to all learners.

The data also reveals that teacher participants embraced the agency that gave them space to develop innovative approaches to PBL with contextualized, responsive instructional strategies that aligned with literacy demands. Additionally, teacher participants used their collaborative sessions to translating new theoretical knowledge into practice. By applying insights from TDL and refining instructional methods, they bridged theory into practice within their classrooms. Through the process of integrating a transdisciplinary literacy approach into PBL, teachers reported how they cultivated responsive, inclusive, and research-informed learning environments that they felt empowered their students to thrive academically as they critically engaged with texts and content across disciplines.

Table 23

Excerpts from Stage Two Codebook, Collective Case Study III

Teacher	Position/ Subjects	Experience
Alice	Kindergarten homeroom (social studies, math, reading, art, writing, presenting)	My biggest shift would be more like not being alone and not trying to solve everything by myself…I've seen the big differences it takes not being alone and being able to collaborate and work with the other teachers in the different areas. Now I'm trying to push myself to not be like that and to bring in others and communicate better. I think because we planned for math and literacy to overlap but science kind of fell in there so the first couple of times I was pointing out and now I see the kids starting to say oh we talked about that when we were doing…They are making those connections which I think broadens their knowledge and helps them remember that for a longer period of time. It's not like they are not just thinking… this is just science and this is just math. They are seeing how it all works together.
Carey	1st grade homeroom (social studies, math, reading, writing, presenting, art, technology)	I went through what ta PBL is and told them what that means and we've been talking about conservation…Theodore Roosevelt believed in conservation. We brought in Park Rangers and they talked about conservation…we did a tour of the school where they noticed things that needed to be taken care of in their environment so we started talking about things that we use every day and things that they noticed when they walked around the school and both classes brought up the whole plastic cup (waste) issue….they came up with the idea that we should just use one cup…they wanted to take it one step further to figure out how many in the whole school. They kept taking it further…so they came up with different presentation ideas and talk through it into every class like share we should do this and then we can… they like the idea of videos and posters so those are the things we are going to do to get the word

		out…I feel like there is something for everybody. Like some really are into the butterflies and some are really passionate about the trash. Some really like these books… so some of them are more interested int pursuit of more knowledge than just reading something funny…I actually assigned them Epic because I collected some stories and pushed them out to them so they had them if they wanted to look at them…learning more and then some are happy to have more understanding but I think they all have something.
Betsy	1st grade homeroom (math, social studies, art science reading, writing)	Marginalized- the lower achieving students, the ones who were kind of struggling. They participated in this and I don't think that they were completely left out or didn't do anything. One of my really low students, and sometimes I can't get him to write one letter on a spelling test, was writing for that poster and drawing pictures and wanted to go hang it up. I don't think they were pushed out. It gave them a voice and something that they wanted to do. They were motivated to do this…They had original ideas and communicating and talking to each other about something that they shared. It wasn't talking about this or that; it was like it built a community within our classroom that we were all working on this together and they could have a conversation about it. They had experiences that they could connect with it like the park rangers coming to visit and new vocabulary words that they had learned and connecting that to someone from history and connecting it to the United States.
Nancy	2nd Grade EIP	Scheduling is always a problem. I don't have a common planning with any of the teacher that I work with so unless it's after school, it was kind of like passing in the hall or when I come into the room for small group, we talked for about five minutes about PBL. There was no long extensive time to plan PBL… So, the second-grade team, I noticed after they started their project after they had planned everything, they realized that it was not a true PBL but they were in too deep to go back and adjust, so I think that was tricky because I wanted to say I don't think this was right but I couldn't. I did not want to overstep because I do jus push into their room… I like that we are not looking gat standards in insolation. We are looking for connections between standards and connections between domains. So, we're not teaching a math unit in isolation and never coming back to it again. We are linking science and linking gin literacy …I like teaching that way.

Nancy's story highlights this emerging theme because she expresses the tensions and consequences of unspoken concerns or the choice not to use her voice during the implementation of lessons. Nancy's response to the interview questions was clipped and brief, noting no changes in her teaching from the professional development or implementation of the PBL. She expressed her appreciation for TDL and how it has reached quiet or introverted students "*who get lost in the shuffle or whose ideas get shut down quickly."* Nancy expressed her understanding of equity and marginalization, stating, "Everybody got to be involved in the creation of the product, whether they were strong readers and writers or strong mathematicians or not, they still got to make part of it. When asked if she would choose this opportunity again, she replied emphatically, "Yes. I would look for ways that I could be more supportive or more involved in the planning and in the implementation because I did feel left out. I would just show up when I could show up." Nancy

provided the research with a cautionary tale of a negative washback effect when a teacher participant did not fully engage in a CoP.

One of the most significant identity shifts is the realization that they were each literacy teachers. The data reveals that these teachers described their transitions from discipline-specific teacher to literacy teacher leads to them to intentionally embedding transdisciplinary literacy strategies across subjects and various text types so that eventually students began to make these connections for themselves. Notably, this collective case study is characterized by the various tensions and difficulties that teachers experienced, most notably in "letting go" of control of the classroom in order to allow students the agency to explore and create.

Part IV Collective Case Study

Reframing Equity & Expanding Notions of Student Potential for Learner Groups

Holly, Quinn, Laura, Rita, and Mary

The data reports that the teacher participants became aware of how text selection, language use, and assessment practices impacted all learners through this process (see Table 24). Their responsiveness to these realizations were not frequently demonstrated in their conceptualization or vocalization of equity in literacy for students of all educational needs; however, their awareness to the differing needs of their students was illustrated by their adoption of asset-based language approaches and their instructional design becomes more cohesive, student-centered, and literacy-driven.

Holly served the K-8 art instructor and dean for connections. Also, a former elementary special education teacher with twenty-four years of teaching experience, Holly's intuitive nature about the needs of all learners were illustrated throughout her time in the CoP with other connections teachers and in the planning of their collaborative PBL. Quinn, elementary EIP

teacher with twenty-five years of experience in K-5, worked with second grade teacher participants and offered insight into what did work well for them in spite of student assessment data indicating a serious regression. The data reveals that Quinn also stepped into the second grade PBL at the product phase, reporting positive student engagement and their ability to verbally explain what they learned. Laura recently moved from the forth and fifth grade team to serve as a special education teacher for the elementary school. With five years of experience in education and PBL, she reported a unique perspective of students' growth during small group time in the resource room. Rita, another veteran elementary educator of twenty-two years and special educator, chose the CoP with kindergarten and EIP teachers to build a literacy lesson focused on emerging literacy skills and math. Data reports her vision for teaching group work at the earliest stage to foster student agency and work ethic among all learners. Mary, the ESOL teacher who emerged as a leader from Stage One, revealed the positive power of student engagement and her passion for acknowledging and leveraging strengths and gifts of English language learners.

Table 24

Excerpts from Stage II Codebook, Collective Case Study IV

Teacher	Position/ Subjects	Experience
Holly	K-3 Art; Dean of Connections (science, social studies, math, reading, art, writing, presenting)	It was nice. So the planning part. Sometimes when it's a large group of teachers only one or two does the bulk and the others just follow along. but because everyone was responsible for their own little thing, everybody actually did their actual part. Everybody's piece of the pie is an equal size. and everybody turn theirs in on time and we had a shared document…I like the community of practice ideas. Marginalized? The ones who get looked over. They don't in my room… in here they're able to show their strengths. You know when you hear about famous people who have all these disabilities and stuff, but then they excel in the creative arts because they have a different strength. They (students) can exercise it in here. The ones that get marginalized probably are the ones that are too high or sometimes they get so hung up on being perfect about everything that they struggle in creative arts. They have a hard time with letting go, boundaries. Whereas (the other) once they come in here, it's time for them to fly, they are a little free so they are the ones who excel.
Quinn	2nd Grade EIP (social studies, math, reading,	I think a lot of teachers don't sit down and talk to kids. We teach. We test. We may converse with them, but like, do we like to pick their brains? They really amazed us with what they already knew and used their ideas... I would bring in more literature and passages that

	art, writing, presenting, technology)	pertain because I didn't really like the reading passages that went with it (PBL) other than what we researched. I would implement even more literacy into the lesson… but I feel like they learned more than any other group or class I've ever worked with…The kids who normally would have been left out, are the ones who have to sit by themselves, get overly excited, but no, even those children, they made sure that everybody made something – contributed – they did really good. I was very impressed …The only struggle with the research and stuff is that my kids the EIP kids that they are not performing on grade level so any science and social studies text or anything that they're having to read is a little bit more challenging for them. But with the teachers using epic and a variety of sources other than just picture books or just informational texts out of the room, it helped… I teach the grade level standards, but I either reteach (vocabulary, comprehension, fluency) what has already been taught or I teach what they're going to need to know…we just have to spend a little bit longer.
Laura	3rd Grade Special Education (math, reading, writing, science, art)	I think that is the component that we don't always recognize. It goes beyond just the content standards and the basic planning. It's actually teaching the kids how to work in a group. That was one thing that I noticed in 3rd grade rooms, their groups had a variety of students who may not normally work together. or may not even be on the same ability level. so when they were grouped together, they each played a different role. they don't always know how to play those roles, so that was another component that went into it. there were a lot of… several of us were in there one day and it was a little chaotic, but I could hear each group, when a conflict would arise, we would give different solutions, and step back, and the kids would agree that this is what we would do. That was very nice to see because a lot of times especially as an adult and I'm bad about it. If there's a problem, I just want to get in there and fix it. Let me do this to be quick with it. So, it was nice to have that time and to actually let them talk and work through problems and solve this, Oh, we did this together kind of thing. It shows a lot of growth for them. They tried to make each group diverse with their abilities and what they could offer so it was nice because each student had a part to play…I feel like they (my students who need extra support) got a good understanding of what their project was. It was spread out over a good time so they were having to keep up with where they were and what they were working on … they did so much with it. They had different books that they would read in class. They would do their own research on their chrome books, different activities throughout their lessons and then they would have that work time on the project and I really think what helped with this PBL is that field trip. When they came back, I saw a huge jump and what they wanted to contribute…they really wanted it to be authentic and what they really wanted it to be what they saw… they wanted to set up a museum. I meant was just playing the roles, the leadership, carrying out the different projects and making choices. I guess some of the disciplines would be the problem and solution of them having a conflict, hearing the best way to solve it. One group I was working with they were trying to build something and one of them wanted to use cardboard, but one of them wanted to use the sticks. and they could not decide what the wall should be, so we were looking at what they designed, and so finally they were like let's do the cardboard and put the sticks on the outside. so that worked out even better. things like that. as far as the standards they apply the different things from the research they had done from the read aloud and different books and things like that. One thing that was good was that they went on a field trip to the museum so a lot of them after that, they wanted to look up what things they see on the field trip that applied to their region. They were like we saw this in our region… and I saw a lot of that, really wanting to tie back in what they saw in real life – Ocmulgee mounds - and apply it to their own work.
Rita	Kindergarten Special Education (social studies, math, reading, writing, presenting, art, technology	I think in our classrooms we tend to or we say that we hold our students to high expectations. I think that when it gets to work and we know that our students with disabilities or our students who are struggling who may not have a disability but have a gap and we assume that they can't do it. And then we make all of these accommodations and we put all these things in place but we never teach them how to do it. We never help them learn how to do it. We gloss over it and expect them to learn it. We are making excuses and we're not actually digging in and fixing the problem…I see that it allows for them (diverse learners) to learn from their peers. I see that it allows them to actually have a real-world experience and to see why they're learning is important. It builds in that ability to use what

		you are learning. It's not "sit and get" because it's applying it now and I think that's very important. I think it helps our struggling learners. Definitely.
Mary	K-3 ESOL (Social studies, math, reading, writing, presenting, art, technology	ELs can be marginalized but not really with this project because my students are highly intelligent. One of them was still struggle with knowing background knowledge. I guess we could say this…whereas we may have BK of the artic or igloo, snow and stuff, some from other countries may not have built that background knowledge. I had to … before they would go over it in class, we did something called doodle notes over the houses the clothing, and the tools for my one student but we did it together. It's not a language barrier (sometimes). It's really more like they really don't know a lot of this (already)…I think the kids had more opportunity, especially with 3rd grade, had more opportunities to be able to like make the actual product for their project. They had more opportunities to see actual realistic items. To give a visual and let them become (immersed) like a real totem pole (arrowheads). They were able to see artifacts that tied that in (book) The learned an artifact and instead of seeing it on a computer screen", to have the materials, the kids were very excited and being able to have all these materials and choosing how they built things…I saw a lot of choice… a lot of letting go (teachers).They were figuring out their own problems and teachers would step in every now and then but the kids would have to talk to each other. There was so much conversation. For example, you did it and I did it this way but can we come to an agreement? Whose way is better and talk about it … I saw a lot of that. I saw a lot of choice and constructive criticism from the teacher… step in now but then back out again. That was wonderful.

The teacher participants consistently presented specific asset-based language that centered student participants in their understanding of how best to reach student who frequently are intentionally or unintentionally pushed out of a lesson. The data reveals that these teacher participants brought advanced training and expertise in inclusive practices to their CoPs. Their responses to professional development and inquiry-driven strategies for learners signaled a deliberate shift from deficit-thinking perspectives. They routinely describe the range of students' academic abilities and linguistic backgrounds as beautiful and inspiring. Furthermore, their commitment to research-based instructional practices was highlighted through TDL as they helped other educators plan and implement a PBL unit. Using this literacy lens, the four educators demonstrated their expertise in assessing the strengths and potential of all learners. They reframed student capacity for their CoP teachers and nurtured independence and agency for their students within the inquiry-based and multimodal environments. This theme offers insight into how sustained professional dialogue and reflection can support more inclusive and responsive instructional practices.

Convergence of Quantitative and Qualitative Data Analysis

Teacher Participants

Through the integration of three sets of teacher survey responses and three samples from qualitative teacher data, the merged findings provide a comprehensive understanding of research results. First, item H from the teacher survey reported a notable improvement in teacher agreement and positive shift in teacher beliefs about high expectations for all learners as well as their agency as educators to facilitate student success. This data reveals a shift toward a student-centered and asset-based mindset for teachers. Likewise, qualitative data reported from Farah's story within a collaborative case study supported this quantitative analysis. These merged findings provide comprehensive understanding of the positive teacher shift in that more teachers have a unified belief in high expectations for student success following the research.

The data from item J on the teacher survey reported improvement in teachers' perceived commitment to student learning and use of student-centered instructional practices. The mean increase from 3.36 to 4/50 indicates that teachers in the CoPs communicated their shared educational values. Despite a slight increase in variability (SD .047 to .065), these results still indicate a consensus among teachers. This merged data with qualitative report from Laura's story supported the positive shifts in professional culture following their time in a CoP and indicated a collective teacher efficacy for sustaining these new literacy initiatives.

The merging of data from item K of the teacher surveys, with CoP transcripts and interview data from Nancy's story indicated that there was a modest positive shift indicating a culture of continuous improvement among the teacher participants (see Table 25). Furthermore, the data indicates that as the teachers are also stepping outside their comfort zones, they are experiencing tensions and grappling with new instructional strategies. Overall, it reports a

willingness among teacher participants to engage in innovation and professional growth, but it also reports the logistical struggles teachers face each day as they attempt to collaborate with others.

These merged data sets yield a holistic understanding of teachers' perceived benefits following their time in a CoP as they designed and implemented a PBL unit using transdisciplinary literacy. The study's findings illustrate the complexity and depth of teacher identity and subsequent shifts as they engage in self-reflection and meet the needs of students in their classrooms.

Table 25

Sample Merged Data from Quantitative and Qualitative Analysis

Quantitative	**Qualitative**	**Merged Results**
Survey Question H: Teachers assume that all students can learn at reasonably high levels and that teachers can help them. (M = 3.50; SD = 1.02; M = 4.33, SD = .72)	**Farah's Story** from collective case study: Leveraging CoPs for Evolving Literacy Practices to Maximize Student Impact	Teacher identity shift towards equity-centered instructional practices.
Survey Question J: Through words & actions, teachers affirm their common values concerning critical educational issues and in support of their collective focus on student learning. (M = 3.36; SD = .47; M= 4.50; SD = .65)	**Laura's story** from the collective case study: Reframing Equity & Expanding Notions of Student Potential for Learner Groups	Positive teacher reports towards CoP; positive response to equity-lens
Survey Question K- Teachers take risks in trying new techniques and ideas and make efforts to learn more about their profession. (M = 3.50, SD = .76; M = 3.93, SD = .83)	**Nancy's story** from the collective case study: Dialogic Self-Reflection: Evaluating Tensions in Shifting Pedagogical and Professional Identities to Foster Learner-Centered Spaces	Increased tension as teachers tried new methods and engaged in dialogic self-reflection.

Fidelity

The final Stage Two implementation also embedded efforts to measure and ensure fidelity of implementation of TDL and PBL was strengthened. Stage One teacher participants

expressed their teacher agency and specifically targeted barriers and concerns such as scheduling and professional development for Stage Two (see Table 26).

Table 26

Fidelity to Implementation Index Constructs and Indicators

Construct	Indicators
1. CoP Collaboration	a. Established, protected time and location for CoP
2. Coordination between administration and teacher participants	a. Engaged, supportive leadership for PBL b. Nature and frequency of communication c. Alignment of school calendar and research requirements
3. Data collection	a. Site administration of fall and winter MAP testing for ELA/reading and Math; teacher survey b. Sharing data among stakeholders
4. Training and professional development	a. Training for teacher participants for TDL, PBL, and student engagement
5. Planning for PBL design and quality	a. Ongoing planning among teachers and administration

With hopes of strengthening the research, these fidelity checks specifically reviewed Stage Two protocols, adding validity to the outcomes as the school also implemented training and mandates from the state legislature for reading curriculum adoption. In an effort to determine fidelity to the research design of Stage Two, the following areas were considered: teacher participation from four participants, site capacity, teacher training, and CoP design for planning and collaboration (see Table 27). Analysis reported data that provides context for identifying and addressing the multi-level factors of this research.

Table 27

Fidelity Findings about Intervention Components for Stage Two

Component:	Criteria	Planned	Delivered	Percent
Teachers (n=16)				
Survey	Teacher participation	19	14	74.0
Professional Development	3 Sessions: TDL, PBL, Student Engagement	3	3	100.0
CoP with Coaching visits	Teacher participation	3	3	100.0
Interviews	Teacher participation	19	19	100.0
Member checking	Teacher participants	19	6	31.58
Site Capacity				
Student testing within designated time frame:	Winter and Spring MAP Growth Assessment for ELA/Reading and Math			
	Kindergarten	2	1	50.0
	First Grade	2	2	100.0

	Second Grade	2	1	50.0
	Third Grade	2	2	100.0
Teacher Planning	Designated CoP planning time	3	3	100.0
Stipends, Texts, Supplies	Funds for texts, stipends, supplies from a grant from Sandra Dunagan Deal Center for Early Language and Literacy	$50,000	$50,000	100.0

Teachers once again reviewed the data and made suggestions for further implementation of CoPs as teachers use TDL to build PBL units. The evaluation revealed three potential implementation barriers that, when addressed, could expand the positive progress that the qualitative data provided. Barriers include 1) maintenance of program and its sustained effectiveness to reach all student groups 2) infrastructure struggles such as conflicting school schedules, testing protocols, and classroom planning that require continued coordination with special services, and 3) funding for sustained on site professional development for the transdisciplinary literacy and PBL to encourage engagement in multimodal settings and broad selection of texts.

Chapter Five presents discussion of research data analysis, potential implications for the educational community, limitations that emerged during the study, and considerations for future research.

Chapter 5. Discussion

If you judge people,
you have no time to love them. – Mother Teresa

The instructional context of this research aids the interpretation of quantitative and qualitative findings and their broader implications. Mandates for reading curriculum adoptions and fluency screeners from Georgia House Bill 538, alongside instructional variations across grade levels during the research period, likely influenced teacher implementation and student outcomes. These contextual factors warrant careful consideration and evaluation of the study's findings. It also impacts potential directions for future research and instructional design. In order to further isolate reasons for variation in student percentile rankings, it is important to evaluate the implementation of the intervention in terms of what was planned, how it was implemented, and the degree to which it varied among grade levels. Furthermore, implications for future research must consider the unique challenges teachers face when implementing TDL within a PBL unit with fidelity.

Review of Theoretical Framework

The theoretical framework for this study incorporated various theories with TDL positioned at the intersection of collaboration, learner engagement, and application of knowledge. TDL is a shared conceptual framework that transcends the standards of two or more disciplines to provide a new perspective of a dynamic system, surpassing the boundaries of disciplines that previously have been interactive from a discipline-specific base (Puig & Froelich, 2022). It provokes curiosity, collaboration, and accountability for teachers and students, integrating multimodal, multisensory activities to promote creativity and engagement in flexible spaces. TDL provides ideal innovative learner engagement through a convergence of disciplines

that includes scaffolding that is designed from the analysis for students' zones of proximal development (Vygotsky, 1978). TDL traverses disciplinary boundaries, transcends and promotes synergy, moving beyond superficial level of teacher/learner engagement. It is encircled by theories representing collaboration, learner engagement and application of knowledge. The following sections provide a review of the framework that guided this research and informs the discussion.

Learner Engagement

In asking the question who are the learners, the study explores the possibilities of using inquiry-based thinking to challenge students and teachers to expand their roles and gain a deeper knowledge and understanding of how to use skills (Freire, 1985). The reflexive, reflective exploration into critical literacy theory addresses issues of inequality by emphasizing the importance of questioning clarifying inferencing to examine power relationships between teachers and students, authors and readers (Dyches, 2023; Seery et al., 2021; Stewart et al., 2021). The concept of equity in this research extends beyond an access-oriented mindset for teachers; they gain specific language to measure academic growth, close achievement gaps, impacting opportunities to become productive learners. Incorporating teacher identity work within this theoretical framework enriches the study; teachers engage in dialogic self-reflection to consider their positionalities and to navigate the tensions that exist in these explorations. Because teachers' identities and beliefs influence their instructional approaches (Truscott & Barker, 2020), reflection, collaboration, and professional support of CoPs allow teachers to attend to discursive practices that can foster teacher agency and shifts in the development of teacher identity (Luguetti et al., 2018; Paulus et al., 2020). This recursive process is again highlighted within the framework for this research.

Collaboration

Collaboration in between students and teachers in this study is framed in three theories: constructivist, socio-Constructivist and socio-cultural theory. Piaget's (1971) constructivist theory describes the dynamic stages of cognitive development, stating that the adaptation and assimilation of knowledge is centered upon actions such as creating, experiment and testing. Vygotsky (1978) Socio-constructivist theory extends this by stating that learning is constructed based on previous socially-situated student interactions. Socio-cultural theory extends this, encouraging social interaction as a language that is acquired and an agent for altering powers of thought. This gives thought new meaning for explaining lived experiences (Vygotsky, 1978). Furthermore, as language becomes a tool for discovering how disciplines intersect and how people co-construct knowledge, teachers begin to shift perspectives about traditional methods of text selection (Lemieux, 2023). Reflection develops into a key component in this process and allows the teacher and learner to extend the action of revision, positioning the learner as an agent for learning.

Application of Knowledge

The application of knowledge section of this theoretical framework is formed by experiential learning theory, PBL, and communities of practice. The research examined teachers' knowledge and perceived benefits of enhancing learner engagement, fostering teacher collaboration, and facilitating the application of new knowledge, hence five additional educational theories anchor the research design: critical literacy, constructivism, social constructivism, experiential learning theory, and PBL theory. Kolb (1984) developed a participatory approach to instruction encourages active, engaging experimentation, constructing knowledge, and learning new content through observation, reflection and revision (Girvan et al.,

2016). The reconceptualization of learning by doing builds inclusive and equitable learning environments as various disciplines are integrated to analyze and confront authentic real-world problems (Rockquemore & Shafer, 2000). Dewey (1916) advocated for the teacher use of contextualized instruction and inquiry-based methods that prioritize literacy goals and sustained empathy building across different groups of people (Alkhudiry, 2022). It is through the investigation of CoPs that this research investigates teachers perceived benefits for acquiring spaces and support as they examine various educational theories across disciplines and focus on the single goal of creating a PBL unit that addresses the needs of all student learners (Wenger, 1998; Ko et al., 2023). Furthermore, the research highlighted the innovative professional learning design for CoP for implementing transdisciplinary literacy. Collaborative agency among educators created an educational environment that allowed teachers to reflect on and consider innovative practices for all student groups.

The research design, convergent parallel mixed methods, presented a complex but revealing set of results with meaningful future implications for study. As the research investigated how teacher participation in CoP evolved and influenced their perspectives about teaching practices related to TDL instruction, it did not propose the use of a control group in which to study the fidelity of implementation and student impact across classes receiving the intervention and those who did not. Consequently, data analysis must merge the quantitative and qualitative data gathered from teachers and students in order to construct informed implications.

Summary of Findings

This study examined the implementation and impact of a TDL initiative grounded in PBL frameworks and viewed through an lens in which teachers address how to meet the needs of learners who have varying literacy abilities. The findings demonstrate significant shifts in teacher identity, instructional practice aligned with research-based literacy initiatives, and collaborative inquiry-based culture of learning, but sustained positive impacts on student literacy gains require future study. Quantitative analysis of pre-and post-surveys and MAP assessments revealed measurable student growth for some but not all student groups and increased teacher engagement with transdisciplinary instructional design. Third grade showed statistically significant improvements in student performance in ELA/Reading and math, with moderate effect sizes, and the intervention could be interpreted as positively influencing learning outcomes. When quantitative data were analyzed and merged with qualitative data from teacher noticings, reports showed evidence of potential progress in ELA/Reading and Math. This analysis determined that the findings did not indicate positive results during the limited time frame. Data from Kindergarten math percentile scores were not statistically significant even though student growth was evident.

Qualitative data included teacher interviews, CoP transcripts, and researcher observation and reflections and described the evolving roles of teachers. Their responses and observations about positive student engagement with various texts supported their transformation from discipline-specific teachers to literacy-focused educators. Furthermore, it investigated teachers' capacity to reframe discussions about high value teaching for all student groups within their classrooms. Teachers increasingly engaged in dialogic self-reflection took instructional risks and adopted asset-based language to redefine student potential. Data further revealed that the

implementation of this research executed strong performance in its reach and adoption at the research site. The data also indicated effective participant recruitment of teachers with various experiences and expertise. Teacher interviews reported many occasions of positive communication throughout their time establishing and developing a collaborative culture within CoPs. They also expressed a growing desire to lead professional development and support future initiatives at their school.

The data reported teacher concerns and challenges about the sustainability of progress without addressing barriers such as scheduling and sustained professional development. Teacher participants expressed their commitment to implementing and future sustainability of PBL using the tenets of TDL. They unanimously stated their desire for ongoing professional growth in ways to connect student learning across disciplines and enhance instructional quality while fostering teacher leadership. It is not without challenges, and potential effectiveness through implementing TDL within a PBL unit using an greater conceptualization to text selection merits further study.

This research addressed the capacity of teacher participants to collaborate within a CoP to develop innovative lesson plans that strengthen the alignment between new government initiatives and the pedagogical principles underpinning reading instruction. Teacher participants representing varying levels of expertise and experience must navigate legislative mandates from various state governments to implement the science of reading practices by systematically eliminating low value reading instructional practices. Aligning classroom structures with these literacy objectives underscores the necessity of enhancing teacher understanding and implementing high impact practices that facilitate access to texts and academic success for all student groups. Findings indicate that when the teacher participants provided an environment integrating asset-based language practices with innovative multimodal activities, they validated

and affirmed the abilities, cultural backgrounds, and linguistic identities of each student. The study highlights how kindergarten through third grade students established connections across disciplines and actively engaged in learner autonomy. They demonstrated the ability to self-correct in one discipline, applying metacognitive strategies to another, thereby reinforcing transdisciplinary skill transfer (Puig & Froelich, 2022). Consequently, teachers observed a positive shift in student perspectives, wherein learners embraced the PBL unit and considered possibilities rather than limitations in their academic contributions. In effect, the data revealed this transformation resulted in increased student engagement and motivation, fostering an environment where students actively read, analyzed, and revised their work. Their enthusiasm for learning became contagious, a driving force that reinforced equitable access to success as a tangible outcome.

This research provided data supporting the development of high impact learning spaces where educators fostered students' ability to self-direct, self-regulate, and build reading stamina as they attended to a variety of texts. The recursive nature of this process extended beyond student interaction with text or classmates; it emphasized the transactional relationship work between text selection and students' capacity to decode meaning. Concurrently, the interchange of schematic working system, prior knowledge, and vocabulary acquisition strengthened the learner's metacognitive development (Lemieux, 2023). This synergy created through TDL implementation was enhanced by the multimodal activities that PBL provided. Throughout their time in the CoPs, teacher participants critically engaged with collaborative discourse, demonstrating a heightened awareness of the value of collective knowledge. By embracing discussion about their professional identities, they also navigated challenges in instructional

practice and contended with the problems of practice such as the complexities of relinquishing control over how students interacted throughout PBL implementation.

Implications

This research continues to build on the dynamic theories that informed the study and provided insight into meaningful TDL instruction and facilitates the call for a deeper commitment to the study of shifts in teacher identity. As the teacher participants continued to struggle with literacy laws and the ever-evolving needs of learners, they found space and transformative potential within CoPs. Educators repositioned themselves as co-constructors of knowledge, and by recognizing and affirming expertise in one another, they reclaimed a sense of professional fulfillment. Ultimately, the most profound outcome of this collaborative work as reported by teachers was the amplification of student voices, reinforcing the transformative potential of equitable and dialogic learning environments. Three notable implications provide educators with a meaningful call to address the needs of all learners as they promote practices that provide sustained positive student impact, examine pedagogies through a lens of how to explicitly reach students who are often pushed out of lessons because of lack of background knowledge or vocabulary, and expand the reach of transdisciplinary literacy initiatives. Teachers discovered avenues to reclaim joy in their work and create a culturally responsive environment (Muhammed, 2022) by acknowledging expertise in their students and one another as they strengthened literacy and inquiry skills.

Practices Associated with Positive Student Impacts

How are the interventions of this research related to its impacts and what does that mean future research? What were the costs or gains to student achievement? In an effort to determine fidelity to the program model for implementation (Hill et al., 2023) of Stage One and Two, an

evaluation was conducted about the background and experience of teacher participants, site capacity, teacher training and professional development, and CoP design for planning and collaboration. As Hill et al. (2023), succinctly stated, “While it may seem intuitive to expect that greater intervention fidelity will be positively associated with improved outcomes, this is not always the case” (p 4). Based on merged results from quantitative and qualitative data, second grade scores are statically significant yet show significant regression in math scores. The quantitative and qualitative data did not complement each other in this scenario. Data from Chapter 4 evaluated possible threats to fidelity of implementation that occurred throughout the course of the study but only emerged in data collection from teacher interviews following implementation. Also, first grade showed high fidelity to implementation, yet percentile scores are marginal in terms of achievement.

Third grade data reported high levels of fidelity to implementation and likewise produced positive impacts as demonstrated by quantitative and qualitative data; all data sets complemented each other. Moreover, the third-grade students received the added value of intensive supports from vertical alignment from Special Education, EIP, and ESOL teachers as well as administration involvement. Third grade provided a comprehensive and succinct reporting of details as the robust data collected from this CoP supports; however, we must not assume that “more” for third grade meant “better.” Further investigation in the form of qualitative work with teachers is needed to determine the levels of impact from direct and support research components. This research model and logic model should be revised to expand the protocol for follow-up questions after professional development, additional availability for field work in the classrooms, and a fourth CoP in which all teacher participants analyze data and give feedback. Three CoP meetings were originally scheduled in the research plan. Overstreet and Pitts (2024)

expressed that with implementation research, new programs fail when the teachers and school leaders lack support over time to enact meaningful transformation to educational practices (p.2).

This cautionary assessment should alert school administrators who are not watching the implementation of SoR reading curriculum and garnering regular teacher feedback. Additional coaching in TDL and PBL might have resolved the implementation issues within this research, but does not necessarily indicate that achievement scores would have been higher. Further research is needed into why the effects of the direct and support components varied with the intended populations. The continuation of the CoP to strengthen teacher agency (Bandura, 2001) as uncovered in this research supports the implementation of high-value, high-impact literacy pedagogies. Bandura (2001) defined agency in terms of educators taking initiative, proactively making choices or changes in pedagogy or teacher identity. In essence, the teacher participants exercised control over their time in the CoP, their time building literacy lessons, and evaluating student impact.

Three components provided the greatest contribution to positive outcomes from the research: CoP, PBL professional development, and implementation of TDL through the use of a unique and wide variety of texts as well as guest speakers who modeled how to leverage these texts for maximum engagement and learning. Providing post-training supports to teachers ensures that the teacher participants continue to engage in a lengthy and iterative process of planning, evaluation, and collaborative problem solving within CoPs (Lyon, 2017). For example, the third grade CoP showed the greatest diversity of teacher and administration support (EIP, Special Education, ESOL, Gifted, Assistant Principal, homeroom advisors) in which these stakeholders aligned the content for inquiry and collaboration among students. The data reported evidence of robust, student created driving questions that further strengthened the inquiry across four or more

disciplines. Both first and third grades accomplished this. Finally, the grades that provided an extensive text selection that incorporated multimodal investigation of artifacts, realia, posters, models of fossils, storybooks and non-fiction books also extended this learning by including guest speakers from the National Parks Service, Porch Indian Tribe and taking field trips to authentic sites. The effective integration of TDL within a PBL unit by these teacher participants became a multi-level template (Lyon, 2017) that can be leveraged as an exemplar for implementation success.

By identifying the practices associated with positive impacts, researchers can reflect, revise, and furth investigate the role that TDL has in literacy reform and the role that teachers play in its success. As educators address barriers that slow positive student impact and uncover the gaps in literature surrounding the implementation of SoR literacy initiatives, they will also uncover the gaps in what we as educators know and what we do (Fahim & Straus, 2022). Assessing and tackling the know-do gap of a literacy implementation involves those stakeholders who can best identify why the gap exists (Fahim & Straus). Implications for future study should engage in the iterative cycle of reflection and revision, intentionally centering equity in the refinement of research designs and implementation models.

Examination through an Equity Lens

Teachers' noticings in the research provide an important implication for educators who seek to understand how teachers' identities are shaped by their understanding of equity in education. To what extent did the teachers embrace the challenge to evaluate their teaching practices through a different perspective? How did the prompting of the researcher encourage or discourage teacher participants to critically examine their positionality and approach to literacy instruction? How did the tension surrounding these questions invite teachers to engage in the

conversation or prompt them to distance themselves from it? The potential for this research to inform the greater conversation about how teachers reach students of all abilities within a classroom depends upon the depth and authenticity of the teachers' responses and the researcher's understanding of how this happens. Vetter (2012) stated that sustaining meaningful change in teacher practice is arduous, complex, and messy because the expectation is that teachers will confront and reconstruct deeply held beliefs and instructional practices. Furthermore, teachers are challenged to use this lens to recognize and respond to students' cultural and linguistic backgrounds as they evaluate their cognitive contributions (Mercier & Hinman, 2024).

In this research, teacher noticings of student engagement enhanced the moderate success of student achievement in scores through the implementation of TDL. The data reflecting teachers' perceived benefits of the integration of disciplines into PBL units tailored for learners of all abilities counterbalanced low achievement impact. Teacher-participants cultivated a culture of student motivation by prioritizing instructional coherence. Within each CoP, educators received resources to critically examine their pedagogical purpose and underlying instructional philosophies. The CoP provided space that challenged teachers' comfort zones and allowed conversations about their problems of practice and study of TDL (Vetter, 2012). Data reflected that throughout the research, teacher participants recognized that students benefited from multiple opportunities to observe, assess, and iteratively refine their work. Teachers documented this progress while adhering to the principles the new literacy mandates and aligning their lesson plans with established academic standards. Notably, educators' understanding of equity was most profoundly reflected in their ability to support all of their students with intentionality and responsiveness. Teacher participants consistently employed asset-based language, fostering an inclusive and affirming learning environment through scaffolding and differentiated instructional

practices. As they provided students with deliberate encouragement and structured redirection, students engaged in inquiry-based strategies introduced by teachers from professional development.

The data provided numerous insights into the ways in which the participants navigated a range of experiences from tensions and discomfort to discovery and delight. While individual teachers conceptualized the experiences and definitions of students in varying ways, they collectively maintained a student-centered approach, prioritizing each learners' needs within the TDL and PBL frameworks. This commitment to fostering meaningful, enduring learning experiences with goal of improving literacy underscores the transformative potential this pedagogy (Hinman et al., 2023).

This research provided teachers and students with inputs designed to help them thrive regardless of their unique needs. At what level did this research capture teacher participant growth in their understanding of how to reach, motivate, and inspire students who are often pushed out of lessons? Did targeted access to text selection lead to viable opportunities for success that closed achievement gaps for learners of all abilities? While teachers were unable to vocalize their understanding of this beyond inputs and outputs, they did demonstrate their awareness of creating and executing lesson plans that reached all students within their classrooms. They routinely ensured that each student's needs were being met throughout the duration of the research regardless of quantitative data results that indicate a progress for some and regression for others in reading abilities. As a result, students across all ability levels leveraged equitable access to texts within positive learning environments where they exercised autonomy and engaged in the meaningful application of their studies. Educators reported notable increases in student engagement when instructional practices aligned with affective factors such

as interest, values, self-concept, and attitudes. These teachers began to extend their understanding of how to reach students in terms of access to greater text selection only.

Quantitative student data indicates significant findings for third grade in which literacy gains demonstrated potential positive impact of the intervention on student literacy in ELA/reading and math. Teacher participants such as Farah and Polly who worked with this third-grade students positioned themselves as leaders throughout the research. Vetter (2012) described these positionings as difficult, taking practice over time in which the leader must negotiate both new personal expectations with new professional responsibilities. Negotiations that make change difficult, but can effect change through this process. As teachers model these negotiations and provide meaningful scaffolds for students, the students recognize that collaborative groups can provide support for taking on new positions within the classroom and negotiating identities Laura's story illustrates this point; in her interview, she described the maturity and personal growth of her students during their special education small groups as they worked through lessons for the third grade PBL.

Teachers also observed that students developed greater agency when managing their independent reading through deliberate practice, leading to improved reading stamina and sustained attention across various selection texts. Moreover, teachers' intentional and responsive pedagogical approaches facilitated a paradigm shift from perceiving student challenges as deficits to recognizing them as learners with instructional needs requiring targeted support. This shift in positionality underscores a reframing of instructional practice that prioritizes student strengths. Puig and Froelich (2022) conceptualize this dynamic as a co-triangulation process, wherein interactions between schools, students, and instructional practices generate a reciprocal cycle of academic improvement. The findings further demonstrate how TDL served as a catalyst

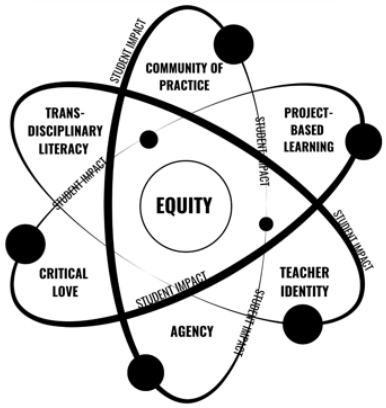
for accelerating literacy development across K-3 grade levels and content areas but this was not represented in the test results of the MAP Growth Assessments. Further research about the bias nature of standardized testing would extend the discussion about equitable access to assessments (Ladson-Billings, 2006).

Extending the Reach

As this conversation continues to move forward, educators who serve rural communities can leverage TDL practices that create positive student impact with vertical alignment through a CoP. Extending the reach implies that educators are provided the necessary supports such funding, coaching, or text selections. In addition, teachers often request opportunities, time, and space to share their expertise and develop their teacher identities. Freire (1985) posited that it is essential for people to link knowledge to action, to be active participants in their learning. Because the data from this research shows us that these results were in part based upon the integrity of implementation within the CoPs, it is crucial to investigate the teachers' role in serving the students through innovative practices that place equity at the core of what drives the connection between students, teachers, and action (see Figure 10).

Figure 10

Revised Framework for Implementing Transdisciplinary Literacy within Project-Based Learning Unit with an Equity Lens.



By adding to this framework with the intentional work of literacy specialists Bettina Love and Yolanda Sealy-Ruiz, educators can extend the research of equity to include critical love (Touloukian et al., 2024). This theory includes concepts of loving students and a call to action to connect more effectively with them they learn to read. Reflexive work about one's ability to reach students from various backgrounds and abilities is complex, never linear, and filled with a messy unresolvedness (Freire, 1985) that routinely emerges as new questions and problems emerge from research. Student impact, the goal of all literacy initiatives, is represented in the recursive nature that allows for reflection, revision, and redefinition of what it means to construct knowledge with equity at the center.

Limitations

Despite the important implications that this study provides, limitations do exist. First, there is a small sample size, and for this reason, the generalizability of this study is limited by the number of participants. Sampling was purposeful and not a true random sampling. While the teacher participant size of this research is conducive to the nature of the qualitative section of this research study, a more expansive pool of teacher and student participants would provide additional quantitative data sources. By enlarging the teacher pool to a national level to include elementary educators, the researcher could expand the population diversity in terms of teacher nationality, ethnicity, years of teaching experience, and disciplines taught among those educators. By using a national group of professional educators, collaboration could provide opportunities for interviewing additional participants as well as protocols for additional quantitative data tests to expand methods of triangulation.

Notably, for reasons beyond the control of the researcher and in spite of implementation frameworks designed to mitigate problems, the school site made two changes to academic testing

of student participants in Stage One and Stage Two that adversely impacted the researcher's ability to analyze student growth in ELA/Reading over the course of the study. During the Stage One, Spring ELA/Reading and Math testing was conducted within the first week of the research. Administration explained that they needed to provide the data to homeroom teachers as they prepared students for state testing. Furthermore, no plans were made by the administration to test these students again following Stage One. During Stage Two, the administration elected in the Fall to give only MAP Fluency screeners to kindergarten and second grade classes. This was not discovered until after the intervention had started, making it too late to request MAP Growth Assessments for ELA/Reading.

The timeline for this research was six months because it did not put undue pressure on the participating educators to commit to a large-scale project. The timeline was set in an effort to keep PBL planning to one unit and not to unnecessarily overwhelm participants or create a negative washback effect until data was retrieved from implementation. However, an extended research timeline might allow teachers to participate in comprehensive opportunities for more robust conversations and reflections throughout collaboration during their professional learning communities. Extension from one semester to one school year could provide educators and researchers with further opportunities to acquire additional relevant data as well as to develop a stronger community of support for future collaboration.

Future Research

Qualitative Self-Study

Future research can respond to these implications. First, a self-study by the researcher will examine how she interacted with teacher participants within the CoPs. An analysis of her decisions could uncover shifts in her educator identity, probing how she negotiated tensions and

formed questions to challenge personal assumptions, biases, and belief systems (Hinman et al., 2023). A self-study would investigate how entering into the conversation with teachers created tensions, how grappling with personal feelings influenced her interpretation, labeling, and explaining of the data she collected.

Qualitative Study of Teacher Agency

Extending this implementation over one to two years will provide more time for the engagement and motivation gains experienced by teachers and students in literacy to translate into more significant impact. As teacher participants willingly embarked on a study to investigate the potential benefits of CoPs within a school system, they were confronted with making instructional decisions from several different perspectives: transdisciplinary literacy, text selection, and research-based approaches to evaluating student engagement and assessment. Follow-up interviews and support within the school might uncover practices that have positive outcomes on student achievement. The researcher could investigate how teacher participants continued to build PBLs using the knowledge and resources they gained from the research. CoPs could continue to provide space for teachers to committed to implementing literacy initiatives to collaborate and address the needs of all students in their classrooms (Charner-Laird et al., 2016).

Findings might show how this study could be replicated or generalized for a variety of rural elementary schools across the United States. Project researchers could investigate how teachers might translate viable outcomes into strategies that impact teaching across many disciplines at different levels (Anderson et al., 2022) thereby creating a sustainable vertical alignment that more profoundly supports students' literacy development from the earliest stages through high school (Hensley, 2021). Given that the data might suggest that teachers as leaders are deeply invested in professional development goals that directly support a review of current

methods and texts selection (Truscott & Barker, 2020), this desire to positively impact this collaboration and foundational work of innovating teaching strategies within their disciplines might inspire teachers at all levels. More in-depth studies might capture and reveal additional valid implications for administrators, teachers, and stakeholders as they develop future professional development that centers teacher agency.

The results from this research can inform future studies about the role of communities of practice positioned on a vertical alignment to include special education, EIP, ESOL/ ELL, and gifted teachers who are committed to the examination and creation of lessons with a prioritized focus on literacy initiatives to reach students who are often pushed out of lessons. Moreover, this study furthers the quest for educators to provide best practices through the selection of texts that will resonate with all student groups within our educational systems. To sustain and expand the innovative teaching strategies that contributed to strong gains in student voice, confidence, and work ethic, it is essential to provide ongoing teacher leader coaching for induction educators and implement workshops that target or focus on transdisciplinary literacy (TDL), project-based learning, (PBL), and communities of practice.

Mixed-Methods: Implementation of Literacy Practices in Rural School Systems

New research studies could investigate how are administrators, teacher leaders, and stakeholders are evaluating the implementation of SoR in rural areas where resources are scarce. By studying these impacts on teacher agency through CoPs, the researcher can research the de-implementation of ineffective methods of literacy instruction as state governments are legislating the implementation new high-value practices and reading curriculums. An evaluation of text selection by these teachers could inform the research community about shifts in teacher identity brought about by the new government literacy initiatives in small systems in rural communities

throughout the Southeast United States. This study could add to the expanding body of research about the specific focus of literacy initiatives to address students who often lack background knowledge, vocabulary, and opportunities to use an expanded selection of texts (Truscott & Barker, 2020). It highlights the need for this issue of research-based learning among different age groups and disciplines to be further reviewed.

Additionally, as teachers begin to identify low-impact practices and de-implement non-research based and ineffective teaching strategies, follow-up assessments could be conducted to evaluate how well teachers navigate this process. Teacher-participant interviews could be expanded to measure confidence levels and program effectiveness over time. The research could be extended to continue efforts to monitor and collect qualitative data from teacher observations. Extending the implementation will help assess student impact and provide additional data points to determine the long-term effects of the intervention. Because teachers responded to the CoP and collaboration in such a favorable manner, additional outlets for teacher feedback will enhance data collection. These recommendations will help refine future interventions and strengthen the overall impact of implementation of TDL. Moreover, this study could create additional questions for continued qualitative study in which fourth and fifth grade students could be added to the pool of potential participants. Implications for further research for students would include opportunities for them to benefit from transdisciplinary literacy instruction that provides lessons and texts that are more equitable (Neubauer & Wesley, 2023) as well as add their self-reported benefits stemming from new methods of literacy instruction.

This research reveals the professional benefits and collective efficacy beliefs uncovered through CoPs of educators from different disciplines. In addition, the study demonstrated the potential gains and positive impacts for educators through the investigation and development of

new approaches to transdisciplinary literacy and instructional practices on learning (Truscott & Barker, 2020). Through this convergent mixed-methods research design of both teachers and students, this study examined the potential effects of creating spaces for teachers of a variety of grade levels, expertise, and experience as they collaborated on expanded topics of how teachers select, integrate, and teach a variety of texts for our youngest learners. The implementation of literacy initiatives using TDL within PBL unit showed modest gains in student performance for third grade. Results from MAP Growth assessments in ELA/Reading and math testing that students overall showed modest growth in ELA and math literacies but did not always reach expected growth targets. Consistent implementation of literacy work remains for educators.

Conclusion

While the positive impacts from the teacher created PBL lessons that prioritized TDL showed modest gains in some student performance, an even greater impact was made in student engagement and enthusiasm for a variety of texts. Results from MAP Growth assessments in ELA/Reading and math testing that students overall showed low to high growth in ELA and math literacies but did not always reach expected growth targets. Consistent implementation of literacy work remains for educators. Extending this implementation over one to two years will provide more time for the engagement and motivation gains experienced by teachers and students in literacy to translate into a more significant impact on achievement scores. As Puig and Froelich (2022) asked, "How do we support strong, vital, intense, energetic, and mindfully vigilant teacher-colleagues in supporting strong, vital, intense, energetic, and mindfully vigilant student learners?" (p. 24). It begins by reminding our educators that fidelity to the student must remain the primary commitment.

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Appendix A

Teacher Survey

Default Question Block

Community of Practice:
Project-Based Learning, Transdisciplinary Literacy, Equity Lens- A Mixed Method Study Facilitated to Examine Teacher Identities and Student Impact

Principal Investigator: JoAnna Arnold

Informed Consent for Web-Based Survey

Principal Investigator: JoAnna Arnold, EdS
Project Title: Community of Practice: Project-Based Learning, Transdisciplinary Literacy, Equity Lens- A Mixed Method Study Facilitated to Examine Teacher Identities and Student Impact

You are invited to participate in a research study to determine if there is a difference between the self-reported understanding of transdisciplinary literacy by elementary teachers following their experience of participating in a CoP designed to help teachers increase their knowledge about best practices in transdisciplinary literacy. JoAnna Arnold is conducting this study under the direction of Dr. Victoria Cardullo in Reading Education at Auburn University.

If you choose to participate in this research study, you will be asked to complete a survey about your experiences with a CoP designed to collaborate, investigate transdisciplinary literacy within a project-based learning unit for 3rd Grade, and create lessons with equity in

literacy focus. The survey should take no more than ten minutes. All identifiers, name or email, will be removed from the data. The information from this survey confidential and only reported in statistical analyses. At no point will your ident revealed. All data will be stored in BOX, a maximum-security portal that is univ... password protected. Furthermore, the data will be backed up according to the protocols of the university's data management system. Only the researchers will have access to the master list that associates participant names with codes that protects their identity.

There are minimal risks associated in participating; however, data collected throughout this research will be potentially published or included in proposals for presentations. The potential benefits include your contribution to the body of research about focus groups, especially those with an equity in literacy focus. If at any time you wish to withdraw your participation from the research project, you may do so without penalty or problem.

Please contact JoAnna Arnold at jza0091@auburn.edu with any questions about your role in this study. You also have the right to contact Auburn University's Institutional Review Board by phone (334)-844-5966 or e-mail at IRBadmin@auburn.edu or IRBChair@auburn.edu if you have any questions or concerns about this process or your rights as a participant.

Thank you for reading this form and considering your opportunity to participate in this research.

Please indicate if you wish to proceed with this study by selecting yes. If you do not wish to proceed, please select no.

- O Yes
- O No

Did you attend a CoP for the study of transdisciplinary literacy within a project-based learning unit for 3rd Grade?

- O Yes
- O No

The Auburn University Institutional Review Board has approved this Document for use from 01/24/2024 to ----------
Protocol # 23-599 EP 2401

In which state do you teach?

Which of the following disciplines do you teach?

- [ ] World Languages- Spanish
- [ ] World Languages- French
- [ ] World Languages- German
- [ ] English, ESL
- [ ] History
- [ ] Math
- [ ] Science
- [ ] Art
- [ ] Music
- [ ] Drama
- [ ] CTAE

Please indicate which level(s) of education you teach:

- [ ] Elementary (K-5)
- [ ] Middle School (6-8)
- [ ] Secondary (9-12)
- [ ] Post-secondary
- [ ] K-12

Which of the following accurately reflects your age range?

- ○ 20-29
- ○ 30-39
- ○ 40-49
- ○ 50-60
- ○ Over 60

Which of the following accurately reflects the number of years you have be

Which of the following choices accurately reflects this statement?

Teacher voice and input were valued throughout the professional development and focus group sessions.

- Strongly Agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

Which of the following choices accurately reflects this statement?

Lessons that I co-created during the sessions were implemented with fidelity in my classes.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

Which of the following choices accurately reflects this statement?

Throughout my time with the CoP, I made changes to the type of texts that I use in my lessons.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

Which of the following choices accurately reflects this statement?

Throughout the CoP time frame, I identified students in my classes who w changes in the texts that I use during my lessons.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

Which of the following choices accurately reflects this statement?

I am willing to participate in future collaborations that emphasize transdisciplinary literacy and project-based learning.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

CoP members talk with each other about their situations and the specific challenges they face as they navigate the development of a project-based learning unit.

- To a great extent
- To a large degree
- 50%
- Somewhat
- Not at all

Teachers share, observe, and discuss each others' teaching methods and philosophies about project-based learning and transdisciplinary literacy through an equity in literacy len

- To a great extent
- To a large degree
- 50%
- Somewhat
- Not at all

Teachers assume that all students can learn at reasonably high levels and th help them.

- O To a great extent
- O To a large degree
- O 50%
- O Somewhat
- O Not at all

Teachers work together to develop shared understandings of students, curriculum, and instructional policy, but also to produce materials and activities that improve instruction, curriculum, and assessment.

- O To a great extent
- O To a large degree
- O 50%
- O Somewhat
- O Not at all

Through words & actions, teachers affirm their common values concerning critical educational issues and in support of their collective focus on student learning.

- O To a great extent
- O To a large degree
- O 50%
- O Somewhat
- O Not at all

Teachers take risks in trying new techniques and ideas and make efforts to learn more about their profession.

- O Not at All
- O Somewhat

- ○ 50%
- ○ To a large Degree
- ○ To a Great Extent

Teachers feel honored for their expertise within the school as well as within the district, the parent community, and other significant groups.

- ○ Not at All
- ○ Somewhat
- ○ 50 %
- ○ To a large Degree
- ○ To a great Extent

Within the school, there are formal methods for sharing expertise among faculty members so that marginal and ineffective teachers can improve.

- ○ Not at All
- ○ Somewhat
- ○ 50 %
- ○ to a large Degree
- ○ to a Great Extent

The school leadership keeps the school focused on shared purpose, continuous improvement, and collaboration.

- ○ Not at All
- ○ Somewhat
- ○ 50%
- ○ To a large Degree
- ○ To a Great Extent

The staff imparts a sense that new teachers are an important and productive part of a meaningful school community.

- ○ Not at All
- ○ Somewhat
- ○ 50%
- ○ To a large Degree
- ○ To a Great Extent

Appendix B

Interview Questions

AUBURN UNIVERSITY

COLLEGE OF EDUCATION

CURRICULUM & TEACHING

Interview Questions

1. What sort of benefits do you feel you gained through:

   A. professional development for PBL?

   B. focus group?

   C. professional development for transdisciplinary literacy?
2. What aspects of being part of the focus group were negative or not useful to you? Why or why not?
3. What type of student in your classroom is marginalized versus the type of student who is not?
4. What benefits to students did you observe from the implementation of the newly designed collaborative PBL unit that addressed the needs of diverse learners?
5. What negative impacts did you observe from the implementation of the newly designed collaborative PBL unit that addressed the needs of diverse learners?
6. What specific changes if any did you make to your approach when designing and implementing the unit using transdisciplinary literacy? PBL?
7. How did your teaching philosophy or identity shift during this research?
8. Based on your experience, would you choose opportunities for professional development or learning communities for PBL or transdisciplinary literacy the next school year?

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Appendix C

Alignment of interview questions with research questions

RESEARCH QUESTIONS	INTERVIEW QUESTIONS
1. How does a transdisciplinary literacy approach inform teachers' instructional knowledge and development of best practices when designing and implementing a project-based learning unit that is responsive to all learners?	1. What sort of benefits do you feel you gained through: B. focus group? 6. What specific changes if any did you make to your approach when designing and implementing the unit using transdisciplinary literacy? PBL?
1A. In what ways do teachers talk about the nature of transdisciplinary literacy and its role in the design of curriculum and instruction?	1. What sort of benefits do you feel you gained through: C. professional development for transdisciplinary literacy? 2. What aspects of being part of the focus group were negative or not useful to you? Why or why not? 6. What specific changes if any did you make to your approach when designing and implementing the unit using transdisciplinary literacy?
1B. In what ways do teachers talk about the nature of project-based learning and its role in the design of curriculum and instruction?	1. What sort of benefits do you feel you gained through: A. professional development for PBL? 6. What specific changes if any did you make to your approach when designing and implementing the unit using transdisciplinary literacy? 8. Based on your experience, would you choose opportunities for professional development or learning communities for PBL or transdisciplinary literacy the next school year?
1C. In what ways do teachers use a transdisciplinary lens to make instructional decisions in consideration of diverse learners?	4. What benefits to students did you observe from the implementation of the newly designed collaborative PBL unit that addressed the needs of diverse learners?

	5. What negative impacts did you observe from the implementation of the newly designed collaborative PBL unit that addressed the needs of diverse learners? 6. What specific changes if any did you make to your approach when designing and implementing the unit using transdisciplinary literacy? PBL?
2. How have teacher identities impacted the application, execution, and evaluation of project-based learning aligned with transdisciplinary literacy?	7. How did your teaching philosophy or identity shift during this research?
3. How are diverse learners' interactions, engagement, and achievement shaped by instruction informed by transdisciplinary literacy and project-based learning?	3. What type of student in your classroom is marginalized versus the type of student who is not? 4. What benefits to students did you observe from the implementation of the newly designed collaborative PBL unit that addressed the needs of diverse learners?
3A. What student noticings have teachers identified to support project-based learning aligned with transdisciplinary literacy using an equity lens?	4. What benefits to students did you observe from the implementation of the newly designed collaborative PBL unit that addressed the needs of diverse learners? 5. What negative impacts did you observe from the implementation of the newly designed collaborative PBL unit that addressed the needs of diverse learners?
3B. How does the development of transdisciplinary literacy within project-based learning affect student performance?	4. What benefits to students did you observe from the implementation of the newly designed collaborative PBL unit that addressed the needs of diverse learners? 5. What negative impacts did you observe from the implementation of the newly designed collaborative PBL unit that addressed the needs of diverse learners?

Appendix D

Stage One Code Book

Stage One Codebook

A priori	Subthemes	Codes	Definition	Quotes
TDL Implementing newly learned practices: Making instructional decisions (standards, visual literacy, assessments Integrating disciplines (authentic, creative extensions and PBL products) Considering differentiation methods from new perspectives	**TDL Assessing Knowledge Acquisition**	**Assessment Standards Visual literacy Authentic, creative extensions**	Variety of methods used to determine what student has learned (over a certain amount of time); formative and summative	Mary: I'm working on a pd to do with all teachers. On my pd there's actually a science portion. My pd is mainly showing while these kids are very very smart, we have to have academic vocabulary. Like the kids have to know the academic vocabulary. When you are adding in any social studies or adding in science, you have to understand ok they probably don't know what … something sciency…like scientific method…that means… scientific method… they don't know academic vocabulary when it comes to any of this. When they integrate all the disciplines throughout, they (teachers) have to think about ok how are they going to teach them this though. Are we going to have pictures? I use pictures for everything. Tina: When we are designing a program and I'm asking those (driving) questions, they are helping me figure what we are going to do and how this is serving others; how we are going to take it out. Let's reflect on it; let's envision how could we make it better. Polly: Response to reading with writing, interactive read-alouds, and making it meaningful whether it's text to self or text to world. I feel like we are doing that. Handing the kids the responsibility. Shared reading, independent reading, the listening. Them with expectations with writing. We started handing them rubrics. Getting them to be self-reliant. They have to read the rubric. Let's see. I don't know. I'm going to buck you on that. I think we have started integrating aspects of transdisciplinary literacy. I'm not saying I'm an expert at it, but I feel like we have done pretty well. Polly: They went from doing it in classrooms to presenting in the library front of the parents. They really talked about what they wanted to improve and I saw it. I mentioned before letting the kids have more control; there shouldn't be an idea of perfection in PBL. Needs to be the outcomes of what the kids attained and what they are able to achieve based off the skill set they have. Did we build them up and build their confidence? Diane: I still try to make learning fun, I always try to do hands-on activities as much as possible. I always try to have a visual aspect, a hands-on aspect. For auditory learners, I do use lectures. Sometimes I'm doing all three at the same time…

TDL Implementing newly learned practices: Making instructional decisions (standards, visual literacy, assessments Integrating disciplines (authentic, creative extensions and PBL products) Considering differentiation methods from new perspectives	**TDL through PBL Learning Environment**	**Student choice Student voice Groups Engagement**	(Flexible) spaces that maximize student engagement (including multimodal, multisensory setting) in an educational atmosphere	Polly- I'm thinking too, what if we have a representative from both classes that forms a committee to help make decisions for 3rd grade? I'm open to hearing student voices… give them an idea of how to run things. That is my goal. Mary: But, when I was in 3rd grade, we did an extensive PBL but we had that PBL training. We had our driving question, that one question that everything… that drove our entire project. So that's what I mean it went well. But we brought in the zoo from Albany. We had them bring in reptiles. We had people come in and speak. We tied in everything. The kids made infomercials and flip grids. I think I have a better understanding of PBL because we did that training. I don't remember her name. She was wonderful Tina: They are over there for kids to see and I'll say … Did we create today? Did we perform today? Did we respond? How did we respond? How did we connect? Diane: I think we have a lot of different, diverse students in our class, so they had to learn to work together and come to a common decision on the rules that they wanted to nix and those they wanted to implement. And then also when they voted on who the president was going to be, how they delt with the loss or the win.

TDL Implementing newly learned practices: Making instructional decisions (standards, visual literacy, assessments Integrating disciplines (authentic, creative extensions and PBL products) Considering differentiation methods from new perspectives	**TDL through PBL Integrating disciplines**	**Selecting disciplines Service learning Products to reflect merging of disciplines**	Application of two or more disciplines used during instruction	Polly: to obtain stronger writing goals that is for sure. have an understanding of how the Georgia economy and government works. As well as understand how to manipulate data on a chart. Chances are we are going to see this more during their science and social studies time because she has it planned out like with math. She's got bundles that she uses to plan math. this will reinforce what they need during that time. to make it happen. Polly: Social studies, writing cause first thing Monday they are going to practice picking a candidate. For president who they are going to pick. It's an opinion piece and why. Then and then, they are going to write a campaign paper like their speech. So that's the writing part, ELA part is going to come with listening skills and speaking skills. grammar is going to come in being able to use some of those techniques with their writing. Social studies is coming in. Math can come in once we get the votes in; cause we are doing data right now. Diane: I guess I have gained a better understanding of how to make certain content areas and standards hands-on or give (the) how to create lesson plans that are not just lecture, paper. It's hands-on and it gives them the opportunity to see what they are doing and why they are doing it. Mary: With my curriculum it does that. It goes reading, you have grammar, then it goes into math, science, social studies, and ties into writing and everything goes together. Whatever you are reading ties into all of that. So I use all that

TDL Implementing newly learned practices: Making instructional decisions (standards, visual literacy, assessments Integrating disciplines (authentic, creative extensions and PBL products) Considering differentiation methods from new perspectives	**TDL through PBL Student Collaboration**	**Tensions Work ethic Craftsmanship Student collaboration**	Curiosity, creativity, and student-initiated incentive to participate in one's own learning and in groups; tensions resulting from freedom and choice/voice	Polly: I don't know because they get so bogged down in the freak out. And a lot of mine feel like they have to have one specific answer and I didn't give them a guideline because if I tell them I need two sentences that's all they're going to do so I backed off of that and I wanted to find it until the point was made. and they still tend to dance around the topic instead of finding it. Diane: Nope. Some of mine are going to freak out. I'm going to leave them where they are. Their nerves are already high because of milestones. One has completely shut down because of milestones. He's not thinking anything through right now because of milestones stress. There's a lot of stress. Polly: They are still having a hard time communicating and having a hard time performing group work. And understanding that their idea can't be the only idea…. Diane: Right yeah. They struggle a lot with that. In all the PBLs I've done over the last two years, there is always somebody crying. They are arguing constantly. That's a struggle. I think that if we could make it to where PBLs did more individualized work, that it would work better. But a lot of PBL, it's all about the collaboration of learning. And every time I've had a pbl… Tina: Language- development of language skills. For them it is a collaborative effort. Literacy-helping with language. You have connection with other scholars as well as connections with people outside of our school. For music, a lot of what we do is giving that gift to others. It's making them go outside of themselves it is not all about what "I can do for me" it is about "what can I do for others." Mary: For my students who did not have the background knowledge like them learning new things about our culture was surprising to them. They were like "OH." A lot of stuff they were not exposed to.

Equity Addressing equity and needs of diverse learners: -Maintaining asset-based mindset -Reimaging scaffolds and interventions -Tackling student stress, craftsmanship, work ethic as they receive choice/voice	**Instructional Decisions**	**Asset-based mindset Scaffolds Interventions; Differentiation**	Teacher-led choices or changes in teaching methods including interventions or modifications based on constant formative analysis responsive to the needs of all learners	Mary: That is something we all have to work on.It sounds like there is a lot of tension how to do it versus wanting to or not to. Some people think it's hard but it's not. If I can just show them. Like that's on my pd. There's a science piece. It shows you how to modify. Mary: Another aspect of it too is academic vocabulary - that we automatically assume that they have this academic vocabulary. That is my building piece. Polly: The kids, the students and their understanding of the standard and how we can manipulate the vocabulary to put it in their language. And if not in their language, how to encourage them to use the language of the standard. **Polly:** Generally, when I am more relaxed, and I know that have more control they are too. I feel that that's where we are at. I'm not trying to put a focus in 500 different areas. That is where the understanding of PBL has really gotten into me. I have learned to breathe through it and not overcomplicate it. I'm not saying I'm perfect at it by any means, because I'm not. but I think I have gotten better at it. Polly: I'm naturally a person that wants it no gray area, black or white. I strive for perfection in almost everything I do. **I changed my definition of what perfection is**. I base it off the students and what they need. What's perfect for this kid or what's perfect for that kid. So my idea of perfection is not black or white anymore; a lot gray area based off what my kids need, my classroom needs, and sometimes it is not about just one kid, it's about what this group need to be successful. They are working hard and they need it; it's just it's always been student based but it is a lot deeper now. Tina: One thing that has changed is that I give the kids more input. Negotiate. What do you want to see happen. Even with other HR teachers. What do you want this to look like. Lots more negotiation. More input. More choice as far as When you first start, your like you are going to all this by myself and I want want want… then it becomes let's all work together Mary: I don't think people mean to do it. I think they hear ESOL and automatically (assume) they are non-English learners. It's not their first language. I think that is the most beautiful part. Because it is not their first language but they can …. So might be put into a category but **they are multilingual. That's beautiful a beautiful thing.** People look at it, not in a mean way, as they might have a harder time and that is not true. Not true at all. They learn it differently. My kids are really smart.

Equity Addressing equity and needs of diverse learners: -Maintaining asset-based mindset -Reimaging scaffolds and interventions -Tackling student stress, craftsmanship, work ethic as they receive choice/voice	**Diverse learners**	**ESOL** **EIP** **Sp ED**	Unique learning needs and characteristics that may differ from majority of learners in an educational setting; wide variety of backgrounds, experiences, race, ethnicity, socio-economic, multiply-abled, blending learning styles	Polly: You see that they are engaged they worked well. I'm really proud of (one student). His idea wasn't the winning idea (for his group) and at first it bothered him but he has handled it well. He's still engaged. He did not get upself with himself. He's done very very well. Mary: We've been doing a lot of informational pieces. A lot of informational pieces. 4th grade just did opinion, so the entire unit is based on opinion. And it goes with the standard that I'm using. But every single page that we work on that we use that I work from to teach from has that scaffold and has that extension piece. Diane: The ones who get pushed out are the gifted ones. I feel like my gifted students are not focused on as much as my other students. Do you see what I'm saying? I feel like I focus more on the ones who are struggling in other areas because those are the ones I am more worried about. Tina: The ones who are centered are the ones who like it. Like Student. He's not always centered. It is not his thing. It could be a cultural thing or it could be a motivation… he is a boy and music is not his thing. But someone like other student is all in because he's smarter but it also more his thing. Why do you think it is his thing more? He is not as athletic. A lot of the boys are like if they are all athletic, it just is not as interesting to them. Polly: The ones that don't project their voice. The ones who struggle with letting go of control. They struggle with not being the leader. I saw that more often than with babies without a voice. My natural leaders not understanding how to let other people help.

Teacher Identity	**CoP**	**-Teacher buy- in; Confidence; Collaboration; Communication; Tension- teachers giving control to kids; how kids responded to more freedom** **-Barriers to scheduling professional development** **Lack of understanding of TDL- expressions of confusion; emerging use of strategies with PBL**	Set of actions (program, method) aim to improve a student's academic progress; target an area of need; measure improvement	Polly: worried about time… not overloading it because I don't want to freak out the other teacher. making sure that we hit everything we need to hit (standards) for the milestones because I have quite a few who are scaring me. Polly: Collaboration because I really listened to my partner teacher, and I kept her learning style and her teaching style in mind and I really tried to make sure that anything I planned would benefit her as well and her kids. Our classes are really different. We are the ying to our yang. And what she has, I need, and what I have, she needs. And listening to her and really keeping her in mind while I planned helped me grow as a teacher and as a professional. Polly: I would like a different format of planning or teacher planning with PBL or professional learning with pbl. I don't feel like the last one was a beneficial as it could have been. The person delivering was incredible, and she is good at what she does, I feel like I was kind of thrown to the wolves. It's hard to pick that driving question especially with someone who has never seen it before. Then trying to figure out how to execute it and trying to get the kids in gear or not lasting too long. One of ours took way too long and threw off our grading process. And if we would have forced the kids through it they would not have done nearly as well as what they did. Tina: One barrier is that we are not all in. I don't know if that is what you are looking for. It's hard to PBL and to be mandated by testing. Those two things are a barrier. 3rd grade has to prepare for milestones. If they don't do well, it looks bad. How do you integrate PBL and make sure they are getting all that milestone stuff they need? One barrier is not everybody agrees with PBL even though they are here (at school) and another one is just that making sure they cover the milestone stuff. It's hard. Diane: I don't feel like I changed anything. I did exactly what my partner teacher told me to do. Laughs. I worked as a team, but I didn't change anything. Wait, yes I did. I think originally they were going to originally only supposed to vote in one new thing into the classroom and I let mine vote in three new things. That is one new thing that I didn't stick to. Diane: She has three of my students, Mary does. Ok. So I'm going to work with Polly. I talked with her yesterday about what had already started the PBL… I trust you. I trust Polly.

				Diane: change in philosophy? No. I became a teacher because I wanted to make learning fun and do hands-on learning because I myself am a kinesthetic learner, so I learn by doing. I don't learn by you just telling me what to do or seeing it written on the board. PBL has always been an interest of mine. Um, which is one reason I came to Furlow because they do a lot of PBLs. I don't feel like my teaching philosophy has changed. Mary: But I think this year has been a lot of change for me. I think I've shifted my way of thinking on a lot of things. From beginning to end of year. I shifted my way of thinking from homeroom teacher to ESOL. We can do more. I learned how important reading is. Knowing letters and sounds. It is important. I've been doing professional development for the last two years. My mindset has completely shifted. What I thought how to teach reading is not… not saying that what I was doing was wrong but not I have a whole new outlook on really how to teach reading

Emerging themes:

Implementing newly learned practices:	**Addressing equity and needs of diverse learners:**	**Unpacking teacher identity for the first time:**
• Making instructional decisions (standards, visual literacy, assessments • Integrating disciplines (authentic, creative extensions and PBL products) • Considering differentiation methods from new perspectives	• Maintaining asset-based mindset • Reimaging scaffolds and interventions • Tackling student stress, craftsmanship, work ethic as they receive choice/voice	• Communicating and miscommunicating • Describing positive dynamics of CoP • Managing tensions that surface (letting go of control) • Realizing a need more PD for TDL

Appendix E

Stage Two Code Book

3 Themes that emerged from coding

Refining Instructional Knowledge and Practices- The recursive process in which educators engage in evidence-based professional development to refine teaching methods and strategies, enhancing their understanding and adaptability to better meet diverse student needs through reflection, evaluation, and revision.

Curating Dynamic Learning Spaces: The purposeful design and continuous transformation of educational environments that promote engagement, creativity, and active participation from teachers and students by redefining and reshaping physical, social, and intellectual spaces to support authentic learning experiences and cultivate a culture of collaboration, innovation, and inquiry.

Fostering Open Discourse Using Asset-based Language (*Growth Mindset)*: The intentional cultivation of an open environment in which individuals are encouraged to engage in free, respectful, and constructive communication that encourages diverse viewpoints, ideas, and experiences that can be openly shared.

⊞A priori #1: TDL

	Subthemes	Codes	Definition	Examples
TDL Integration of different disciplines in a harmonious manner to construct new knowledge and uplift learners to higher domains of cognitive abilities and sustained knowledge and skills	Refining Instructional Knowledge and Practices	Assessing Knowledge Acquisition	A range of assessment methods employed to evaluate a student's learning progress over a specified period. Differentiation	**Gail I27** We made specific changes to product at the end and so originally, we were going to have them individually make the houses and they were just going to present to the class. Instead, we had them work in groups and make their houses and instead make it a museum exhibit and then presented to second grade as a native American homes museum. I feel like that was more engaging to them. It was more teaching. I'm this somebody who's going to need to know this instead of I'm presenting to a class. **Alice I32** *Kindergarten: At first, we were just basing the unit on the book "Not a Box" and the more we talked about it and talked with other teachers, we pulled in "Iggy Peck Architect." And another book about shapes. As we went along, we thought that they can label. That's part of writing and we can get them to write a sentence to display with their creations, their project (final product). I feel like we are pulling in more and we are going to have them explain it to parents as they come for the celebration of learning. That gives them the oral presentation. We are trying to pull in as many pieces (assessment)… We keep finding ways to get them to share their ideas.* **Sonya I87** *We incorporated more books, the STEM, and tried to add the different differentiation pieces. Usually with my kids (gifted) even though they have strength and weaknesses about the same level, but I made sure to differentiate. Thinking back to the bats, we had fictional books about bats and it was leveled as well. Some of them are higher in math and they are in reading. There was a lot of differentiation instead of a whole bunch of teaching at one level.* **Nancy** I like that we are not lookin gat standards in insolation. We are looking for concnections between standards and connections between domains. So we're not teaching a math unit in isolation and never coming back to it again. We are linking science and linkin gin literacy …I like teaching that way.
		Diverse Learners	Students with learning needs and characteristics that may differ from those of the majority of learners in an educational setting, encompassing a wide range of backgrounds, experiences, racial and ethnic identities, socio-economic statuses, abilities, and blended learning styles.	**Laura, I 14** *They tried to make each group diverse with their abilities and what they could offer so it was nice because each student had a part to play…I feel like they (my students who need extra support) got a good understanding of what their project was. It was spread out over a good time so they were having to keep up with where they were and what they were working on … they did so much with it. They had different books that they would read in class. They would do their own research on their chrome books, different activities throughout their lessons and then they would have that work time on the project and I really think what helped with this PBL is that field trip. When they came back, I saw a huge jump and what they wanted to contribute…they really wanted it to be authentic and what they really wanted it to be what they saw… they wanted to set up a museum.* **Rita, I55** *I think in our classrooms we tend to or we say that we hold our students to high expectations. I think that when it gets to work and we know that our students with disabilities or our students who are struggling who may not have a disability but have a gap and we assume that they can't do it. And then we make all of these accommodations and we put all these things in place but we never teach them how to do it. We never help them learn how to do it. We gloss over it and expect them to learn it. We are making excuses and we're not actually digging in and fixing the problem.* **Sonya I86**

TDL Integration of different disciplines in a harmonious manner to construct new knowledge and uplift learners to higher domains of cognitive abilities and sustained knowledge and skills				*They were able to make connections…they were going to make text to text connections from what they learned in here (resource) from what they did in another class. One kid was questioning my kid, so she (teacher) paired them up and they had their own little side conversion about the region…inquisitive…*
		Instructional Decisions	A diverse array of pedagogical strategies and adaptations implemented by educators, including interventions and modifications informed by continuous formative assessment, to effectively respond to the diverse needs of all learners	**I10 Farah** *I'm trying to be more problem based. I feel like I controlled it more in the past, in previous PBLs. I did too much and the kids needed to lead more of it. It needed to be more of them having some kind of choice, determining how things were going to look. I tried to control too many pieces of that in the past. This time after listening to the PBL coach, I was trying to let them (do it).* **Polly I21** *We ended up doing the rubric midway because I didn't know that it had not already happened. I think it's very important to let the kids know. For one they have to use the language of the standards. They have to use that vocabulary to expose kids to vocabulary because you don't want to hinder them by going oh, they're young, they're not going to get it. Yes. They will. Give it to them… They can hold vocabulary…Give them the language that they are responsible for and they will keep it in their mind. It helps them with future projects, especially when they have to self-regulate… I will refocus and remind them. They do have power and the ability; you just have to show them that they have it.*
		Integrating disciplines	An instructional approach that combines concepts, skills, and methodologies from two or more academic disciplines to enhance learning, promote connections across disciplines, and foster a deeper understanding of complex concepts	**Carla P74 CoP** *First grade: It's mainly Roosevelt (social studies) and science standards for plants and animals… math calculations for cups,author's purpose, chronological order, and writing* *** **Rita p54** *Just helping to see how you can incorporate reading throughout everything. Everything uses reading especially with science and social studies because you know I that our teachers can feel like they have to push something aside. But you don't, you really don't. Literacy is within everything you do. Vocabulary through sentence structure through writing… through everything.* **Farah I10** 3rd grade-social studies, math, reading, writing, presenting, art) *but when we were doing it before, it was strictly, "this is just Native American project we're doing" we weren't' integrating things (disciplines)…and now even things I didn't plan still happened. There was math that we put in there. When they were building, they realized they were …if I'm building a house and the side is 2 inches higher than the other side, they need to be even or my roof is not going to sit on the top. Making the teepee and putting their polls together and wrapping their buffalo hide around it, we realized we have to have some kids of shape at the bottom. We're going to have to build a solid structure to something around so they put a lot of thought into it than we have in the past.*
	Refining Instructional Knowledge and Practices	Interventions	Structured sets of actions, including programs and methods, designed to enhance a student's academic progress by targeting specific areas of	**Laura stage 2 CoP Transcripts 83** *a little bit challenging for me, especially since I am kind of new in this aspect – special ed teacher- and they all had a different writing topic so that threw me off because I was only having to help one individual kid at a time but overall it was really neat just to break things down for them. Like one kid he didn't know how to google pictures. he did not know how to copy and paste into different places. so I showed him and he was so excited, he said don't tell me now I want to do it myself. Let me try it myself. I have to remember the steps." and then he did the next*

TDL Integration of different disciplines in a harmonious manner to construct new knowledge and uplift learners to higher domains of cognitive abilities and sustained knowledge and skills	Curating Dynamic Learning Spaces		need and systematically measuring improvement over time.	*few slides of getting his pictures and so it was just neat for me learning the side of how to add in an accommodation and modification. You know they were struggling reading or listening to a video and being able to talk about their region. So instead, I switched to pictures – visual literacy – on their different topics, and when they looked at those, then I was able to ask questions and look at the picture and tell me more information that way. I felt like it was helpful and it was just so neat seeing wait, when they first get all those little pieces of the of the homes, I thought this would be terrible. I stepped in was like it was really nice seeing everything come together. everybody was working on something different, so I did a little bit here and there and they looked great. They really turned out good and it was neat seeing the younger kids be creative.* ***Rita_stage 2 cop transcripts 83*** *It turned the learning into something real and I think that's great. That's what makes it relatable. because like you said, that was real life teaching of how to copy and paste something into a Google find a picture and that's something they're going to need to know how to do for the rest of their lives. That is a literacy competency that we don't think of as literacy, but it is. and they were excited about it. and let me do it on my own. I got it and that's what you want your kids to do.- Special Ed – with everything and you don't see that often.*
		Instructional Learning Environment	structured physical, digital, and social conditions in which teaching and learning take place, encompassing pedagogical approaches, classroom dynamics, resources, and technologies that support student engagement, knowledge acquisition, and skill development	**63 Mary** *I think the kids had more opportunity, especially with 3rd grade, had more opportunities to be able to like make the actual product for their project. They had more opportunities to see actual realistic items. To give a visual and let them become (immersed) like a real totem pole (arrowheads). They were able to see artifacts that tied that in (book) The learned an artifact and instead of seeing it on a computer screen", to have the materials, the kids were very excited and being able to have all these materials and choosing how they built things…I saw a lot of choice… a lot of letting go (teachers).They were figuring out their own problems and teachers would step in every now and then but the kids would have to talk to each other. There was so much conversation. For example, you did it and I did it this way but can we come to an agreement? Whose way is better and talk about it … I saw a lot of that. I saw a lot of choice and constructive criticism from the teacher… step in now but then back out again. That was wonderful.*
	Fostering Open Discourse Using Asset-based Language	Student Motivation	intrinsic and extrinsic drive that fosters curiosity, creativity, and active engagement in the learning process, encouraging students to take initiative and responsibility for their own academic growth	**Olivia Stage 2 CoP3 p83** *The best part when you talk about it being relatable was when we were making houses and stuff. do y'all have to do the inside? What are your requirements? And they answered yes ma'am. So is that shelter, cooking, sleeping. Like what are we looking for? What are your components? and they were like, yes, I guess cooking. so we went back to pictures, looked at the cooking and then to see them figure out, oh this is a real fire. They have a real fire, not a stove. that was really cute. and then the beds. What are they sleeping on? It was like bunk beds so that was kind of cool for them to go back and look at pictures and then related to how did they sleep? How did they cook?* **Farah Ip11** *They were sparking up conversations about it immediately about what they would do differently and how they wanted to make it even better… And they can bring in other disciplines on their own too. Like that math thing was on their own. One student finally said "I need a ruler. This is wrong. It is not gonna work." And once they realized that, they tried it and it didn't work, and they know what the issue was. I would ask, what are you going to do? to prompt them and then they would bring it in on their own.*

A priori #2: Teacher Identity

Theme	Subthemes	Codes	Definition	Examples
Teacher Identity Thoughtful, intentional pedagogical work linked to a thoughtful and intentional reflective examination of personal & professional perspectives, goals, attitudes, and areas for improvement or change (Stewart et al., 2021)	Fostering Open Discourse Using Asset-based Language	Attitudes	a person's feelings, emotions, thoughts, positionality, and mindset	All key teacher words **Julie I79** *I don't know if my teaching identity changed but my teaching philosophy definitely it changed the way I am going to use other disciplines in class. I wouldn't have ordinarily thought I could include science into my drama classroom. I was more fun and they became more inquisitive and they bought into the drama when I brought up astronomy.*
		Agency	Action, intervention, to produce a particular result or effect	**Rita CoP 3 p 90** *I think it's worked out good, the way we were able to schedule EIP this year along with our other intervention services and special education services it is still within that small group block time but we have more people. So each teacher had an EP teacher with her. and it sounds like that was a good thing that you were able to incorporate some PBL planning with two adults in the room. and kids were pulled out as well. Working on aspects but out of the room…That seems to work pretty well. and they were able to do any other PBL pieces during or throughout the day as needed. They had the autonomy with the scheduling too. Teachers were able to do what they needed to do and take as much time as they needed.* **Bertha I83** *I do have the autonomy to teach some things that I feel are important that may not be taught in the curriculum- social skills, responsibility.*
	Fostering Open Discourse Using Asset-based Language Refining Instructional Knowledge and Practices	Communication	Ways in which two or more people impart, share and receive info	**Connections**
		Shifts	Tensions, reflectivity leading to changes or shifts in approach to text selection, learners' needs, &/or instructional decisions	**Farah** *I think I'm just a mix of it. I don't think I have one philosophy. I do think this project and the way that I did, this general change is going to change the way I do things in the future. It has changed things about my teaching styles. As far as what, I'm not 100% sure. I know that throughout this process, it worked really well for me to let the kids be the experts. Even when they were doing their presentations, I would tell them, "You are the experts" of your exhibits…On the field trip, every question we asked the (guide), she knew the answer. For them it was taking pride that this is my thing, and I'm in charge of it. I don't think I had that mindset before…They were able to just run with it and take control within reason. I think it was very special. I mean was something they're going to remember especially when we do it for families.* ***s I87*** *We incorporated more books, collaboration. I do my thing normally. I might look at the teachers' pacing guides so I'm not going to start this person here…I'd rather do it simultaneously, but I don't necessarily collaborate with them and say this is what I'm doing or do you see an area of need? We do (did)not plan together (before)… Sometimes, I feel like we are just reading a book. The way the TDL coach presented it, there is so much you can do starting with the book and that can trickle down and you can fit so much more in there. Shift-looking at the value of bringing literacy into it.*
		Teacher leadership	Development to intentional promotion of high impact instructional strategies in all	**Polly** **Sonya I88**

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Teacher Identity Thoughtful, intentional pedagogical work linked to a thoughtful and intentional reflective examination of personal & professional perspectives, goals, attitudes, and areas for improvement or change (Stewart et al., 2021)			classrooms, high -quality multimodal learning	*I think this is something we need to embed in our beginning of the year planning. Not just the team teachers or grade teachers, but anyone who works with the kids neds to be part of that process that designing process so we can all say, this is our strength. We could all bounce ideas off of each other instead of coming in at the end of the PBL… as an afterthought.*
	Fostering Open Discourse Using Asset-based Language Refining Instructional Knowledge and Practices Curating Dynamic Learning Spaces	Collaboration (Constructivist to socio-constructivist to socio-cultural theory)	*New knowledge* constructed through personal experiences (Creswell et al., 2018); *reflecting* as individuals and groups to retain knowledge (Paulus et al., 2020); exploring how disciplines intersect and how people co-construct knowledge can shift perspectives about traditional methods of instructions; *action/revision*	**Diane and Nancy** *You like your planning and your collaboration and all of those things.?* *E: That has been super easy. We are both on the same page but I wish I had roped T in sooner but I guess I thought she was with other people.* *T: I was supposed to be with first grade. But it just kind of happened. Shutters went out on maternity leave and there was a big disconnect of communication.* *E: I wished I had asked her sooner. I know Deriso is working with Landreth too.* **Polly** *The kindergartners surprised me because what they were able to do with their projects. going from one teachers room to another teachers room there creativity was incredible. ideas that they have any any boundaries that I saw was more so with navigating communication among younger children. they have their ideas and they want to do their ideas and then they had to work on collaboration. communicating with each other and realizing that it's OK if we take his idea and then morph his with and yours together. and they handled that pretty well it's just that they had to see it and sometimes what would help would be if you modeled it with another teacher and saw that we both had ideas and go oh OK we can make this work.* **Elaine**
	Refining Instructional Knowledge and Practices Curating Dynamic Learning Spaces	Community of Practice (CoP) (Wenger, 1998; Ko et al., 2023)	Expert or emerging teacher leaders foster professional resilience through social interactions focused on a common goal (Su et al., 2020); examination of various educational theories across various disciplines provides support for the development and shaping of teacher practices	**Rita I54** *I think it's helped to have a common language with advisors with being able to support them through the planning process and knowing that and seeing how different grade levels are incorporating all the subject within the PBL and helping them use the knowledge in all the subjects and grade levels…it's helped me to see how to be a person who can help connect people…having that collaboration with teachers…* ***Sonya I84*** *It was just that time set aside. WE were all right here in the room and I can say like,, what are you doing? What does this look like before it's an afterthought. Before it was a parallel typed teaching, and they were doing something and I was doing something but we never met and communicated and worked together… but (with CoP) we had to be purposeful.*
		Planning	Period of time a teacher devotes each day (regularly) to design and organization of classroom learning activities	**Holly** *It was nice. so the planning part. Sometimes when it's a large group of teachers only one or two does the bulk and the others just follow along. but because everyone was responsible for their own little thing, everybody actually did their actual part. everybody's piece of the pie is an equal size. and everybody turn theirs in on time and we had a shared document.* **Sonya CoP1** *That's what we were talking about so then I was trying to meet with everybody else to figure out what theirs is going to look like because we share planning because it is easier. I don't have planning with k-1 or 2, so I'm trying to figure out like the basis of what they're doing but what it where did you end up deciding to go with it, what is your end goal results?* **Gail CoP2:**

				We were planning this project I think Tasha might have mentioned it to us and we were like let's see if we can do this and then we found out it was free and we were like yes let's do that. we are trying to do authentic experiences so making sure that it is not just oh I found this on Teachers Pay Teachers and let's do that but instead, we want to make sure it's things… Misty has done it before where they did a walk through but we haven't done it in conjunction with this project.
Teacher Identity Thoughtful, intentional pedagogical work linked to a thoughtful and intentional reflective examination of personal & professional perspectives, goals, attitudes, and areas for improvement or change (Stewart et al., 2021)	Refining Instructional Proficiency Fostering Open Discourse Using Asset-based Language	Perceptions about Professional Development	PBL with Gerlach TDL with Goodin SOR / Cox Campus/ LETRS training / Growing Readers training Student Engagement with Malcolm Mitchell	**Polly?** **p74CoP3 Bertha-** *I finished LETRS, Growing Readers was helpful, it makes them better readers so they are able to listen better… the comprehension because they're reading skills are better due to the curriculum. Their comprehension and communication skills are better…* **Carla-** *My phonics instruction is better and then you have to connect it all like she said.* **Bertha-** *The program that we're using has a lot of vocabulary and they are sued to new vocabulary so having another new word that goes along with that … just fits in. the Park Rangers were like conserve means to save and protect and now every story we read about an animal are we saving it? Protecting it? What are we doing? Every story has a new skill.* **Rita I57** *I think it helped re-solidify my understanding of PBL and remembering that it is about answering a question. It's about helping a need, looking for a need and solving for that need. It's student led and guide to solve the need in a real way.* **Sonya I84** *I was able to incorporate the literacy aspect that I don't think I always do and then having the time to sit down and plan and evaluate what you've done or collaborate with other people. I was able to filling in some holes that before I didn't realize. It was just me. I'm taking the Cox campus literacy course a and I happen to be on the vocabulary unit or lesson and with the bats with first grade. I incorporated some of those skills in that and it just kind of went right along with each other. Before I would have the word posted, but I wouldn't have a picture or use it in a sentence. It all kind of came together.* *Kathy* *I really enjoyed meeting with the other teachers because I wasn't just giving my thoughts. The other teachers were able to share input and we were able to collaborate. It wasn't' just me with my thoughts and my own ideas. I as able to reach out to the other teachers and learn what they were thinking too.*

A priori #3: Equity in Text Selection

Theme	Subthemes	Code	Definition	Examples
Equity Lens: Text Selection with attention to representation of student groups Ensuring that the texts chosen reflect a broad spectrum of experiences, backgrounds, and cultures; providing access to best outcomes for all learners	Curating Dynamic Learning Spaces Refining Instructional Knowledge and Practices	Authentic		**Rita I54** *I see that it allows for them (diverse learners) to learn from their peers. I see that it allows them to actually have a real-world experience and to see why they're learning is important. It builds in that ability to use what you are learning. It's not "sit and get" because it's applying it now and I think that's very important. I think it helps our struggling learners. Definitely.* **Bertha I80** *PBL- I gained ways to make projects more authentic. I like this idea and I tried to implement it in this unit collecting data, making observations to give them more ownership of their ideas and problem-solving.*
		Understanding and applying concept of equity lens	Defining equity in terms of access and outputs for students in classroom; tension that comes from reimagining how to reach diverse learners	**Elaine I71** *I have one (student with exceptionalities) in here who doesn't like to work very well with others. But surprisingly all the groups did work very well together. They didn't argue or fuss. They all participated but sometimes he would try to do his own thing…but I redirected him.* **Julie I78** *Marginalized? I would say it has more to do with socio-economics rather than skin color in my class but unfortunately some of that ties in together in our city…I 've seen the benefits of putting that "annoying kid" with a group of kids that he doesn't normally work with, ones that he doesn't normally feel comfortable with or they don't feel comfortable with…that annoying kid is annoying because sometimes they are from a poorer home or a home where they are getting neglected.* pI55 **Quinn CoP3 stage 2 84** *The kids who normally would have been left out, are the ones who have to sit by themselves, get overly excited, but no, even those children, they made sure that everybody made something – contributed – they did really good. I was very impressed.* **Laura** *I think that is the component that we don't always recognize. It goes beyond just the content standards and the basic planning. It's actually teaching the kids how to work in a group. That was one thing that I noticed in 3rd grade rooms, their groups had a variety of students who may not normally work together. or may not even be on the same ability level. So when they were grouped together, they each played a different role. they don't always know how to play.*
	Refining Instructional Knowledge and Practices	Paired texts	Selecting a fiction and non-fiction that have similar topics or themes	**Farah I10** *3rd grade: I think I tried to integrate more than I have in the past as far as their paired texts and reading in general, focus in on that aspect and how and where it could go. More reading than I did in the past. I think it's easy to put the two together*
		Types of texts	Considering, reviewing, selecting a variety of text types/features including but not limited to visual (posters, infographics,	**Olivia** **Bertha I83** *I liked the introduction to the books. A lot of them were older books that I remember reading and I had forgotten about them… the read alouds… I like being introduced to those books and reminded of those books. I made an emphasis more to include the books and stories that we*

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			pictures), artwork, music, realia,	*read and the way the illustrators illustrated the pictures from the books and how that could reflect in what their posters look like. How to get a message across and what's important about that communication when you want someone to understand what you are trying to say. So being very intentional about those connections.*
Equity Lens: Text Selection with attention to representation of student groups Ensuring that the texts chosen reflect a broad spectrum of experiences, backgrounds, and cultures; providing access to best outcomes for all learners	Refining Instructional Refining Instructional Knowledge and Practices Fostering Open Discourse Using Asset-based Language	Questioning definitions of new vocabulary	Asking for clarification for words like marginalized or diverse; emerging understanding of how it might change instruction; choice of words in classroom	Rita/ Tina **Betsy|I82** *Marginalized- the lower achieving students, the ones who were kind of struggling. They participated in this and I don't think that they were completely left out or didn't do anything. One of my really low students, and sometimes I can't get him to write one letter on a spelling test, was writing for that poster and drawing pictures and wanted to go hang it up. I don't think they were pushed out. It gave them a voice and something that they wanted to do. They were motivated to do this.* **Carla p69CoP** *They liked the slogan that the park rangers told them about… Leave no trace… and they wanted to share it with everybody. Park Rangers did a PowerPoint and showed them the logo with all the symbols and explained what they stood for the national park symbol shaped like an arrow head for the indigenous people the lake represents recreation, animals represent wildlife, plants represented the environment… so they went through all that (vocabulary) with then.*

#4: PBL

Theme	subthemes	Code	Definition	Examples
PBL Application of knowledge in which teacher prioritize and maintain literacy goals through contextualized instruction and inquiry-based methods of investigation (Dewey, 1916; Girvan et al., 2016); sustained empath building and development of social and civic skills across diverse groups of people (Alkhudiry, 2022)	Refining Instructional Knowledge and Practices Fostering Open Discourse and Growth Mindset	Assessment / Knowledge Acquisition	Variety of methods used to determine what student has learned (over a certain amount of time)	**I9- Farah** **Elaine I72** *2nd grade: We used videos from GPB, read alouds about regions, google slides, and research. They actually designed a presentation and kinda did that on their own. One student designed one and then everybody else wanted to design their own. They learned about that on their own. I was impressed by that. They learned how to do Google slides. They learned about doing research on their own so they could inset images of the animals, weather, climate or landscape. They had historical figures…They were busy concentrating and creating something of their won. That really helped to work together as a team and presented the project.*
		Innovative extensions	Use of (modern technology) and evidence-based information to disseminate knowledge/ authentic, original	***Carla/Bertha first grade CoP p67*** *I went through what ta PBL is and told them what that means and we've been talking about conservation…Theodore Roosevelt believed in conservation. We brought in Park Rangers and they talked about conservation…we did a tour of the school where they noticed things that needed to be taken care of in their environment so we started talking about things that we use every day and things that they noticed when they walked around the school and both classes brought up the whole plastic cup (waste) issue….they came up with the idea that we should just use one cup…they wanted to take it one step further to figure out how many in the whole school. They kept taking it further…so they came up with different presentation ideas and talk through it into every class like share we should do this and then we can… they like the idea of videos and posters so those are the things we are going to do to get the word out.* ***Gail I49 third grade*** *We decided after the PBL pd with Laura that we felt like we needed to make an adjustment because ours was coming across as more of an overarching project as opposed to a PBL. We adjusted our product so that instead of it being a presentation… we going to do it as more of a **museum walkthrough**… felt like it was more PBL way of going about it…we also talked about them creating more artifacts and things that they felt would represent their Native American regions and be more inclusive of the standard and of the comparison of different things.*
		Literacy (+ resources)	Read, write, listen, speak, with variety of text types	English, Landreth **Quinn CoP 3 p 88** *The only struggle with the research and stuff is that my kids the EIP kids that they are not performing on grade level so any science and social studies text or anything that they're having to read is a little bit more challenging for them. But with the teachers using epic and a variety of sources other than just picture books or just informational texts out of the room, it helped… I teach the grade level standards, but I either reteach (vocabulary, comprehension, fluency) what*

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		Innovative extensions	Use of (modern technology) and evidence-based information to disseminate knowledge/ authentic, original	***Carla/Betsy first grade CoP p67*** *I went through what ta PBL is and told them what that means and we've been talking about conservation…Theodore Roosevelt believed in conservation. We brought in Park Rangers and they talked about conservation…we did a tour of the school where they noticed things that needed to be taken care of in their environment so we started talking about things that we use every day and things that they noticed when they walked around the school and both classes brought up the whole plastic cup (waste) issue….they came up with the idea that we should just use one cup…they wanted to take it one step further to figure out how many in the whole school. They kept taking it further…so they came up with different presentation ideas and talk through it into every class like share we should do this and then we can… they like the idea of videos and posters so those are the things we are going to do to get the word out.* ***Gail I49 third grade*** *We decided after the PBL pd with Laura that we felt like we needed to make an adjustment because ours was coming across as more of an overarching project as opposed to a PBL. We adjusted our product so that instead of it being a presentation… we going to do it as more of a **museum walkthrough**… felt like it was more PBL way of going about it…we also talked about them creating more artifacts and things that they felt would represent their Native American regions and be more inclusive of the standard and of the comparison of different things.*
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	Refining Instructional Knowledge and Practices	Integration of disciplines	Two or more disciplines used during instruction	**Sonya I87 (1st grade: science, social studies, math, reading, writing, presenting, art?)** *With the bats, we did use some of the shape bats and we incorporated actual shapes and the tangram pieces and it showed you where the circle was the head and triangle for the ears. It was divided into actual shapes and there was another one that just and the overall shape and you had to figure it out based on which one you got. You were struggling with the more open*

PBL Application of knowledge in which teacher prioritize and maintain literacy goals through contextualized instruction and inquiry-based methods of investigation (Dewey, 1916; Girvan et al., 2016); sustained empath building and development of social and civic skills across diverse groups of people (Alkhudiry, 2022)				*ended one. So, there was differentiation when I found the shape it had two different ones…kids would get frustrated and I would say hang on, try this one and see.* **Elaine I75** *2nd grade: We were doing writing, reading, social studies, art, science with climate, and technology. My vision of it changed but it was still about the five regions of Georgia. I feel like we didn't have a problem to solve per se but they did the project and it was hands-on engaging and they learned from it.* **Isabella I49** *(Spanish/culture, math, history, music, geography, reading, writing) We did Latin dances. We focused on learning merengue because it is the easiest one. Where did it originate? So we had the maps and a geography lesson. I gave samples of music and dances and they had to rate each sample and see what their favorite kind of music was…It wasn't that there was a right or wrong answer, there was not wrong, it was about whatever they liked better. Everybody had a chance…I included "Drum Dream Girl" and we connected it to drumming, beats, and counting. They had to draw and write a sentence about what they could be if they could dream anything…We spoke about how the main character was from Cuba and parents were African and Chinese. We had actual drums, For older kids we talked about the history about where meringue originated. They had to talk about slavery, so I had to talk about slavery. The slave trade to the Dominican Republic which is different than to the US. It was a very different process and a different time. We went over the demographics of DR…most of the natives were killed…no one made jokes. It was serious topic. Not something to joke about…this is what happened.*
		Literacy-Background knowledge	Information essential to understanding a situation or problem	**Farah , field trip** **Gail I27** *I think we made changes in the types of books that we use. We used a lot of non-fictions before, but after we went to that PD about it, we used some fiction books. We found some folk tales and those kinds of things and so we combined our fiction and nonfiction…paired texts. We used to do a reading at the beginning and say this is some background knowledge for you this is a nonfiction text and then we would move on. Since we did the paired readings, we did use some throughout and I think it gave them a better background but it was throughout. It wasn't "said it and forget it."* ***Mary*** *Els can be marginalized but not really with this project because my students are highly intelligent. One of them was still struggle with knowing background knowledge. I guess we could say this…whereas we may have BK of the artic or igloo, snow and stuff, some from other countries may not have built that background knowledge. I had to … before they would go over it in class, we did something called doodle notes over the houses the clothing, and the tools for my one student but we did it together. It's not a language barrier (sometimes). It's really more like they really don't know a lot of this (already).*
		Skills across disciplines	Students using abilities and talents learned in one discipline to support learning in another discipline	**Alice I29** *I think because we planned for math and literacy to overlap but science kind of fell in there so the first couple of times I was pointing out and now I see the kids starting to say oh we talked about that when we were doing…They are making those connections which I think broadens their knowledge and helps them remember that for a longer period of time. It's not like they are*

				not just thinking… this is just science and this is just math. They are seeing how it all works together.
		Standards	Required or agreed level of quality of target learning objective within a discipline	**Olivia I38** *Their standard (3rd grade SS) was also the one that I taught in 7th grade. Seventh grade social studies standard, very similar. Using your environment and your resources. For like for them, it was using land, vegetation, their climate to get their food and their housing. So if you were in the Adobe housing they had clay so they also made a lot of clay pots and houses were clay. If you move to a region with a lot of trees, they made their houses out of trees, and use grasses to weave containers… third grade was more like living conditions for their home life where they seventh grade was more on a bigger scaled with producing and selling. But it was still the same environment and how affected how you live.*
PBL Application of knowledge in which teacher prioritize and maintain literacy goals through contextualized instruction and inquiry-based methods of investigation (Dewey, 1916; Girvan et al., 2016); sustained empath building and development of social and civic skills across diverse groups of people (Alkhudiry, 2022)	Curating Dynamic Learning Spaces Fostering Open Discourse Using Asset-based Language	Inquiry driven (sustained inquiry; *critical thinking)*	Triggering curiosity; active exploration, investigation; Rigorous, extended process of posing questions, finding resources and applying information *process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and evaluating info*	**P 36 Sonya** *First grade was doing conservation and I ordered stuff for butterflies and learned that we were looking at pollinators. I already had some nonfiction and fiction books so I bought some things to pair it with. One of the pages of the nonfiction book mentioned bats and how they are pollinators. The kids were asking how they were pollinators? I was like I don't know! So we wrote down "how are bats pollinators?" Then I started doing research and that led to a two-week unit on bats. I've never done that before in my life and we just kept going. It opened up a whole new world of things that I didn't know about bats and they didn't know….I couldn't have planned it better if we had talked about it a year ago and actively been researching. It just happened. Now we're on to bats!* **Betsy I82** *They had original ideas and communicating and talking to each other about something that they shared. It wasn't talking about this or that; it was like it built a community within our classroom that we were all working on this together and they could have a conversation about it. They had experiences that they could connect with it like the park rangers coming to visit and new vocabulary words that they had learned and connecting that to someone from history and connecting it to the United States.*
		Student engagement	visible investment in learning; attentive; level of interest and active participation demonstrated in learning process	**Elaine** **Quinn CoP3 p 86** 2nd grade: They (students) researched, and they illustrated what they were going to actually create and then expanded it with the PowerPoint. They're adding the writing component to it, but it was mainly social studies. They learn so much more I feel like doing the project then they would have if she just or if any of us would have just taught the standard by lecture. It was so hands-on. I was so impressed with the group participation. they all got along. One little girl, she worked three days trying to create a human to go on the coastal plain because they did a lot of the ocean animals for their project. Her clay dried out, the head fell off, she started crying and they – her group – took some of the animals off and told her OK now you create this. They made sure that she got to do part.
		Student Collaboration	One or more students working together to achieve an objective	***Laura: CoP3*** *I think that is the component that we don't always recognize. It goes beyond just the content standards and the basic planning. It's actually teaching the kids how to work in a group. That was one thing that I noticed in 3rd grade rooms, their groups had a variety of students who may not normally work together. or may not even be on the same ability level. so when they were grouped together, they each played a different role. they don't always know how to play those roles, so that was another component that went into it. there were a lot of… several of us were in there one day and it was a little chaotic, but I could hear each group, when a conflict would*

PBL Application of knowledge in which teacher prioritize and maintain literacy goals through contextualized instruction and inquiry-based methods of investigation (Dewey, 1916; Girvan et al., 2016); sustained empath building and development of social and civic skills across diverse groups of people (Alkhudiry, 2022)	Curating Dynamic Learning Spaces Fostering Open Discourse Using Asset-based Language			*arise, we would give different solutions, and step back, and the kids would agree that this is what we would do. That was very nice to see because a lot of times especially as an adult and I'm bad about it. If there's a problem, I just want to get in there and fix it. Let me do this to be quick with it. So, it was nice to have that time and to actually let them talk and work through problems and solve this.Oh, we did this together kind of thing. It shows a lot of growth for them.* **Laura CoP3 p88** *with that, what I meant was just playing the roles, the leadership, carrying out the different projects and making choices. I guess some of the disciplines would be the problem and solution of them having a conflict, hearing the best way to solve it. One group I was working with they were trying to build something and one of them wanted to use cardboard, but one of them wanted to use the sticks. and they could not decide what the wall should be, so we were looking at what they designed, and so finally they were like let's do the cardboard and put the sticks on the outside. so that worked out even better. things like that. as far as the standards they apply the different things from the research they had done from the read aloud and different books and things like that. One thing that was good was that they went on a field trip to the museum so a lot of them after that, they wanted to look up what things they see on the field trip that applied to their region. They were like we saw this in our region… and I saw a lot of that, reall wanting to tie back in what they saw in real life – Ocmulgee mounds - and apply it to their own work.* **Dianne CoP** *Our gifted learners are our (group) leaders and they have done their part with research to bring back to the other kids who may struggle with getting some of that information. So they developed that to bring back to them to present to them so they have facts. Then, I paired I tried to divide my groups where I will have a strong learner with a … i don't like to say lower or slower learner… a struggling learner… Ones with IEPs. I've got one who can barely talk. He won't be the one presenting because you can barely understand what he is saying. So that is how I have got them divided up. It is not like all my gifted learners are put together. Pretty divided up.*
		Work Ethic & Craftsmanship	a student's feelings, emotions, thoughts, and/or mindset pertaining to work ethic and craftsmanship	**I 10 M Farah** *When we presented it to the second grade and did our museum for them, they were very prideful. They wanted their stuff to look good and authentic. Going on that field trip was very helpful for them and seeing a professional doing and wanting them to do it and avoiding stereotypes. Things like that and I think have benefits for them and we are going to do it again for their families (celebration of learning).* ***Polly Interview*** *The kindergartners surprised me because what they were able to do with their projects. going from one teacher's room to another teacher's room their creativity was incredible. ideas that they have any boundaries that I saw was more so with navigating communication among younger children. they have their ideas and they want to do their ideas and then they had to work on collaboration. communicating with each other and realizing that it's OK if we take his idea and then morph his with and yours together. and they handled that pretty well it's just that they had to see it and sometimes what would help would be if you modeled it with another teacher and saw that we both had ideas and go oh OK we can make this work.*
		Student voice	Student openly states opinions and/or questions; interacts vocally with others in groups; speaks (up) to express thoughts	**CoP 27 Carla** *We're talking about identifying the basic needs of living things…like some of them accepted those basic things but then they wanted to argue other things like sleep and so we would talk about why it does fit for some living things but not for all. And then they just wanted to keep going and keep thinking and keep adding to it. So it's good*

PBL Application of knowledge in which teacher prioritize and maintain literacy goals through contextualized instruction and inquiry-based methods of investigation (Dewey, 1916; Girvan et al., 2016); sustained empath building and development of social and civic skills across diverse groups of people (Alkhudiry, 2022)				*because they were thinking about everything like that. Some of them were really interested in it.* **P76 Carla** *I feel like there is something for everybody. Like some really are into the butterflies and some are really passionate about the trash. Some really like these books… so some of them are more interested int pursuit of more knowledge than just reading something funny…I actually assigned them Epic because I collected some stories and pushed them out to them so they had them if they wanted to look at them…learning more and then some are happy to have more understanding but I think they all have something.* ***Kathy***

#5 Implementation barriers

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Theme	subthemes	Code	Definition	Examples
Implementation Barriers	Refining Instructional Knowledge and Practices Curating Dynamic Learning Spaces	Resources / Funding	Money available or set aside for teacher PBLs and professional development	Holly
	Refining Instructional Knowledge and Practices	Schedule	Calendar and timetable of events, activities, classes, planning within school (day,month,year); shifts, and unexpected conflicts and how they are addressed including weather related school closings	Connections Polly *I don't get to meet with Miss Hale or Ms. Peacock. Our plans do not align because it is during one of my small groups.*
		New literacy curriculum	HMH; school decision to purchase; lack of training	Betsy
	Curating Dynamic Learning Spaces	Staff	Any paid employee who works directly or indirectly with students at school; teacher related absences such as trainings, meetings, out of classroom	Farah with help, Carey with none
	Fostering Open Discourse and Growth Mindset	Student behavior	The way a student conducts oneself; toward others; emerging abilities to use PBL materials	I82 Betsy/Olivia/Diane
	Curating Dynamic Learning Spaces Refining Instructional Knowledge and Practices	Time	Unit of minutes; hours; days etc; interval; how teachers managed time for implementation of PBL unit	Gail I27 *(3rd grade) The timing I think the PBL took way too long and some of it was waiting on supplies and some of it was us giving them way too long on the writing part but so you know we intended this to last roughly a month and it ended up being two, so it kind of got the rest of our science and social studies off… we gave them way too long to work on things.* Diane

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