ABSTRACT

Title of dissertation: A WINDOW INTO MULTILINGUAL LEARNERS' WORLDS: HOW TO REDESIGN CURRICULUM WITH DIGITAL MULTIMODAL COMPOSITIONS TO PROMOTE ELEMENTARY STUDENTS' WRITING EXPERIENCES?

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This design-based research explores strategies to redesign scripted language curriculum with digital and multimodal components in two elementary English Language Development (ELD) classrooms to support multilingual learners' writing. This dissertation research also examines students' writing experiences in this digital multimodal learning space. For many multilingual students, writing class can be a space of exclusion when instruction and curricula do not recognize, understand, and invite their rich funds of knowledge. As a result, these students are often mislabeled as "disengaged" or "struggling". This exclusion is further reinforced by a restrictive, print-based notion of literacy and the pressure of language-focused standardized assessments, where linguistic development in English is the only focus. This conventional pedagogical approach to writing ignores students' diverse communicative repertoires. Ultimately, it creates an artificial boundary between "official" school writing and the authentic, multimodal literacies skills that students need to participate in the digitalized contemporary world.

However, there is a lack of multimodal curricula and instructional frameworks that value and highlight these learners' diverse knowledge and capabilities. Similarly, while standards like the Common Core promote digital and multiliteracies skills, in practice, they are often treated as

an “add-on” rather than an integrated part of academic learning, especially within writing instruction. Therefore, this research aims to explore how to redesign curricula in response to new technologies, validate multilingual learners' multimodal practices, and better support their specific learning needs. This dissertation research highlights digital multimodal composing (DMC) as a potential asset-based and fruitful writing space, where students can use their full semiotic resources, including visuals, audio, and spatial modes throughout the digital composing process. This research explores two questions: (1) what are design strategies for teachers to create a digital multimodal learning space despite the constraints of language-focused curricula and assessment pressure; and (2) How does this multimodal learning space offer multilingual students more learning opportunities?

This research is grounded in sociocultural theory to understand students’ learning process, and informed by third space theory, multiliteracies and multimodality, and culturally responsive/sustainable pedagogy to guide my curriculum redesign rationale and teaching practices with multilingual learners. This study involves a semester-long close partnership with one teacher to redesign a writing curriculum and implement DMC projects with 20 4th and 5th grade multilingual students. Data sources include daily class observations, instructional co-planning sessions, interviews and informal conversations with teachers and students, and artifacts collection (e.g., redesigned curriculum materials, students’ daily composing artifacts). This research not only identifies a framework for teachers to integrate digital and multimodal resources into curricula authentically but also highlights that such a learning space supports a more differentiated and collaborative writing process. It also deepens students’ meaningful use of multimodality to mediate comprehension, which ultimately promotes multilingual students’ writing experiences cognitively and cultivates positive writers’ identities.

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Chapter 1 Introduction

The development of technology in recent decades has greatly influenced teaching and learning in schools. Policy makers, researchers, and teaching practitioners are exploring the implications of how technology may reshape and facilitate the learning process, and what kinds of new skills need to be addressed to better prepare all students to fully participate in the society. In literacy education, these new developments have inspired teaching stakeholders to reconsider and expand the definition of reading and writing in this new context. Therefore, questions including how to go beyond the traditional approach of teaching discrete print-based literacy skills to respond to the new reading and writing genres brought by new technologies, how to update literacy instruction to serve students' various literacy practices mediated by new tools out of schools, and how to use the multimodal resources afforded by technology to support and enrich students' meaning making process, need more exploration.

Much prior research has demonstrated the complexity and benefits of teaching reading on digital platforms (Coiro, 2020); however, there is not much research regarding integrating multimodal resources and technology into writing curriculum in K-12 settings (Smith et al., 2021). Therefore, this research focuses on the potential of digital multimodal composition (DMC) as a newer approach to teach writing. The use of digital platforms can better invite multiple semiotic resources including visuals, audios, spatial resources (New London Group, 1996) in the process of writing. This research specifically focuses on multilingual learners' writing experiences when engaging with multimodality and digital tools, as well as explores strategies to authentically integrate multimodality into scripted language curriculum. Through the design-based research approach and multimodal analysis, this case study holistically tracks

multilingual learner's writing process and products through close observation, regular interviews, analysis of writing artifacts to understand how they navigate and draw upon multimodal resources to make meaning, what they aim to express through these multimodal designing choices, in what ways the use of multimodal resources support their learning of writing in English, as well as practices to implement digital multimodal compositions with multilingual learners in formal school settings with scripted curriculum and pressure of standardized assessments.

1.1 Statement of the Problem: Current Writing Instructions in K-12 Schools

For many multilingual students, schools are a space of exclusion where they come to be assimilated and walk away with negative and deficit labels about their languages, cultures, values, abilities, and identities (Flores, 2018). Especially in language and literacy classrooms, school writing instruction and curriculums disconnect multilingual students by spending little time on recognizing, understanding, and inviting learners' rich out-of-school literacy experiences (Marshall & Toohey, 2010). For a long time, it is not uncommon for these multilingual students to be labeled as disengaged and struggling writers because writing tasks disconnect them, they do not receive responsive scaffolding, or simply because their English proficiency for now is not able to fully express their rich ideas only in English (Delton, 2012; Hughes & Morrison, 2014). As such, there is an assumption that they are not ready to conduct complex writing before they are proficient in English. However, this mindset not only neglects the rich funds of knowledge (Moll et al., 1992) these students have, but also equates English proficiency to learning ability, which in the end will further push these emergent writers away from meaningful writing and self-expressing experiences.

Another feature of writing instruction and curriculum in schools is the "restrictive print and language-based notion of literacy" (Jewitt, 2008, p. 248). Many teachers hold the strong belief that linguistic development is the only key for L2 writing instruction (Harman & Shin, 2018; Lenters & Winters, 2013; Yi et al., 2020). Additionally, many teachers are under the pressure of standardized assessments to focus on print-based writing skills which does not necessarily take into account students' rich communicative repertoires. Therefore, teachers mainly rely on standardized, summative, language-focused approaches to assess students' writing progress (Yi et al., 2020). As argued by Yagelski (2021), this overemphasis on the correctness of the form of writing is a separation of the writing's content and writer's voice from its form. Schools actually value the form of texts for the purpose of evaluation, instead of caring about the meaning making process in writing.

Another critique of current school writing instruction relates to its authenticity. There is a boundary between writing that students (including multilingual learners) engage in out-of-school spaces and the "official" school writing (Marshall & Toohey, 2010). School writing does not take into consideration the already expanding territory of literacy (including multiliteracies, digital literacy, visual literacy) and newer writing skills that are critical for the participation in a multimodal, digitized contemporary society (Jewitt, 2008).

Although more and more literacy researchers now have called for writing pedagogies which center on multilingual students' "rich communicative palette" (Smith et al., 2021) to express their unique perspectives and understandings of the world (Pinnow, 2011), there is still a lack of this type of writing pedagogy and curriculum that highlight multilingual learners' voices, knowledge, and multiple capabilities that might not be valued in mainstream classrooms (Jensen & Nelson, 2022; Li & Akoto, 2021). Also, although various educational standards, such as Common Core State Standards, call for the attention to and promotion of multiliteracies skills

and digital literacy skills in content areas to foster 21st century learners, these skills are still perceived to be a separate part or an add-on to academic learning, instead of a natural and integrated part of the learning process (Hafner & Ho, 2020; Ramos & Musanti, 2021). Not to mention integrating these skills into writing classrooms. The breakout of COVID-19 pressed the "reset" key of the school curriculum (Ladson-Billings, 2021), which further shows the importance of technology and multiliteracies skills in contemporary education. Therefore, the problems of how to innovate school curricula that align with the development of technology, respond to multilingual learners' rich everyday multimodal literacy practices, and better address multilingual students' learning needs should be further explored.

In order to address these problems, this dissertation research highlights digital multimodal composing as a potential asset-based writing space to understand in what ways this type of writing activity can support multilingual students' writing engagement and progress and to explore effective practices that can integrate and facilitate digital multimodal compositions into regular school curriculum to sustain this learning space.

Scope of Research

Multilingual learner is an inclusive term for diverse learners who are developing multiple language (varieties) and literacy skills at the same time. However, this research will mainly focus on one subgroup of multilingual learners – students whose home languages are not English or marginalized varieties of English, and are developing English language proficiency through formal school instruction in the United States. Therefore, students who are receiving ESOL/ ELD support in their school are the main focus of this study.

In addition, multimodal composition does not necessarily need to be digital, although technological tools provide huge potentials for inviting students' full semitic resources for making meaning (Hafner & Ho, 2020). However, this research only focuses on multimodal

composing activities that integrating digital tools instead of art-based projects or non-digital version of multimodal composition, because one of the goals of this research is to understand how learners engage in exploring, navigating and drawing upon their prior knowledge relating to technology, and the implications of this experience in updating writing curriculum and instruction in schools.

Research Questions

This dissertation research has two research questions:

1. What are some design strategies to foster a multimodal learning space in elementary English language development (ELD) classrooms?
2. How does this multimodal learning space offer multilingual students more learning opportunities?

1.2 Positionality Statement

I am a Chinese English bilingual student, a former English language teacher working with K-12 multilingual students with various cultural and linguistic backgrounds. Being both a multilingual learner myself and a teacher of multilingual learners give me a special and valuable insider perspective of challenges multilingual learners often encounter, as well as the eagerness and resilience we have in academic space. This understanding and everyday experience greatly influenced my interest in exploring pedagogical approaches to support multilingual learners, which in the end led to this dissertation topic. My passion and goals to promote a more effective and authentic multimodal language and literacy education stem from my own frustration of many moments of "not understanding" and confusion about what people are saying and writing. Despite always receiving high scores in standardized language assessments, I still often need to

rely on non-linguistic resources to have more "clues" of information. I am, as many others, so adroit at figuring out information by drawing upon pieces of clues to map out the whole picture. Multimodality for me is to bring the skill, the practice and those clues back to classrooms legitimately as part of the natural learning process.

At the same time, I also recognize the differences between me and most multilingual children I worked with in this research project, despite our shared identity as language learners and our shared goals to make progress in language and literacy learning. I didn't grow up in this community which means I was an outsider of the learning community of my dissertation. I didn't have any relationships with principals, teachers and students before I entered into this community. This community outsider identity often fought with my multilingual learner insider perspective, which shaped many of my decisions in the dissertation process to do, or not to do something, to challenge or not to challenge (for now). Therefore, this is not a top-down, out-of-context educational intervention, but a negotiated and collaborative journey with teacher and students for a unique multimodal learning experience. My identities as a new researcher, a co-teacher, and a doctoral student who was experiencing dissertation-research and writing often led to different voices in my mind throughout the whole process. There were many times I chose to listen to my inner voice of a doctoral student who had fear of losing this hard-earned research opportunity, instead of following my researcher's expectations to push the boundary more. However, as I obtained more trust from the teacher and students and gradually built up a stronger classroom insider identity, I started to feel more comfortable and confident to enact the call from my researcher's mind to move one step forward.

Because of these authentic negotiations of my various identities and the experience of building up close and trustful relationships with teachers and students in the space, the direction

of this dissertation was out of my expectation and out of my imagination in the end, making it a unique adventure for me to continuously grow as a novice researcher.

Chapter 2 Literature Review

This chapter aims to explore what prior research found about: (1) the potential of digital multimodal compositions in writing instruction for multilingual learners; (2) how prior researchers define and interpret multilingual learners' writing progress during and after doing multimodal composition projects; and (3) how researchers and teaching practitioners designed and implemented multimodal composition projects.

In this chapter, I start from defining key terms and foundational theories relating to multimodal compositions and writing of multilingual learners. Then, I present how I identified articles related to my research topics. Specifically, I reviewed research articles that attend to multilingual learners' digital multimodal composition experiences and learning outcomes to have a deeper understanding of the effectiveness of digital multimodal composition in supporting writing engagement and development. Additionally, research that discusses teaching practitioners' perspectives and instructional details were also reviewed. I end this chapter with implications of prior research on my research design and considerations, identified gaps in research and practices, as well as in what ways my dissertation research built upon prior knowledge to further address these gaps.

2.1 Definition of Key Terms

In this section, I defined key terms related to my research topic, based on how they were used in prior research.

Multilingual Learner

There are many terms and labels describing students who are learning and developing English proficiency in schools, including limited English proficiency (LEP), English language

learners (ELL), English learners (ELs), and learning English as a second language (ESOL) students. Although frequently used in federal and state documents, García et al. (2008) critiqued the use of these labels, because these labels take a deficit-oriented perspective by emphasizing what a learner is lacking, and position English as a superior language (variety). Building upon García et al.'s (2008) idea that "English language learners are in fact emergent bilinguals" (p. 6), Souto-Manning (2016) claimed that the change of terms from ELL or LEP to bilingual or multilingual students is a sign of a "paradigmatic shift" (p. 265) which highlights learners' potential and funds of knowledge, as well as has important implications for moving towards a more affirmative and equitable education.

Thus, I use the term "multilingual learners" in this proposed research, which is defined as young people who are developing more than one language (varieties), because it is the most inclusive term which presents the diverse nature of these students (Meyer et al., 2020). Although the scope of this research is limited to students who are receiving ESOL support in their school, in the literature review, I included several research articles which focus on Black and Native American adolescents' multimodal composing experiences because these students are multilingual students whose language varieties should be justified and affirmed as they develop the language of instruction in schools.

New Literacies and Multiliteracies

The definitions and orientations towards "literacy" keep changing and developing. Street (1984) posed an "ideological model" of literacy which contrasts the long-held "autonomous model" of literacy (pp. 1-2). According to Street (1984) the autonomous model views literacy as decontextualized, isolated, independent variables relating to economic development and abstract cognitive processes, which implicitly privileges some practices as "literacy" while ignoring the different literacy practices in different cultures. In contrast, the ideological model of literacy

recognizes the social and cultural contexts of literacy practices. This new perspective of literacy takes a critical role in The New Literacy Studies (NLS) which contain a body of interdisciplinary work which shares the same sociocultural view on literacy that people not just read and write "in general", instead "they read and write specific sorts of texts in specific ways" (Gee, 2015, p.36). A later related movement of "New Literacies Studies" further expands the scope of literacy as more than print literacy, with a specific focus on digital literacies and the influence of pop culture on literacies practices (Gee, 2015, p. 44). Baynham and Prinsloo (2009) also called this as a third wave of NLS. Lankshear and Knobel (2007) specifically discussed what is "new" in new literacies. They believed that new literacies have both "new technical stuff" and "new ethos stuff" (p. 7). Therefore, the concept of new literacies is not only about having access to new technological tools; instead, the core is how the use of new technical stuff changes the old mindsets and "enable[s] people to build and participate in literacy practices that involve different kinds of values, sensibilities, norms, and procedures" (p. 7).

Scholars in the New London Group (1996) call for the pedagogies of multiliteracies which also challenge the narrow and autonomous definition of literacy as print-based technical reading and writing skills (Street, 1984) and recognize the authentic and changing literacy practices in a more culturally and linguistically globalized world. However, the goal of multiliteracies pedagogy is not to demean traditional literacy, but rather to decenter its long-held prestige in literacy education (Burke & Hardware, 2015). The pedagogy of multiliteracies is a process leading to innovative and transformative literacies practices, instead of reproducing whatever is provided by teachers (Cope & Kalantzis, 2009). Multiliteracies emphasize the abilities to understand, interpret, critique, and create texts, both print-based texts and multimodal texts such as images, videos, and audios. According to the New London Group (1996), learning is a designing and redesigning process, so that students are designers who should be able to draw

upon all semiotic resources they have to make sense of texts and construct meaning. Leu et al. (2017) argued that the necessity of preparing and encouraging students in developing new literacies skills is that "to be literate tomorrow will be defined by even newer technologies that have yet to appear and even newer discourses and social practices that will be created to meet future needs" (p.1). Therefore, recognizing, embracing, and responding to social changes and social realities should be the core in literacy education.

Both New Literacies Studies and Multiliteracies aim to respond to the new social, cultural and technological changes to expand the territories of literacy and shed light on new literacy education frameworks, pedagogies and approaches.

Multimodalities

Bezemer and Kress (2008) defined modes as "socially and culturally shaped resources for meaning making" and each mode has "different modal resources" (p. 171). For example, image is a type of mode, and images have multiple modal resources such as "font, size and framing" (p. 171). Therefore, a social semiotic perspective of multimodality (Kress, 2000; Kress & Van Leeuven, 2001) draws attention to the affordance and limitations of each mode, and "how those modes contribute both separately and collectively to multimodal ensembles" (Grapin & Llosa, 2020). Multimodality is also one of the important features of multiliteracies practices, which focuses on integrating resources such as visual, aural, sensual, spatial with linguistic elements to convey richer and more complex meaning (Copes & Kalantzis, 2009; New London Group, 1996). Engaging in multimodal meaning making is natural and common for many culturally and linguistically diverse students. For example, the literacy of Kiowa people is highly dependent on storytelling and listening (Jackson & DeLaune, 2018), and the core of Navajo literacy involves ritual performance and interpretation of sand painting (McCarty, 2013). Latinx children in Ghiso's (2016) research revealed their daily engagement in storytelling and bilingual visual texts

in community space such as the laundromat. These daily multimodal practices relate to the ideological orientation towards literacy (Street, 1984), which emphasizes the sociocultural contexts of literacy. These examples also demonstrate that literacy itself is multimodal instead of fully relying on written expressions. However, this truth is often ignored and devalued in schools where teachers are pressured into adopting "reductive literacy" (Harman & Shin, 2018, p. 2; Marshall & Toohey, 2010). Tan et al. (2020) also argued that schools only see and privilege a certain type of modalities, which leads to the stifling of other multimodal modes in the meaning making process.

Multilingual Writing

The focus of this literature review is multilingual students' writing development. Therefore, there are also some key terms relating to multilingual learners' translingual language use, which is common and natural in their oral and written communication, that need to be defined. There are many terms used to discuss the phenomenon of hybrid use of multiple languages, including codeswitching, translanguaging, and codemeshing. For the scope of this literature review, I will only focus on these three terms instead of many other related terms such as plurilingualism, flexible bilingualism, heteroglossia, because these three are the most commonly used in articles identified for the topic of this literature review and are commonly used in the applied linguistic and education fields.

According to Velasco and García (2014), one of the defining differences between codeswitching and translanguaging is the view of multilinguals' linguistic systems as a unitary one or separate. The codeswitching perspective believes that multilingual learners have separate language systems (codes), and they "switch for communicative purposes" (p. 7); whereas the translanguaging perspective emphasizes multilinguals draw upon one integrated linguistic system for appropriate communication resources.

The fluid use of multiple languages can happen not only in speaking, but also in writing discourse (Canagarajah, 2011). Teaching writing to multilingual learners is not giving tools, voice, and freedom back to them; instead, it is using classes as space where multilingual students deliberately work on language that "they are already inevitably and necessarily engaged in" (Horner & Alvarez, 2019, p. 21). Velasco and García (2014) recognized the complexity of writing and believed that translanguaging is beneficial to multilingual learners. They found bilingual students adopted translanguaging strategies and multimodalities in the planning and drafting stages of writing to facilitate the thinking and expressing process, to dig deeper into the exploration of writing topics, and to achieve rhetorical purposes such as engagement. Similarly, Canagarajah (2013) argued that multilingual learners actively adopt "intuition, perception, and imagination to co-construct meaning"; however, autonomous orientation of literacy, which is prevalent in formal schooling, "connect literacy to rational processes, devaluing the engagement of other senses" (p. 44). Thus, Canagarajah (2011) used the term "codemeshing" to describe the process of "mixing communicative modes and diverse symbol systems" (p. 403). Codemeshing differs from translanguaging and codeswitching in that it goes beyond the use of different languages, and emphasizes using both full linguistic repertoire and multimodal resources for communication. Canagarajah (2013) defined codemeshing as a form of writing which creates hybrid texts for voice (p. 40).

In sum, these different approaches and terms all help educators recognize the natural, creative, and deliberate language practices which can be different from monolinguals. Additionally, these lines of research recognize and justify multilinguals' fluid use of full semiotic resources in communication.

Multimodal Writing/ Compositions

The expanding scope of literacy to "literacies", the recognition of the importance of multimodalities in different cultural groups' communication, and goals of much prior research to justify multilingual learners' creative language use, all lay important theoretical foundations for a more flexible, and newer approach towards writing education for multilingual learners.

Being a proficient reader and writer in contemporary life is different from decades ago because the ever-changing technology has dramatically changed the literacy practices students engage every day, which propel educators to rethink what literacy skills we need to prepare our students in this context (Copes & Kalantzis, 2009). New London Group (1996) asked educators to think about what an ever-changing society means for literacy pedagogy. Yi et al. (2020) also asked the questions of "what counts as writing? What counts as texts?" (p. 1), especially in this technology-prevalent society. For example, Ghiso (2016) interpreted writing as "beyond a linguistic artifact". There are new writing genres such as "webpages, wikis, blogs, emails, fan fictions, videos, podcasting, and virtual gaming" (Brown, 2015, p. 153). These new genres which are prevalent in the contemporary world should be included in literacy instruction.

Although multimodal composition does not need to be digital (Hafner & Ho, 2020), the potential of technology and students' engagement in digital literacies practices, especially in this post-COVID era, open new opportunities for rethinking and redesigning our traditional writing instructions. This also relates to the emphasis of 21st century skills in many policies and educational standards (e.g. CCSS) to prepare all students, not only multilingual students, to be able to understand the affordance and limitations of different modes of representations in different disciplines, know how to translate between various modalities and be adept at "synaesthesia" and "orchestration" of different meaning representations (Copes & Kalantzis, 2009; Kress, 2000; Kress & van Leeuwen, 2001).

With all these new changes and the call for a more asset-based writing pedagogy for multilingual students (Kennedy et al., 2019), traditional writing instruction which solely focuses on print-based skills (e.g. vocabulary, syntactic structures) neither center multilingual students' full semiotic resources, nor prepare them for learning contemporary writing skills. As such, in order to support multilingual students in authentic and meaningful writing development, multimodal composition can be one way to motivate and engage these students. Multimodal composition means students strategically and coherently use both linguistic and non-linguistic modalities to construct meaning in their writing products (Smith et al., 2021). Multimedia posters (Hughes & Morrison, 2014), digital storytelling (Turner, 2011), podcasts (Smythe & Neufeld, 2010), and memes (Nguyen et al., 2022) are all examples of multimodal composition projects.

2.2 Digital Multimodal Composition and Writing Development

In order to answer the questions about the potential of digital multimodal composition in helping multilingual learners to engage in and continuously develop their writing, and identify practices related to implementation of digital multimodal composition activities, I found four main themes from prior literature: meaning making flexibility, new understanding of literacies, construction of multiple positive identities, and entry points for teacher scaffolding.

Theme 1: Meaning Making Flexibility

Prior research found that multimodal composition activities can help multilingual learners' make progress in writing because it encourages students' full semiotic repertoire across language and across modalities to construct meanings.

Embracing multimodalities in the writing process creates many entry points for students whose English is not yet proficient, into writing tasks (Smith et al., 2017; Vasudevan et al.,

2010). This often leads to greater motivation in writing and confidence to participate in school learning activities. For example, Vasudevan et al. (2010) found that Michael, a disengaged writer in school, gradually became an active storyteller and motivated to share his writing in the "building speak" project. The student enthusiastically shared photos of his home and drew upon his life experiences to explain in his writing why these photos represent important stories in his life. Similarly, In Linares's (2021) ethnography research of refugee students' journal writing, the author found rich translanguaging practices, which is defined as the hybrid language practices of bilinguals to draw upon their full linguistic repertoires to "select features that are socially appropriate for the academic or communicative task at hand." (Velasco & García, 2014, p. 8); and efforts of students using drawings to elaborate their simple English sentences. When the students kept getting positive feedback from the teacher and realized their multimodal composition and ideas were valued, they devoted more time to writing the multimodal journal not only as a way for practicing English but also a place to convey feelings and experiences. Therefore, being able to write beyond English words contributes to students' "academic risk-taking" and "emotional risk-taking" (p. 687), which shifts the sole focus on correct grammar to content of the writing.

In addition to creating more opportunities for participation in writing, by allowing "a range of semiotic possibilities" to express ideas, multilingual students are able to express more sophisticated ideas compared with only writing in English (Black, 2005; Bunch & Willett, 2013; Hughes & Morrison, 2014). In Johnson and Kendrick's (2017) case study, they found doing digital storytelling helped a student from refugee background, Yaqub, convey more nuanced and difficult affective messages such as struggling experiences. For example, Yaqub talked about how he could not fully express his desperate feeling on the way of escaping from a war merely through written language; instead, he added background music and a picture of a man walking on

a desert to make readers feel his desperation. Additionally, compared with traditional essays, multimodal composition makes writing more real to both writers and readers. Students who made podcasts in Smythe and Neufeld's (2010) ethnographic research shared that they frequently experimented with different sound effects to convey "the right mood" to audiences which made them create more real stories. Jensen and Nelson (2022) used the term "humanizing essays" to describe how different semiotic resources can be combined to better convey students' voices and achieve the writer's rhetorical purposes.

This advantage is not only evident in language art classes, but also in other content areas writing and learning, such as science. Grapin and Llosa (2020) found students frequently used models in science reports to complement their scientific explanations. An example from Shin et al.'s (2020) research revealed one student was engaged in revising his draft of science explanations to make it more credible. What the student did was integrating a model which clearly visualized the greenhouse effect he was trying to explain. This example also echoes Britsch's (2020) idea that multimodal composition may open up possibilities of "observation, interpretation and language use" in scientific discourse because nonverbal representations are an important part of science learning (Tippett, 2011).

Lastly, thinking and writing across modalities provide new venues and multiple perspectives for multilingual learners to negotiate meaning and improve their understanding of texts, which lays the important foundation for their later writing. For example, in Early and Marshall's (2008) study, students talked about how they purposefully read the text multiple times and took advantage of multiple visual resources in order to have a better sense of how to do the multimodal composition project. Multimodal composition opens more entry points for multilingual students to access content knowledge from multiple perspectives and with tools familiar to them (Ronan, 2014; Smith et al., 2017; Tippett, 2011). In Smith et al.'s research

(2017), they found out that many multilingual students needed visual representations to support laying out and organizing their ideas, and then used these visual tools to further elaborate their ideas in written language. They used images as "road maps" to achieve their expression goals. One student mentioned that she felt her "brain doing more stuff" when she tried to make a slide introducing her hero, compared to writing a paper essay. Thus, students have more opportunities for understanding, deep thinking and organizing thoughts in the process of multimodal composition.

Implementing multimodal composition is not to deny the value of traditional text-based form of writing activities, but inviting more new possibilities for multilingual students to make meanings (Brown, 2015). Prior research demonstrates multimodal composition provides students more flexibility in the meaning making process. This not only makes writing activities more inclusive for students who are still developing their biliteracy skills, but also help these students to use any resources at their disposal to express complex ideas.

Theme 2: New Understanding of Literacies

The second way that digital multimodal composition activities can help multilingual learners' engagement and development in writing is to justify and build upon learners' daily writing experiences out of school, and expand students' understanding of writing skills (beyond the print-based writing skills) that are critical in the contemporary world. Therefore, digital multimodal composition supports the development of writing skills that are not only valued in schools, but in real-world contexts.

Multimodal composition extends the definition of writing as more than print-based skills, which justifies multilingual students' rich multiliteracies resources and knowledge. Educators need to pay close attention to the social reality of our multilingual students who already live in a

modality rich world, and make these multimodal resources more "visible and intentional" in writing (Canady et al., 2020). For example, Ghiso (2016) documented in her ethnography rich translinguistic and transmodal literacy practices happening in laundromat space by analyzing photos taken by students. Leu et al. (2017) emphasized that developing technology has already changed students' daily literacies practices and will keep redefining what being literate means in the future. Luke (2003) called these multimodal texts students are engaged in everyday lives as their "first curriculum" (p. 398) which are starting points for them to understand the world around them. However, schools often ignore the knowledge and daily literacy practices of multilingual students and abide by narrow definitions of legitimate institutional practices (Marshall & Toohey, 2010), which stifles multilingual students' creative and critical interaction with the world. This print-based approach to writing education conflicts with the newer perception of writing as "beyond a linguistic artifact" (Ghiso, 2016), and writing being "a vehicle to a deeper, more nuanced sense of ourselves as beings in the world" (Yagelski, 2021, p. 15), as well as not responds to and builds upon students' literacy skills already learned from their "first curriculum" (Luke, 2003).

Multimodal composition is an example of inviting multiple literacies into the classroom, which leads to new understandings of legitimate literacies practices in schools. This new understanding can become a third space (Gutierrez, 2008) where multilingual students can draw upon their full literacies repertoires to express themselves in writing and to understand their world critically. For example, students in Marshall and Toohey's (2020) research recorded and brought in stories of their grandparents who immigrated from India to the classroom. They used these stories to make picture books, generating opportunities for difficult talks about religious difference and violence, which were topics not touched upon in standard curriculum in schools. Honeyford (2013) observed one student Gabriel in her research creating a digital story about his

name. She found Gabriel used a Latin American way of narration which poetically waved imagination and reality together. His unique way of narration and adroit conveying ideas through several other semiotic resources diverged from standard narrative structures taught in school, but opened the space for communicating his cultural identities in a manner that can best present his own “experiences, dreams and social critiques" (p. 24). Therefore, bringing in cultural and linguistic resources of multilingual students, contribute to these students’ critical thinking skills, challenge hegemony of Cartesian worldview which separates out-of-school funds of knowledge with school education (Yagelski, 2021), and make writing a space for “negotiating, resisting and combating the dissonance of these (their) worlds.” (Flores, 2018, p. 4).

In addition to redefining writing, Canady et al. (2020) asked educators the question “what does it mean to be writers and composers in the contemporary world?” The question points to the fact that decoding and encoding skills are not enough anymore, and five paragraph essays are not the only way to make arguments in the real world (Jensen & Nelson, 2022). Understanding, interpreting, creating and hybriding different semiotic representations are important skills. Therefore, multimodal composition supports contemporary writing development also because it opens the space for multilingual students to learn, explore, and practice multiple literacy skills (such as critical literacy, digital literacy) which they are able to use beyond school walls. Students in Turner’s (2011) research engaged in digital storytelling projects about hip pop writing for social justice, because they believed the critical media literacy skills they learned in the process were applicable for their daily experiences. Similarly, students in Smythe and Neufeld’s (2010) research found that students were motivated in the process of making podcasts. They frequently reread, revised, and evaluated both their written scripts and orchestration of multimodal resources to make sure they are conveying their stories to audiences in an authentic way. In the interview, students talked about how they not only built up their confidence in print-

based narratives but also learned multimodal skills they valued and wanted to apply to out-of-school lives. One student in the study of Canady et al. (2020) revealed that in the beginning she positioned herself as a "media outsider" and she was anxious to do the digital multimodal story writing in the beginning. However, this experience in the end made her not only feel more comfortable using multimodal tools in writing but also helped her realize how multimodalities both enrich and can convey the same message differently.

Multimodal composition not only can include multiple literacy skills but also connect school writing experiences to authentic real-life related writing practices. For example, Castek et al. (2018) invited multilingual adolescents who were interested in being engineers in the future to write their design journals. Their journals were full of models and images besides verbal descriptions of their design decisions because the discipline of engineering requires multimodal representations to fully present works. This writing experience freed students' in experiencing and exploring their aspired careers and helped them understand how multiple literacies were important in their future careers. Thus, excluding multimodal parts, learning experiences will be less authentic and less connected to reality, especially this knowledge will be applied to these students' imagination of their future selves.

Lastly, multimodal composition places "new cognitive demands" for students and it requires more literacies skills compared with writing a traditional essay (Smith et al., 2017). As demonstrated in Smith et al.'s study, instead of layering different modalities in a linear way, students were doing "multimodal codemeshing" (p. 7) when they brainstormed and negotiated modal choices iteratively. By observing focal students' screen recordings when they were creating slides for the "My Hero" project, researchers found all students present varied and unique ways of traversing and hybriding texts, images, sounds, transition effects to make their writing project coherent and holistic. One of the students, Yuliana, said she felt she was "doing

more stuff" and using more skills than writing an essay in the process (p. 14). Similarly, Doering's et al. (2007) argued that writing in the digital era is more than "what one wants to say", but "how one wants to say it" (p. 43), multimodal composition can be the space for students to explore and practice not only traditional writing skills but also skills that can support them better express themselves in the world full of different multimodalities.

In conclusion, all these studies point out that writing education should take into consideration the continuous development of writing and changing definitions of what counts as legitimate writing in schools, and how writing experiences can be authentic and relate to students' needs in contemporary life.

Theme 3: Construction of Multiple Positive Identities

Digital multimodal composition also supports multilingual learners who are often marginalized and disengaged in school writing class to build up stronger agency in writing. Culturally and linguistically diverse students are often considered as having disadvantages in literacy learning, and their unique insights are devalued in schools (Duran, 2017; Li, 2016). Different from this deficit perspective, much prior research demonstrates that digital multimodal composition helps multilingual learners establish positive writer identities which disrupt the negative images constructed by schools (Li, 2016).

Multimodal composition supports positive writer identity because it takes on an asset-based perspective on multilingual writers' writing progress and helps students position themselves as capable writers and knowledge holders, which also closely connects to writing motivation. For example, in Hughes and Morrison's (2014) case study, multilingual students were engaged in creating different genres of digital poem writing and sharing with peers through collaborative social media. They found that allowing multimodal resources in writing products

not only honors students' multiple abilities including technological skills but also makes writing a less daunting task because "all students were on an equal literate footing" (p. 623). In the interview, two students, Benji and Farrah, shared that they were able to better present themselves to peers and teachers in this way. Their perceptions of themselves as creators and critics of writing artifacts lead to their stronger motivations to participate in interaction with peers, which further supports their English proficiency development. Vasudevan et al. (2010) implemented several multimodal projects which help students rethink and reimagine the composing process. They found that one of the students, Saima, a previously shy and silent newly immigrant girl in class, gained a louder voice by "speaking" with images, music and her narration together in her digital storytelling project. Saima was more visible in class and found her own way of contributing to class discussions. Similarly, Korobkova (2017) found students in her research started to perceive themselves as "successful producers of different types of texts" and "adept communicators" (p. 47) due to their new understanding of writing through multimodal composition activities.

In addition, Kennedy at al. (2019) emphasized that multimodal literacy practices are especially beneficial to emergent bilingual students to "wrestle with, complicate, and express their emerging identities. (p. 60)" In their research, multimodal composition becomes a healing space for students to navigate and figure out their senses of social belonging. For instance, Grace, a 4th grade Chin girl who came as a refugee wrote in her journal about her response after watching a video of an immigrant youth's experience in New York city. She related her own experience to the story of the teen and explained her understanding of bicultural identities not as replacing one culture with the other. Similarly, students in Danzak's (2011) research had a deeper understanding of their group identities in the process of interviewing family members and creating comics about their immigration stories. They wove voices from their families in their

writing and provided authentic insights for people outside of their group to better understand their stories. Writing like this leads to self-exploration and self-expression, and "self-expression can lead to self-love." (Lee et al., 2021, p. 28).

Several prior research studies demonstrate that multimodal composition can be a transformative space where students can bring real-life impacts through their writing (Lee et al., 2021). Through multimodal composition experiences, youths actively take on the role of advocates for their own communities and for people who are silenced or misleadingly depicted. For example, in Honeyford's (2013) library project, a group of 7th and 8th grade Latinx students identified the issue that the public library in their community provided limited access to Spanish materials. They engaged in interviewing people in their community, writing up their research as a presentation to the public library board, and redesigning the library website by adding Spanish translation and signs for local people to find information easier. These students agentively used their "in the middle positioning" (p. 68) and their bilingual and multiple literacy skills to advocate for the needs of their own community. As the researcher said, their writing was not only for the library board, but also for broader audiences to call for justice and inclusiveness.

Many multilingual adolescents also use multimodal composition as counter storytelling, which was defined by Solórzano and Yosso (2002) as "a method of telling the stories of those people whose experiences are not often told… a tool for exposing, analyzing and challenging the majoritarian stories of racial privilege (p. 32)." Hull and Nelson (2005) emphasized that students were experts and powerful communicators of their communities, and multimodal composition projects such as digital storytelling amplify these youths' voices to broader audiences. In their research, they highlighted and dissected a student, Randy's, digital story. They found Randy's multimodal decisions such as the choice of background music, the displaying of title and subtitles, as well as his purposeful selection of pictures of iconic figures, conveyed his self-

reflection of his life struggles and social critique beyond his writing, and created a more inviting space for audiences to reflect their own lives with him. Tommy, in Curwood and Gibbons's (2010) research, created a digital poem to push back master narratives about race and sex orientation, and reclaimed his own identity as an Asian American queer youth. The use of multiple modes in his iMovie video vividly presents his true feelings of "being twice below other citizens (p. 73)", while at the same time strategically relieving the tension raised by his video. Youths in González Ybarra's (2022) research drew upon immigrant stories of people in their community to create a testimonio with a photo collage. Their writing helped people in the community to see themselves and their diverse and authentic stories being presented, countering the "meritocratic American Dream narrative (p. 993)". This same group of youth also carefully designed the gallery page of their community website by highlighting photos of achievements, excellence, and joy happening in their community as a way to speak back to negative descriptions about them from outside.

All these students demonstrate that writing can take different forms, and multimodal composition amplifies the messages conveyed by these students in a more powerful way. As Barnes and Tour (2023) argued that digital multimodal composing can help students "(re)code existing power dynamics" and allow for opportunities to engage in critical literacy (p. 106), these multilingual students' multimodal composition experiences documented in prior research can influence not only themselves to be capable writers, but also impact audiences who have misunderstandings and deficit perspectives towards them and their communities.

Theme 4: Entry Points for Teachers' Scaffolding

Changing Perspectives towards Learners' Strengths and Needs. The last theme from prior research is that digital multimodal composition creates more entry points for teachers to

identify learners' strengths and needs, and provide more specific and individualized support, which in the end lead to multilingual learners' progress in learning writing.

There are several research studies shifting focus from students' experiences and writing artifacts to teachers' roles, especially their perceptions and pedagogical strategies in the process of participating or implementing multimodal composition activities with multilingual students. Jocius (2020) emphasized that teachers play a critical role in shaping students' writing experiences. However, some research found teachers can be reluctant to do multimodal composition activities in their classrooms. For example, Dagenais et al. (2017) shows a tension between researchers' goal of promoting multimodal composing and teachers' resistance to use technology tools in class. Teachers in their research thought that multimodal composing is "not real school", and only allowed students to finish their writing on paper and then type their writing on iPads. One of the teachers in this research terminated the project earlier because she wanted to prepare students for the coming standard assessment. Tan et al. 's (2020) literature review also revealed several teachers' negative view of multimodal practices as "less academic" and "less rigorous" for teaching and learning a second language, and these teachers still only assessed students' linguistic development. Similarly, Green (2013) claimed that teachers in the research used students' multimodal composition artifacts to understand students' thinking, but it seems teachers only want to know about students' understanding of new vocabularies instead of any other multiliteracies skills. All this research points to the fact that the premise of understanding the effectiveness of multimodal composition in supporting multilingual students' writing development relies partially on how educators create a space for these types of activities and how educators can gain new understandings of students and provide needed scaffolding to students to learn from writing.

Despite some concerns from teachers, most teachers in prior literature hold positive and open-minded attitudes towards digital multimodal composition. According to interviews with or reflections of teachers in prior research, multimodal composition creates a space for them to braid students' old literacies and new digital literacies practices together (Li, 2016), access to students' funds of knowledge and identities (Pacheco et al., 2021), and better reach the "elusive goals of motivation and engagement" in writing education (Pandya, 2012; p. 184). For example, Burke and Hardware (2015) interviewed a teacher about her experiences of doing photostory with students. The teacher mentioned that talking and writing about weighty issues such as life and death were an onerous task. Although students may understand these topics, "their developing language skills would impede a student's ability to respond" (p. 151). The teacher said she had many "telling moments" (p. 152) about students' ideas in the process of viewing students' photostories, which helped her better engage students in rich discussions. Castañeda et al. (2013) also mentioned that teachers were able to spark deep discussions about cultural identities when inviting multimodalities into the writing process. Both research studies show that multimodalities can be the mediating tools for both teachers and students to have discussions about their writing topics.

Practices to Support Multimodal Composition. Prior research also revealed some teaching practices to support digital multimodal composition experience. The most common practices include actively modifying teaching based on individual student's needs revealed by writing artifacts, providing flexibility for how learners can start their writing, and making the writing process interactive and conversational. For example, the reflection from one of the teachers in Harman and Shin's (2018) study revealed that the teacher had a deeper insight to one of the difficult students' needs and concerns from reading the student's writing, which made her adjust her teaching style with this student (pp. 21-22). The teacher encouraged the student to use

visuals as the "germinating seeds" for his story and had many dialogues with this student to help him write up his story. Another teacher in the same research encouraged multilingual students to write blogs. Peers' and the teacher's real-time interactive comments to blogs made one of the focal students more passionate about improving her blogs. In the end, the researchers found these mediating tools, more scaffolding steps, and deep discussions lead to both students' great improvement in a writing assessment. These students demonstrated huge progress in conventional writing skills, audience awareness and writing motivation. Angay-Crowder et al. (2013) showed how multimodal composition gave teachers more opportunities to interact and respond to students' ideas in the process of scaffolding. For example, teachers frequently asked students about their modal choices, and how these choices connect to key themes in their writing, and how they can convey their ideas better to audiences. This dialogic process of talking and reflecting on content of writing supports students to keep revising and improving their writing in a more agentive manner.

Secondly, many teachers changed their focuses and their approach to assess students' writing, and recognized these assessments as valuable information for pedagogical implication. According to prior research, multimodal composition shifts teachers' focus on writing as a final product, more to writing as an experiential learning process (Burke & Hardware, 2015). Giampapa (2010) argues that multimodal composition helps teachers change the role of "linguistics gatekeeper" (p. 418) when assessing students' writing, and take a more asset-based approach to evaluation. Canady et al. (2020) also discussed how multimodal composition changes teachers' "evaluative perspective", focusing more on what a student didn't achieve, to a more "descriptive perspective" which attends to what a student had already demonstrated in the writing (p. 14). These arguments also connect to the three purposes of multimodal composition assessments identified in Anderson and Kachorsky's (2019) literature review. According to

them, one of the key goals of assessing with multimodal composition is to redefine what should be valued in classrooms and acknowledge students' achievements from multiple perspectives.

Many teachers used multimodal composition as formative assessments, which help them plan the next steps to further support their students in classes. For example, Tan et al.'s (2020) literature review found out that most educators in articles they reviewed took a sociocultural perspective in multimodal composition assessment, which means these educators focused on how well students present their understanding of their writing topics, and how this formative assessment can help them further enhancing individual students' learning. The focal teacher in Tippett's (2011) research said multimodal composition is revealing and the teacher felt it is much easier to identify students' misunderstandings. The teacher also emphasized that it can help her better differentiate instruction because with the flexibility, all students can work at their own pace, and students' who lag behind can still find ways to shine in the project.

2.3 From Prior Research to This Study

In this section, I discuss how prior research helped me conceptualize writing development as multidimensional, which has critical implications for my design of how to analyze and interpret multilingual students' writing (both process and products) more comprehensively. Additionally, reflecting on prior research identified potential challenges in implementing digital multimodal compositions in various educational settings. I gained important considerations for contextualizing and authentically enacting my research project with multilingual learners in formal school settings.

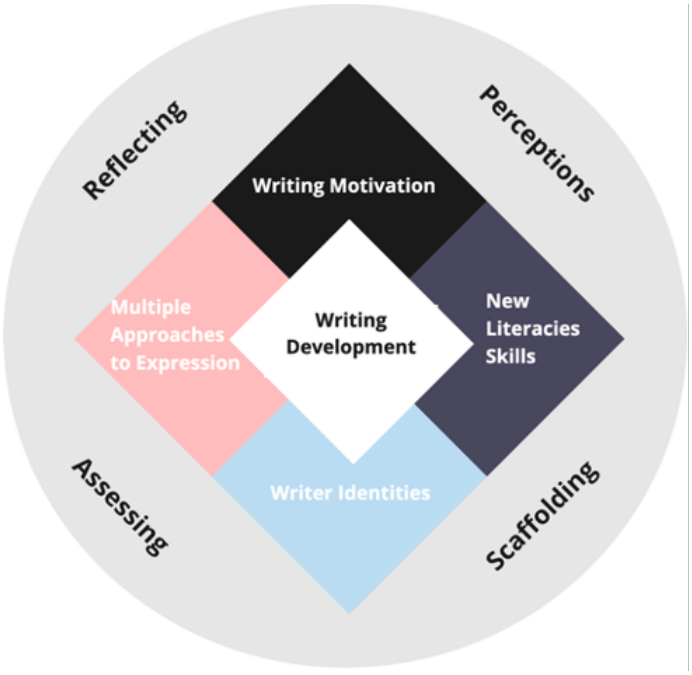
Understanding of Writing Development

The four themes revealed in prior research point to the fact that although print-based writing development already contains multiple aspects including lexico-grammatical features, genre awareness, audience awareness, and depth of content, multimodal composition adds more complexities (such as digital literacy skills, critical literacy skills, and knowledge of multimodalities) into the process. Moreover, the writing development trajectory of multilingual students can also be unique because of biliteracy development, translanguaging practices, assimilation, and conflicting identities in the process of learning writing.

Prior research explores how multimodal composition supports multilingual students in various ways, as shown in Figure 2.1. To be more specific, multimodal composition opens spaces for fostering multilingual students' motivation in writing, and most students interviewed in prior research emphasized their engagement and improving agency in writing (e.g. Hughes & Morrison, 2014; Vasudevan et al., 2010). Multimodal composing also facilitates the writing progress by embracing different modal resources students already have, therefore multilingual students can better access content and participate in expressing ideas (e.g. Johnson & Kendrick, 2017; Ronan, 2014). In addition, it also helps practice writing skills which better align with students' social reality and their needs to engage in various literacies practices in this fast-changing digital world (e.g. Doering et al., 2007; Turner, 2011). Lastly, it supports multilingual students to position themselves as writers with potential and writers who are able to execute impacts through their writing artifacts as counternarratives and testimonials (e.g. Curwood & Gibbons, 2010; González Ybarra, 2022).

Figure 2.1

How Multimodal Composition Activities Support Writing Development



To sum up, the review of prior research helps me better understand writing development as a nonlinear, multidimensional process, especially in the case of doing multimodal composition projects. Writing development may include the complexity of language students are able to use to express ideas, the stronger motivation and engagement in writing tasks, the improving adroitness in using multimodal resources in digital platforms, and growing perception of self as capable writers. Therefore, the multiple dimensions of students' writing development lead to the critical question of how prior researchers measure, evaluate or interpret students' writing growth to capture this complexity. Some researchers solely focused on students' linguistic growth after doing multimodal composition projects (e.g. Green, 2013; Harman & Shin, 2018); however, most research attends to other aspects of writing development of multilingual students. Researchers such as Beucher and Seglem (2019) said they did not want to use a traditional writing rubric which only attends to linguistic development to measure students' multimodal

composition because it will restrict the rich thinking process in the process, and may be unable to capture students' writing development in multiple aspects. Therefore, the observation, assessment, and understanding of multilingual students' writing development should focus on both the writing process and final products, as well as go beyond the linguistic component in writing.

Needs for Effective Teaching Practices

Prior research regarding teachers' practices reveal that it would be beneficial to explore effective teaching strategies and practices to scaffold digital multimodal composition. Traditional effective teaching may not be sufficient in this type of writing projects; instead, teachers will need more skills and knowledge to build up students' prior knowledge and respond to potential challenges.

As illustrated in Figure 2.1, prior research also emphasized that the effectiveness of multimodal composition is greatly influenced by educators' careful design, implementation, assessment and reflection. Teachers' perceptions and practices of multimodal pedagogy shape students' experiences of multimodal composition. Multimodal composition provides several entry points for teachers to understand multilingual students' funds of knowledge (Moll et al., 1992) and other competencies which are often unable to be seen from traditional writing. This understanding and attention to the writing process gives a teacher a clearer idea of where a student is at and how to specifically address and support the student's needs. Mercer and Howe (2012) emphasized that high-quality interactions between teachers and students can lead to improvement in reasoning skills and academic achievement. Multimodal composition creates more opportunities for teachers to ask elaborating and prompting questions based on students' writing artifacts (Harman & Shin, 2018). At the same time, Tour and Barnes (2022) argue that

the complexity of digital multimodal composition requires more support from teachers in the process and for the product. The flexible, inclusive and creative nature of multimodal composition makes scaffolding more differentiated and individualized because there is no one right way to write in this specific context. In several studies (Canady et al., 2020; Honeyford, 2013; Jocius, 2020), teachers purposefully arrange group work because they understand students' expertise in technology and creating multimodal projects. Therefore, peer scaffolding, teacher scaffolding and students' engagement makes writing more motivating. This mutual and iterative process of seeing students' growth, providing ongoing feedback and scaffolding, and motivating students to further revising and improving their writing product leads to multilingual students' continuous growth in both conventional and new writing skills.

Another important implication regarding teaching practices from prior research is that there are many considerations that need to be taken for digital multimodal composition to be accepted and better integrated into school curricula. For example, careful consideration of learners' learning needs, school culture, and teachers' perspectives are important to find the common ground among all education stakeholders. The purpose of multimodal composition is not to devalue print-based literacy, instead, it aims for opening up more possibilities for learners. However, as shown in several research studies (Dagenais et al., 2017; Tan et al., 2020), there is still a long way to go before educators feel comfortable to perceive multimodal composition as rigorous and effective writing practices, be conscious about the changing definition of writing in contemporary world especially after COVID-19, as well as be willing to take risks in exploring new multimodal knowledge with students and finding spaces for multimodal composition within this still high-stakes, monolingual, monomodal, context of teaching and learning.

2.4 Research Gaps

Prior research demonstrated great potentials of multimodal composing activities for supporting multilingual learners in several aspects of writing experience, including helping multilingual learners to be able to communicate more creative and complex ideas despite English language proficiency, being more motivated in writing process, making progress in learning multiliteracies skills and conventional writing skills simultaneously, and having important teaching implications for teachers to understand multilingual learners' strengths and needs in writing.

Besides these potential benefits, researchers also pointed out perceived challenges from teachers and students during the implementation of multimodal composition activities. For example, the question of how to better integrate multimodal composition into standardized and scripted curriculum needs more exploration, which speaks to teachers' concerns about time pressure and standardized assessments. Although multimodal composition and traditional writing are not mutually exclusive, how to strike a balance between developing conventional writing skills and leaving room for new literacies skills and students' engagement needs more exploration. Much prior research was conducted in after-school settings, or was designed as a top-down research intervention in schools, rather than an integrated part of curriculum. Although being promising and thought-provoking, these projects might not be fully applicable in some education settings, especially those with scripted language curriculum and under pressure of language assessments. To my best knowledge, there are relatively scarce studies explicitly addressing these concerns of digital multimodal integration in a more restricted and standardized context. As pointed out by Michalovich (2025), there was little research addressing the gap between practices portrayed in literature and challenges teachers perceived in their specific

contexts. Not knowing how to support teachers to navigate contextual challenges, they might not choose to implement DMC or implement it in a simplified way that might not be as beneficial to students as demonstrated by prior research. As such, we need more classroom-based research that takes into consideration the culture and context of specific classrooms, including teachers' and students' perceptions as well as resources and constraints in the classroom.

Secondly, many studies in this field are researcher-directed rather than teacher action research or researcher-teacher collaboration. As mentioned previously, relatively few studies integrate digital multimodal composition as a natural and organic component of literacy classrooms, so there is a lack of knowledge about considerations and guidelines for teachers to implement in formal school settings. As such, more action research or stronger researcher-practitioner partnerships will be helpful to understand, and better address teachers' concerns in implementing these writing practices. This will lead to a better understanding of how to improve teachers' knowledge and self-efficacy in implementing multimodal composition in a sustainable way. Additionally, there are very few frameworks guiding teachers' practices. Even though multiliteracies pedagogy (Copes & Kalantzis, 2009; New London Group, 1996) is a profound framework adopted by many educators, it is relatively general and does not attend to the special needs of multilingual learners and writing development and how to teach and scaffold knowledge of multimodalities. Therefore, it is still unknown what are some effective practices for teachers to scaffold and support multilingual learners in the writing process.

Moreover, the definition and dimensions of writing development for multilingual learners in the context of multimodal composing should be further explored. The conceptualization of learners' progress is vague and inconsistent. Prior research found that many teachers only attended to linguistic elements of multimodal composition artifacts created by students, while ignoring other writing competencies revealed (Tan et al., 2020). Some teachers perceived

multimodal composition as simply copying and pasting print-based writing into another digital platform (Dagenais et al., 2017). This narrow definition and restricted approach towards the creating and designing of multimodal composition may still go back to the limitations of traditional writing education. To challenge the linguistic-focused approach to evaluate students' writing progress, some researchers used students' interview and reflection about the writing experience as a demonstration of students' engagement and progress in writing; some other researchers used multimodal discourse analysis to reveal the deep meaning of students' writing artifacts and understand how students demonstrate their multiliteracies skills. This body of research shows the gap between researchers' effort to identify a more holistic approach to understand the complex literacy learning process during multimodal composing and prevalent unimodal perspective among educators to assess students' learning. Therefore, we need more research that can contribute to bridge the gap between theory and practices.

Bringing these together, this research addresses these gaps by collaboratively designing, redesigning and teaching with a teacher to enact digital multimodal composition projects in a public elementary school over one academic semester. In this process, the researcher and the teacher can experience and navigate challenges together to identify context-sensitive strategies to foster a more authentic multimodal learning experience. In addition, this research explored students' writing engagement and negotiation with multimodality over time to inform interpretation of their literacy learning. Teacher's opinions and students' perceptions of using multimodality in writing were used to continuously complement researcher's interpretation of learning progress. Furthermore, different from much prior research that adopted multiliteracies pedagogy as a major framework (Burke & Hardware, 2015; Giampapa, 2010; Hasty & Fain, 2014; Hughes & Morrison, 2014), this research will draw upon multiple theoretical frameworks including sociocultural theory (Vygotsky, 1978), third space theory (Bhabha, 1994; Gutiérrez et

al., 1999; Gutiérrez, 2008; Moje et al., 2004) and culturally relevant pedagogy (Ladson-Billings, 1995) that focus more on the learning and development of culturally and linguistically diverse learners, to investigate effective teaching practices. The next chapter will discuss how these asset-based theoretical frameworks have important implications for my designing (and continuous redesigning) of the research project and my approach to work with multilingual learners.

Chapter 3 Theoretical Frameworks

This chapter introduces the three theoretical and pedagogical frameworks that guide the designing, implementation, redesigning and reflection of this dissertation research. Firstly, sociocultural theory lays the foundations for the understanding of the learning process in this research as socially constructed, interactive and mediated by various tools (e.g. multimodal tools). The third space theory provides a critical lens for me to examine the dynamics of how students, the focal teacher and researcher (myself) draw upon a myriad of knowledge to challenge the hierarchy of literacy which positions language as the only valid form of communication in academic contexts. Lastly, the culturally relevant pedagogy offers the guidelines of my pedagogical practices in the classrooms when designing lesson materials and working with multilingual learners.

3.1 Sociocultural Theory (SCT): Foundational Framework on Learning Process

I firstly draw upon sociocultural theory (Vygotsky, 1978) as the foundational lens to understand students' language and literacy learning process. The roles of mediation and social interactions on effective learning, as well as the concept of Zone of Proximal Development (ZPD) influence my initial imagination of what the multimodal learning space I hope to co-created with the focal teacher and students.

Firstly, SCT reveals the importance of mediated action on students' learning, including interactions with tools and people to achieve a new understanding of their world. In this research, I especially attend to multiple mediation tools such as language and other non-linguistic modes, and teacher/ co-teacher's scaffolding to support students' understanding of content knowledge and facilitate their meaning making.

Secondly, as argued by Mercer and Howe (2012), sociocultural theory not only explains how individual learners learn from interaction with experts, but also how these interactions foster collective understanding. They specifically emphasized the importance of "dialogue" in teacher-student interactions which challenged the one-directional, teacher-dominant "authoritative talk". Additionally, the sociocultural approach of pedagogy creates space for students to agentively engage in collaboration and knowledge co-construction (Panhwar et al., 2016). Therefore, in this dissertation, I aim to create a learning space where students have greater opportunities to actively ask questions, generate conversations and shape the direction of their own learning experiences. This might be possible through engagement with multimodality and multiliteracies due to their open-ended, subjective and interpretative nature. It is also possible because the use of digital tools may afford new ways for students to collaborate and co-construct knowledge together.

Thirdly, Lantolf (2000) pointed out that learners have agency and creativity to appropriate knowledge they obtain from experts instead of passively copying the experts' capabilities. This point is important to understand ZPD as a differentiated space for different learners. In this regard, when planning lessons and identifying each student's learning goals, I need to recognize their unique learning styles, strengths and needs to identify the most appropriate tools to support their learning goals based on their specific needs. Moreover, Lantolf et al. (2020) explained that ZPD is more about the quality than the amount of support provided by experts and "mediation is negotiated between expert and novice" (p. 231). As such, my scaffolding, feedback and other support to students' writing should be based on and be directed by their own rich ideas and expression goals. I serve the role of listener and facilitator to support their continuous improvement through dialogues that can generate new ideas and deepen understanding of the content.

3.2 Third Space Theory: Critical Lens

This section focuses on the third space theory as a critical lens to challenge the dominant norms and restricted literacy practices in many mainstream language classrooms. Taking this lens, I envision a classroom where all educational stakeholders in this space should have agency and flexibility to negotiate and decide what literacy practices, skills and resources could be used to inform new learning and reimagine our identities as knowledge holders.

The notion of third space has been used in different discipline areas (Levy, 2008). Bhabha (1994) described third space as a space of "in-between" and "hybridity" where different cultural practices, perspectives and identities are not fixed (p. 2), instead, they keep conflicting, negotiating and reshaping each other. Third space is a rejection to predetermined binary, and is a transitional and dynamic space where new understanding of one's culture and identities can be achieved. Christianakis (2011) further interpreted hybridity in writing classrooms by emphasizing that embracing students' out-of-school literacy repertoires does not necessarily mean a critique of traditional texts used in schools. According to Christianakis (2011), there is a "negotiated hybridity" (p. 1148) under the constraint of curriculum, so understanding hybridity should take into consideration how new forms of literacy both challenge and are restricted by dominant classroom literacy practices simultaneously. This conceptualization of hybridity as a process that knowledge and perspectives from various spaces can have conversations, and the recognition of current school context's influence of what hybridity may be like, have important implications for my understanding of why digital multimodal composition projects can be such a space, and which types of multimodal composition (e.g. which genre of writing, what technological tool to use, and how this project can facilitate learning) may be invited into writing class easier in the beginning.

Gutiérrez, Baquedano-López and Tejeda's (1999) understanding of third space is informed by the idea of hybridity (Bhabha, 1994), but they situated the concept of third space specifically in the context of education. They recognized the diverse, hybrid and conflicting nature of learning contexts (p. 287). In the third space, diverse and conflicting discourses and knowledge can inform, reshape and generate thinking about what knowledge should be taught in the learning space. Gutiérrez (2008) further clarified and elaborated the definition of third space, as more than a bridge between home and school literacies, and more than recognition of various literacies practices at home or school. Third space can provide mediational tools and context (p. 150) for achieving the zone of proximal development (ZPD) (Vygotsky, 1978). However, Gutiérrez (2008) emphasized that the "development" in third space is not only making progress in content knowledge learning, but also the transformation that goes beyond the specific moments of learning, so students can build up and extend their semiotic repertoire for their future (p. 156). Therefore, as a teacher, project designer and researcher in this dissertation project, this point informs my envision and reflection about the ultimate goal of the digital multimodal composition project and my definition of writing development as more than finishing specific projects in school, but cultivating skills and mindset that can be easily transferred and applied in students' everyday lives now and in the future.

Moje et al. 's (2004) perspective towards third space draws upon various understandings of third space from different scholars, including Bhabha (1994), Gutiérrez, Baquedano-López and Tejeda's (1999), and New London Group (1996). Firstly, Moje et al. (2004) recognized the value of third space as a bridge between home Discourse and school Discourse, where students can have access to privileged forms of literacy and knowledge in school (p. 43). Secondly, they also consider third space as a "navigational space", where students can practice and develop a deeper understanding of skills that help them to navigate through different texts, communities,

spaces. This point especially aligns with New London Group's (1996) call for multiliteracies which expand the repertoire of critical skills students need to acquire in order to better participate in various literacy practices in contemporary society. Lastly, Moje et al. (2004) view third space as a space to "challenge, destabilize, and, ultimately, expand the literacy practices that are typically valued in school and in the everyday world" (p. 44).

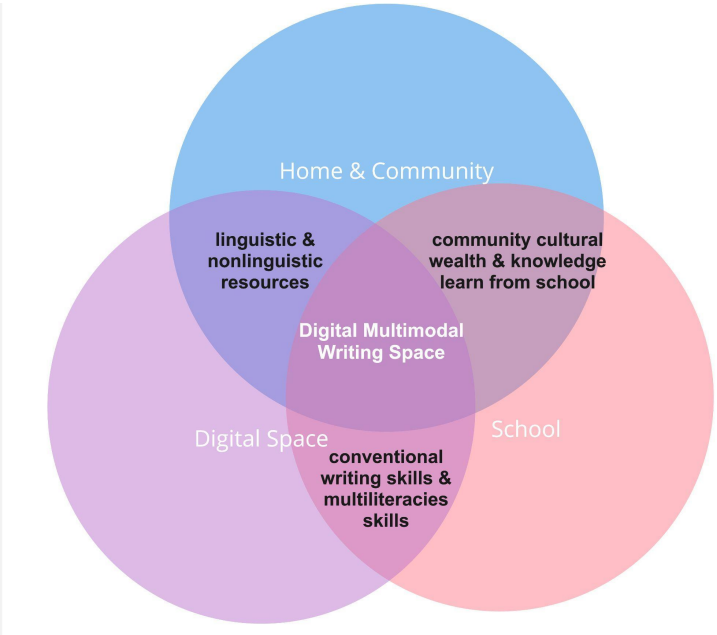
Drawing upon all of these perspectives and conceptualization of hybridity and third space, I understand digital multimodal composition as a potential third space where prior undervalued, ignored knowledge, knowledge from in person and virtual spaces, mixes with conventional writing skills in order for students to have a new understanding of writing and writing skills that can support them to be writers across different spaces. Additionally, as Moje et al. (2004), I aim to make the digital multimodal composition project a space where multilingual students can learn the navigational skills to engage in various writing activities inside and beyond the classroom, both currently and in the future. Therefore, when I design the research project, I consider what kinds of new literacy skills I need to highlight and scaffold for learners to apply beyond the classroom.

Building upon Jewitt's (2008) argument that technologies are remaking, blurring, collapsing, and traversing the boundaries between different spaces (p. 242), the current proposed research is different from prior research of third space by moving beyond home-school binary, and include a virtual space, which has been an integrated part in many students' home and school life, especially after the outbreak of COVID-19. As shown in Figure 3.2, I perceive digital multimodal composition as a possible third space where multiple knowledge from home and community, school, as well as virtual space will emerge, be drawn upon and be integrated for multilingual learners to make meaning. This research explores what knowledge multilingual students in my research context already have, how these different sources of knowledge

negotiate, influence and build upon each other in the writing project, and what kinds of new conversations and new learning can emerge in the process, in what ways the new learning relates to writing development. Besides, Gutiérrez, Baquedano-López and Tejeda's (1999) and Moje et al. (2004) mainly focus on students' language practices in the third space, whereas, I will expand my focus of multilingual learners' engagement and creation of multimodal texts on how they orchestrate both linguistic and nonlinguistic resources together to generate new understanding and new learning experiences.

Figure 3.2

Knowledge in Digital Multimodal Composition Projects



Lastly, there are no definite criteria for what a third space will be like, and there is no one checklist for what activities should be done to create such a space. As Moje et al. (2004) mentioned, we are all moving towards a third space where "cultural, social, and epistemological change" can happen (p.44). Therefore, I understand digital multimodal composition as a third space in progress, instead of perceiving it as an end product. As such, I focus more on both

expected and unexpected moments and conversations, students' feelings, creativity and possible tensions in doing this type of writing projects as important resources for practical implications of how third space can be created and developed. Moreover, instead of strictly following my predetermined curriculum for this research project, I take a flexible and student-oriented approach which welcomes the changes of writing and discussion topics depending on what opportunities of new learning may emerge in the research process, because third space is a dynamic learning space co-constructed by both teachers and students.

3.3 Culturally Relevant Pedagogy: Guidelines for Classroom Practices

In this section, I focus on culturally relevant pedagogy as actionable guidelines for fostering my students' cultural and linguistic resources. For example, it helps me brainstorm how to bring students' home cultures and rich out of school literacy experiences into the curriculum to build up (new) cultural awareness. It also reminds me of attending to the rigor of teaching and learning through a more holistic lens to understand instead of flattening students' progress. Additionally, this framework informs my awareness of finding possible opportunities to engage students on understanding and critiquing social inequity through multimodal and multiliteracies practices.

As discussed in Chapter 2, the effectiveness of digital multimodal composition relies more on teachers' designing and implementation. In order to create an inclusive, dynamic and responsive learning environment for multilingual students in my research project, I draw upon asset-based pedagogies, such as culturally relevant pedagogy (CRP) (Ladson-Billings, 1995), which especially attends to culturally and linguistically diverse students' knowledge, voices and achievements. Therefore, the notion of third space informs me of the big picture and ultimate goals of my research

project, while the culturally responsive pedagogy provides me with guidelines of my practices as a participant observer within the potential third space.

Culturally Relevant Pedagogy and Related Theories

Ladson-Billings (1995) insightfully pointed out the earlier terms (such as culturally appropriate, culturally congruent, culturally compatible…) used in teaching culturally and linguistically groups of students actually strengthened the existing social power hierarchy and promoted the idea of assimilation. Therefore, by observing eight model African American teachers in a low-income, low-performance school district about how they interacted and supported students, she concluded three tenets of CRP: the development of academic ability, the support of cultural competence, and development of critical consciousness. This research is significant to show successful examples of teaching African American students, justify students' rich cultures and combat the myth of disadvantage explanations.

Expanding from Ladson-Billings' work, researchers such as Gay (2002) made more detailed arguments about how to teach diverse students and bridge their in and out-of-school resources. Gay's culturally responsive teaching focuses not only on African American students, but also students from all ethnic and racial backgrounds. To be "responsive", there are five elements that need to follow: "developing a knowledge base about cultural diversity, including cultural diversity content into curriculum, caring and building effective learning communities, communicating with students, and responding to the diversity in instruction" (p. 106). All five elements need huge dedication and deep understanding of both specific cultures and multicultural teaching methods. As Heath (1983) mentioned, the living, working and learning styles can be very different for different communities. Asian American students may remain silent as a way of respecting authority; whereas Black students may do "call response" while the teacher is talking,

to show their prompt feedback and they are thinking and following (Brown, 2004). Also, teachers need the awareness and courage to expose racial and social justice issues which connect to students' life experiences. Both Ladson-Billings and Gay lay important foundations to better engage and support diverse groups of students.

Moreover, scholars such as Paris and Alim (2014) responded to culturally relevant or culturally responsive pedagogy with a "loving critique", in which they pushed researchers to be more explicit and determined in justifying pluralism rather than stop at merely being "relevant" or "responsive". Additionally, they revealed the static assumption of cultures in CRP/CRT, which do not realize the shifting and evolving cultures practices for minority youth. For example, using Hip Pop to teach does not only connect to Black students, but many other racial groups. At the same time, youth are exposed to and developing new linguistic and cultural knowledge all the time. Thirdly, prior theories established simple and purely positive connections between culture and youth development, and did not examine issues such as prejudice, social hierarchy or sexism critically. Paris and Alim (2014) provided an example of using rap battle in class that still excluded the role of females. Instead, they promoted Culturally Sustaining Pedagogy (CSP) which aims to foster "linguistic, literacy and cultural pluralism" in schools (p. 88). Students' community cultural competence should be sustained and developed, while at the same time they need to have access to dominant cultural competence. Their loving critique was accepted by Ladson-Billings who responded with an encouragement of "CRP remix" (Ladson-Billings, 2014, p.74). As she worked more with the First Wave students who were hip pop artists and were eager to be teachers who can contribute to their communities, she realized how her concept of CRP was significantly reduced to culture celebrations, with few dialogues about hegemony, inequity and neoliberalism. Thus, she

called for more researchers to move forward and make changes to her initial theory for the sake of the growing number of diverse students in this country.

New Perspective of CRP after COVID19

Ladson-Billings (2021) situated CRP in a new context which is different from the context when she first brought up CRP. She specifically discussed how the influence of COVID-19 should lead to the "hard reset" in school curriculum, pedagogy, assessment, connection with families and communities (p. 68) to better weave CRP into daily education in the post-pandemic era. In this new article, she also provided several important clarifications regarding the misunderstanding and reductive version of CRP, which further help me reflect upon how I am going to implement my digital multimodal composition research project responsively.

Firstly, for the tenet of cultural competence, Ladson-Billings (2021) emphasized that learners should both retain their home culture and learn different cultures. Also, the definition of culture should be expanded to include youth culture. These two points guide my understanding of the "culture" elements I want to weave into my research design as more than allowing students to use their home languages to communicate ideas for writing, instead, they should be able to engage in the learning of school culture such as writing conventions, as well as other cultural practices that are prevalent in youth's daily lives including how to navigate virtual spaces and write various new genres of texts (e.g. digital books, comics, social media posts, memes).

Secondly, Ladson-Billings (2021) clarified that the second tenet of CRP, academic ability, is more than the coverage of content knowledge, and she emphasized that students' progress and teachers' efforts should be recognized not merely based on if a learner's standardized assessments reach the expected benchmarks (p. 71). This tenet informs how I understand learner's writing development and my approach to assess and demonstrate learner's progress in writing. To be more

specific, multilingual learners will be able to draw upon various multimodal resources as mediational tools (Moje et al., 2004) to access content knowledge and better express their ideas. Also, I will use continuous formative assessments, including observations, students' self-reflections and interpretation of students' artifacts, to understand multilingual learners' progress. As such, students' writing development is not reduced to scores of standardized tests, nor the number of vocabularies and complexity of sentence structures. In the case of digital multimodal composition, I make my assessment of learners holistically because the knowledge and skills involved in these writing projects are complex, unique to each individual learner, and cannot be fully captured by only attending to linguistic forms of writing.

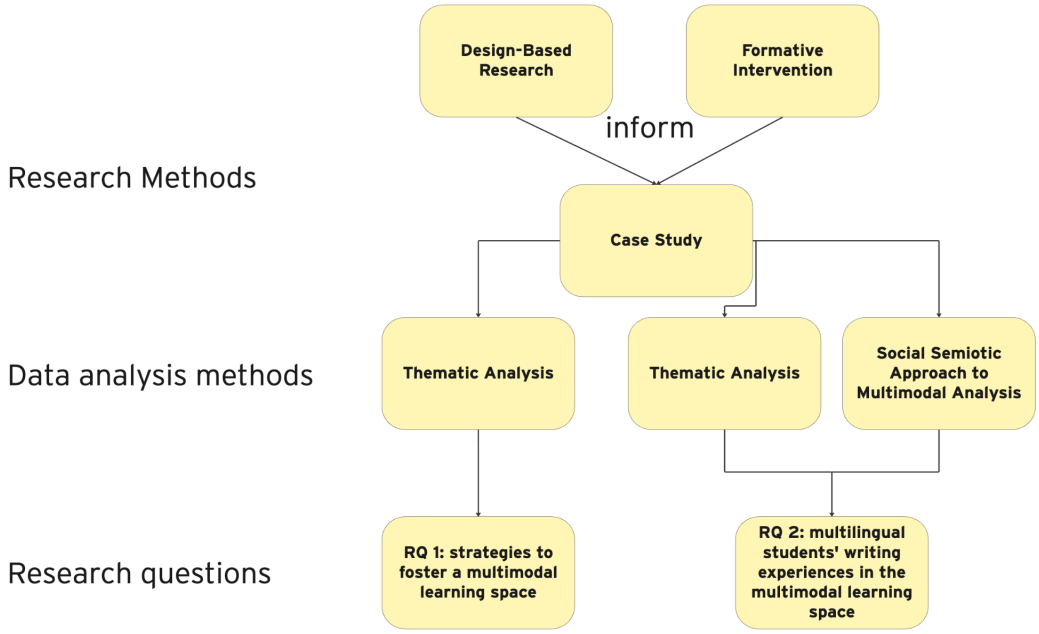
Lastly, the tenet of critical consciousness sheds light on how my research project can extend from the classroom and expand multilingual students' "intellectual tools to address present-day concerns" (p. 72). In digital multimodal composition projects, I should invite discussions about affordance and justifications of multimodal approaches in meaning making, which many multilingual students have already engaged in their daily lives (Stein, 2008). This discussion will open the space for questioning the privilege of a certain mode of expression in schools. Additionally, I envision digital multimodal composition projects as a possible starting point to address the digital divide, which is not only about the accessibility of digital devices, but also the opportunities to learn, practice, and apply multiliteracies skills in digital space. Therefore, multilingual learners can develop the multimodal composition skills which can be applied both in and out of school spaces to counter the inaccurate and even harmful assumptions about their communities, and to pass out their own voices to broader audiences in the future (Curwood, & Gibbons, 2010; Flores, 2018).

Chapter 4 Methodology

This chapter firstly describes how design-based research (The design-based research collective, 2003) and formative intervention (Engeström, 2011) inform this case study to explore strategies to integrate digital and multimodal resources into language and literacy classrooms, navigate possible tensions that emerged in this process, and investigate what learning is possible when students have such a multimodal learning space. Then I will introduce the research context, the focal teacher Mrs. B who collaborated with me to design and implement lessons, as well as the focal multilingual children in two classrooms (4th and 5th grade). This chapter also presents three phases of data collection when the teacher and I engaged in continuous design, implement, and refine strategies to foster a multimodal learning space. After that, I will describe how I adopted a thematic analysis method (Braun & Clarke, 2006) to identify design strategies to answer the first research question, and how a social semiotic approach to multimodal analysis (Kress, 2003; 2010) was utilized to investigate and interpret focal students' literacy learning experiences for the second research question. Figure 4.1 shows an overview of methodological frameworks that inform this case study as well as analysis methods adopted to investigate each research question.

Figure. 4.1

Overview of Methods



4.1 Research Design and Methodological Frameworks

Recognizing the dynamic and multidimensional nature of digital multimodal composition experience and understanding that learners may have various approaches to make meaning, which are shaped by their sociocultural backgrounds and specific learning contexts, this research took a qualitative research approach, specifically case study, to explore the complex writing process and learners' learning experience over time. Case study is a research methodology that closely and deeply examines how participants understand and interpret their own worlds (Merriam & Tisdell, 2016). It especially aligns with my research goals of understanding multilingual students' multimodal composition experiences to highlight their voices, creativity and achievements in the process and listening to their feelings about these types of writing activities. Although case study may be critiqued for not being able to be generalized, case study is powerful in its ability to help researchers to ground their research in specific "social, historical and temporal contexts" (p. 148). This emphasis on individual experiences is especially important

for the research of multilingual learners' learning and writing to put spotlight on their creativity and various trajectories of learning to write and understand unheard voices and unnoticed perspectives. Moreover, Stake (1995) argued that case studies can be counter examples which modify the generalized description of marginalized groups. Lastly, my research is situated in a specific classroom with one focal teacher and groups of students, which naturally make it a case study. Therefore, case study is an appropriate research methodology for my research goals.

Design-based Research Approach

Design-based research (DBR) is a methodology used to investigate and develop innovative practices in real-world settings (The design-based research collective, 2003). Different from action research which is directed by teachers, DBR emphasizes the role of researcher to partner with teachers and collaboratively make theories, interventions or new pedagogy better applied to practices. Another feature of design-based research is that it involves multiple iterations of implementation and refinement to continuously improve and develop practical principles or insights to solve identified problems in the specific educational context (Anderson & Shattuck, 2012).

I took the design-based research approach to guide this classroom-based case study because this research involved co-designing, implementing and refining course modules to address both the lingering and emerging challenges of integrating digital and multimodal resources to support learning in formal education settings. Therefore, this case study probed how to create a digital multimodal writing class with three co-designed writing modules over one academic semester. Case study methods including observation, interviews and researcher's reflective memos ensured that the design and improvement of the intervention addressed the needs of the classrooms.

Anderson and Shattuck' (2012) research review found that instead of measuring "what works" with effect size, most design-based research focuses on " the challenges of implementation, the development processes involved in creating and administering the interventions, and the design principles that emerged" (p. 22). This emphasis on the iterative and evolving process of an intervention shapes one of the focuses of this case study on examining strategies to navigate tensions to reach the research goal of integrating digital and multimodal resources into writing instruction to support learning more effectively.

Formative Intervention

During the implementation of my research, I realized possible limitations of design-based research in understanding a complex and dynamic educational ecology and I decided to bring in formative intervention (Engeström, 2011) as another methodological framework to guide and further supplement my enactment of the research project. This research project aims to understand students' literacy learning experience through digital multimodal composition. The digital multimodal composition experience is the intervention. However, instead of bringing in a curriculum that is fully designed by researchers into the classroom, testing its effectiveness and making claims about causality, this intervention is co-designed and continuously developed through collaboration with a teacher and perspectives from students for a more authentic and organic understanding of what learning is possible when students engage in such a digital multimodal composing experience. In this sense, the intervention is rooted in and grows from the classroom.

As I enacted my research, two methodological questions about design-based research emerged: how many iterations of intervention is sufficient? how to deal with a continuously changing context and agency of participants? Formative intervention provided me with a broader

perspective to deal with these two questions and complexity of educational contexts. Although there are no standards for researchers to know when and if a design-based research project is complete (Anderson & Shattuck, 2012), much research taking this approach was conducted in one year or over multiple years (e.g. Ketelhut, 2007; Gallagher & Fazio, 2019; Lim & Unsworth, 2023) to reach the finality. Differently, with the perspective of formative intervention, the intervention can be more open-ended instead of expecting a complete project (Engeström, 2011). As such, an intervention is both a formative process and an outcome of the research.

Additionally, compared to design-based research, a formative intervention perspective highlights the complexity of context, possible resistance and agency of teachers and students in the context, especially how this agency may shape the direction of an intervention in a surprising way (Engeström, 2011). In the process of research, sophisticated components of social research such as my relationships with teacher and students, teacher's beliefs, and students' motivation for using digital multimodal resources kept changing, which made the iterations of research not a neat process with clear testing, implementing and refining stages. I decided to let participants and context shape and reshape my research design and direction, instead of testing and sticking to a pre-assumed practice expected by researchers because the classroom is not "a site of study, a place in which empirical work is conducted" but "a dynamic context for study" where both teachers and students have the agency to reimagine and transform their literacy practices (Gutierrez & Jurow, 2016).

In sum, informed by the two methodological approaches, this case study involved co-designing lesson materials with a classroom teacher over three iterations (curriculum modules) to address the challenge of integrating digital and multimodal resources in writing instruction. The scope of this research is not to produce a generalized model for creating a digital multimodal

learning space, but to explore the possible strategies and insights for fostering such a space shaped by the context and participants. Therefore, as Olson (2004) argued, with contextualized information and honest descriptions of tensions, messiness, opportunities and learning, this case study can be more valuable for teachers to use this information "to make informed decisions about what to do in the multiple and varied contexts in which they work (p. 25)."

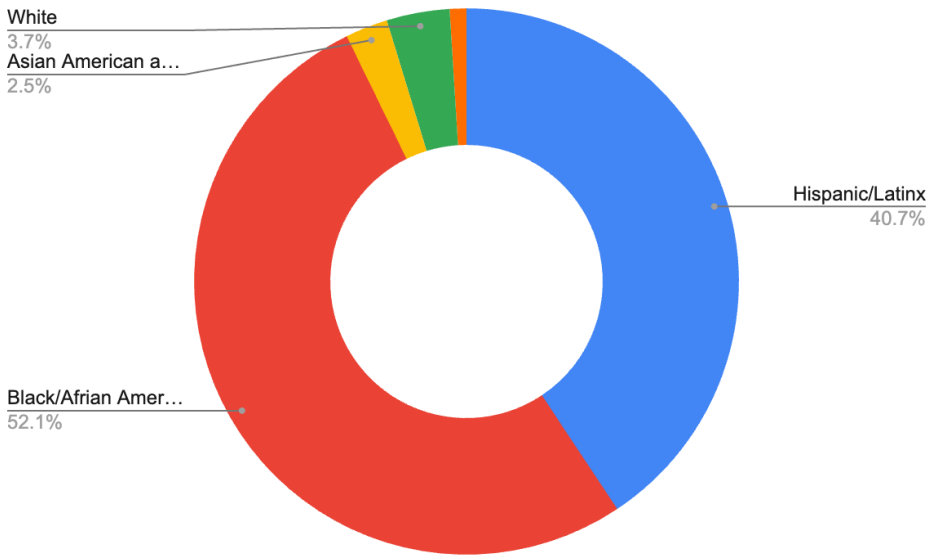
4.2 Research Context and Participants

The School

Sunrise elementary school (pseudonym) is a small public school located in a city in the northeastern area of the United States. The school district is diverse with a large number of Black and Latinx populations. 62% of all students have free or reduced lunch. This school district also has the largest number of multilingual learners among all school districts in the state. According to information released by the school district, approximately every one in four students (25.7%) speaks languages other than English at home. Multilingual students in the school district receive English Language Development (ELD) support through ELD classes besides regular English language art, mathematics, science, and instrumental courses.

Figure 4.2.1

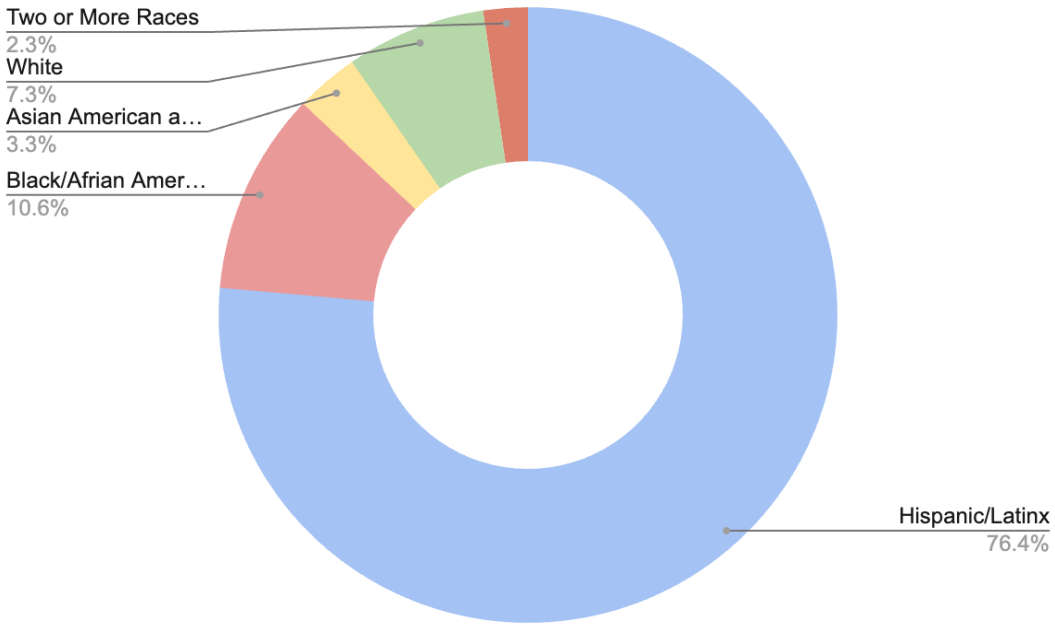
Demographics of Students in the School District (by 2023)



Among 301 enrolled students in Sunrise elementary school, 76.4% are Latinx students. About 100 students in the school are multilingual students. They take ELD courses with a team of four teachers. Most of these multilingual children speak Spanish at home. The school has Spanish-English bilingual staff in the main office to support Spanish-speaking families and students. The school atmosphere is welcoming for diverse learners. There were several bulletin boards on the hallways displaying student-made artifacts including artifacts promoting a harmonious school environment. Outside the ELD classroom where I worked, there is also a big board with greeting signs in multiple languages. Next to the ELD classroom is the school's library and media center where students can read a rich collection of children's books and participate in book fair activities.

Figure 4.2.2

Demographics of Students in Sunrise Elementary School (by 2024)



The Teacher

Due to the proximity of the school's location to a large public university, school leaders are open to collaboration with researchers. With the connection of the school district's ELD office, I had an opportunity to discuss this research project with the school principal in June 2024 and we met virtually again in August 2024 to secure school permissions. The principal recommended Mrs. B, who taught the majority of 4th and 5th grade multilingual students in the school, to be a possible focal participant of my research.

Although I didn't know Mrs. B before the research, she had prior experiences participating in a research project and after-school programs conducted by our university faculty members so she was interested in discussing more about my research project. After several rounds of email communication, a Zoom meeting and an in-person visit during September 2024, she decided to collaborate with me for this research project, and we further discussed my role, shared goals and possible plans for the rest of semester before I officially joined her classrooms.

Mrs. B is a Black female who has been teaching diverse elementary learners for more than 15 years. As a veteran teacher, she had worked with multilingual learners across all grade levels and various English language proficiency levels. During the school year in which I conducted my research, she taught eight ELD sessions per day with 4th and 5th grade multilingual students, including newcomer children. After she received a bachelor's degree in economics, she certified as an ESOL teacher to work with diverse students in elementary settings. As a passionate teacher, her continuous engagement in various educational research and professional development activities also equipped her with a solid understanding of teaching methodologies and practices. Most importantly, she was a caring and well-loved teacher in the school. When I discussed the possibility of conducting research in her classrooms, she said that she would love to open this space if "the research could benefit children academically" and she sincerely appreciated research that specifically focused on multilingual learners' learning experiences which in her opinion was much needed. Additionally, Mrs. B was open-minded and interested in exploring and using digital tools in her classrooms because she believed that education should align with the fast technology trends and she valued children's engagement when they were able to learn through digital tools. This passion began even before the start of this research project: Mrs. B not only attended professional development sessions to improve her technological pedagogical knowledge but also already used many different tools including Nearpod, Book Creator, Flipgrid, NewsELA and Youtube to facilitate her teaching. This helped me find the initial opportunities to integrate my research into her writing classrooms through digital book making experiences with the tool Book Creator.

I was deeply encouraged by Mrs. B's flexibility and willingness to collaborate. When we first met, she encouraged me to consider myself as a part of the classroom community to freely

propose new ideas and talk with children in class which helped me establish my positionality as both a teacher assistant and participating observant. She also introduced me to other classroom teachers in 4th and 5th grades to ensure smoother communication regarding pooling children together daily for ELD sessions. Although her daily schedule was packed, we co-planned lessons every Monday for an hour and we caught every opportunity for brief conversations after each class or on the hallway to share our feelings about lessons, what we want to adjust, discussion about children's writing samples, challenges, new opportunities. We were eager to learn from each other which made this research project possible for a co-design experience.

The Students and The Class

I worked in two of Mrs. B's ELD sessions. Students in both groups (one in 4th grade and the other in 5th grade) were at the same English language proficiency level: WIDA level 3. In our state, multilingual learners take WIDA (World-Class Instructional Design and Assessment) assessments annually to track their English proficiency. Level 3 means these students were at the intermediate level of English proficiency. These students took the assessment in spring 2025 and several of them were most likely ready to exit the ELD program after that. Therefore, Mrs. B worked hard to meet them every day to provide as much language instruction as possible to best prepare these children for assessments.

Mrs. B recommended these two groups of students because one of the teaching goals for these two groups was to improve their writing skills which aligned with my research purpose. Most importantly, these students were focused, hard-working and they had relatively strong digital skills compared to younger learners so that it would be easier for me to embed multimodal composition experiences into the already packed course schedule. All students had their own Chromebook to use in class.

I met these students every day from September 2024 to the last day of school in December. The 4th grade group met every morning, and the 5th grade group met every afternoon. There were 10 students in each group and each ELD session lasted between 30-45 minutes. 19 of the students were Latinx and 1 student was Asian American. Most of the students' parents spoke Spanish only at home, so I prepared Spanish translated consent materials for students to bring home. The Asian American student's parents speak both Vietnamese and English at home, so they didn't request a Vietnamese translation. All twenty students returned their signed parental consent forms and signed the assent forms. All students were proficient in spoken English and they talked to each other mainly in English in class. Mrs. B also mentioned that most of these students were born in the United States or immigrated here when they were very young. Towards the middle of the semester, there were two new students joining the 5th grade group and I often heard them talking with each other in Spanish. One of the students searched resources and used Google translate to facilitate their writing process.

Students in both groups knew each other and had close relationships. I often saw them helping each other by tackling technological problems together and giving each other feedback about writing. These students were also expressive when Mrs. B and I asked them questions. They were active thinkers and learners in class.

4.3 Methods of Data Collection

Throughout the academic semester, I collected various data related to writing curriculum, and teaching and learning in the two focal classrooms through qualitative methods. This set of data was collected during weekly one-hour instructional co-planning time with Mrs. B, two ELD sessions per day over 12 weeks as well as several unstructured reflective conversations with Mrs. B after each class session. Due to the design-based research approach this study had taken, co-

designed lesson artifacts and students' writing samples were also collected for analysis. In sum, data sources include classroom observation field notes, researcher's reflective memos, semi-structured interviews and informal conversations with Mrs. B, conversation notes with students, post-research student survey, students' writing artifacts, co-designed lesson materials and curriculum artifacts. The details of each data source will be described below.

Semi-Structured Interviews and Informal Conversations

I conducted a semi-structured interview with Mrs. B after my first in-person school visit. After the end of the school day, we sat in Mrs. B's classroom, and the interview took about 30 minutes. The purpose of this interview was to understand Mrs. B's beliefs about teaching multilingual learners and using digital tools in classrooms, understanding of multiliteracies and multimodalities, her expectation of this research project and possible concerns. The interview protocol can be found in Appendix A. Mrs. B expressed her uncomfortableness of using audio-recording devices. Respecting her will and understanding that using recording devices may affect how research participants respond to questions, I didn't record the interview. Instead, I jotted down notes while we were talking and immediately composed the notes to recover as many details as possible. Mrs. B intentionally spoke slowly to make sure I could write down as much information as possible. I also asked clarification questions and follow-up questions during the interview to ensure I didn't misunderstand any answers.

Besides this semi-structured interview, this research also involved weekly instructional co-planning and daily after-class debriefing conversations. The co-planning usually took 45 minutes to one hour when we met every Monday before class to discuss learning in the prior week and plan for this week. Sometimes after-class conversations could be brief, taking 10-15 minutes, due to Mrs. B's schedule for other duties; while other times, it could take more than 30

minutes. Still, I didn't record any of these conversations because Mrs. B preferred not to and I aimed to make these conversations as natural as possible to best elicit Mrs. B's perspectives and fostered our partnership as a mutual learning experience instead of merely a method for data collection. During these conversations, we often looked at each student's writing samples together to notice needs and new progress, discussing possible ways to adapt original lesson plans to make them more multimodal and engaging, negotiating emerging concerns, as well as sharing our own joy in this process. I composed notes after these conversations, and I added screenshots of lesson materials and students' writing artifacts on those notes to best contextualize the information.

After the last day of class, we had a 15-minute interview to wrap up this research project and share our own learning and experiences. I followed up Mrs. B with some questions through email, and I also recorded her written response on the email. All notes about conversations and interviews were checked and confirmed with Mrs. B to make sure to capture her ideas.

Collection of Lesson Artifacts

Using the design-based approach, this research involved co-designed lesson artifacts. I collected the original writing curriculum including lesson plans, reading texts and slides to ground my discussion with Mrs. B about which part of the lesson could be adapted, deepened and expanded with digital and multimodal resources. We also used Padlet as the adapted teaching platform and I collected four Padlet boards with rich posts created by me, Mrs. B and students from two classes. These Padlet boards were important sources to reveal how lessons were adapted in a new approach, and how all educational stakeholders in this space co-created this multimodal learning experience over time.

Class Observations

I attended both groups of ELD sessions every day. Instead of being a distant observer of Mrs. B's class, I not only co-designed lesson materials but also helped facilitate students' writing process. I always sat next to or at the same table with students to listen to their discussion, asking questions about their writing and giving feedback as their writing projects unfolded.

Because each class session involved Mrs. B's instruction and a few students' parents preferred their children not to be audio-recorded, I didn't record anything in class. Also, children who had permission for recording and those who preferred not to usually sat together because there were only two big tables in the class, making recording even more challenging. As such, I carried a pen and a notebook while I was in class to write down my observations and finalized the complete notes right after school.

During Mrs. B's instruction, I took field notes regarding the focus of that specific lesson, students' ideas and questions about the topic. When students engaged in the writing process, I walked around the classroom to firstly have a general understanding of their progress, what literacies skills were evident, and what questions they asked me or Mrs. B. Because of the short class time, I focused on 2-3 children in each session to note down more details about their writing process and discuss with them. In this way, I was able to talk with and observe every focal child in each course module. My observation was shared with Mrs. B after each class to confirm if she noticed similar things or something different.

Collection of Students' Writing Artifacts

Two types of students' writing artifacts were collected. Firstly, these students were able to create digital books with the tool Book Creator in the first two modules of the semester. I downloaded copies of their books after each writing session to observe their writing progress

over time. Due to the short time left for the last writing module (3 weeks) at the end of semester, we didn't have sufficient time for completing digital book making projects as prior two modules. Instead, students engaged in writing posts on the Padlet board to express their learning and opinions about the topic. These posts were collected as a record of students' learning.

Conversation with Students

It was challenging to find time outside of the classroom to formally interview students because the school schedule was packed. The only opportunity for me to have conversations with students was during ELD sessions when students were writing. Everyday after class, I wrote down who I talked with and what we talked about. Our topics usually focused on their perceptions of using various digital tools for writing, students' understanding of the writing topic, questions about how they used multimodal resources to make meaning and their experience of this learning experience (see Appendix B for sample questions).

Post-research Student Survey

Due to many new transitions happening at the end of the semester, Mrs. B and I decided to use a survey with open-ended questions to elicit and conclude students' writing experiences in this multimodal learning space instead of doing semi-structured interviews to gather information from most students and save time. I posted questions on Padlet, a tool students had been using for the whole semester and students verbally recorded their responses under each question. This process took about 15 minutes. After that I transcribed students' answers.

Researcher's Reflective Memos

Believing that qualitative research was a reflective process shaped and reshaped by shifting context and interaction with participants, it is important to record the researcher's evolving interpretations of the complex learning ecology. As a research project involving lesson co-design experience, these reflective memos helped me identify emerging challenges and areas of improvement to discuss with Mrs. B and notice new learning in the process.

Every day after composing classroom observation notes, and reading through other data sources collected that day, I composed my reflective notes for initial interpretation of teaching and learning in the day as well as my own learning as a researcher.

4.4 Phases of Data Collection

I started this research project at the end of September 2024 when I obtained all research permissions from the school district, the school and Mrs. B. I concluded this research at the end of December 2024. Table 4.4.1 is an overview of four main stages of research implementation and data collection over 13 weeks.

Table 4.4.1
Overview of Data Collection

Phase	Time	Data Sources
Phase 1. Entering the field	Week 1	● Teacher interview ● Curriculum materials collection ● Instructional co-planning notes
Phase 2. Dive into context & Initial lesson co-	Week 2 - 6	● Classroom observations

designing	**Curriculum topic:** Module 1 4th grade: Apex predators 5th grade: Health benefits of owning a dog	• Teacher conversations • Curriculum materials collection • Instructional co-planning notes • Researcher's reflective memos • Students' writing artifacts collection • Student conversations
Phase 3. Co-designing and implementing	Week 7 - 13 **Curriculum writing topic:** Module 2 4th grade: Mr. Ferris and his wheel 5th grade: Cesar Chavez and his fight for social justice Module 3 4th grade: Plastic straw ban 5th grade: Plastic straw ban	• Classroom observations • Teacher conversations • Curriculum materials collection • Co-designed lesson materials • Instructional co-planning notes • Researcher's reflective memos • Students' writing artifacts collection • Student conversations
Phase 4. Wrapping up and exiting the field	Week 13	• Teacher interview • End of research student survey • Researcher's reflective memos

Phase 1. Entering the Field (Week 1)

In the first week after I obtained research permission, I interviewed Mrs. B to understand the classroom context and collected curriculum materials. The ELD class used the required writing curriculum. I asked Mrs. B questions about her perception of using this curriculum and discussed in what ways this research project can be fitted in. Additionally, I asked more questions regarding her teaching beliefs and possible concerns of my research project. This interview provided contextual information for my later observations of how Mrs. B implemented

the required curriculum and what she did to adapt the curriculum based on her belief about multiliteracies and multimodalities. During our first instructional co-planning session, Mrs. B walked me through the first module students were learning and the digital book project she was going to do with these students.

During this week, I stayed in the classroom mainly to build up the relationship with Mrs. B and children and made them feel more comfortable with me being in class. I also started my consenting and assenting process. We made the plan that I would join class every day (except school closure and class cancellation) even though students might not write in every session. The goals were to have a deep and holistic understanding of students' writing learning process and help students respond to my research in a more natural way.

Phase 2. Dive into the Context and Initial Co-designing (Week 2-6)

From week 2 to week 4, I stayed in the classroom for observation, and we didn't implement any intervention yet because design-based research required an in-depth understanding of context and specific issues to be addressed. Prior research has recognized that integrating digital multimodal composition experiences into formal educational settings as challenging (e.g. time pressure, standardized assessment requirements, scripted curriculum, reductive understanding of multiliteracy), therefore, figuring out what exact challenges that hinders multiliteracies and multimodalities in this particular language and literacy classroom was foundational for later teacher-researcher co-designing to be more beneficial. During these three weeks, my classroom observations focused more on Mrs. B's teaching, especially how her teaching reflected (or not) her beliefs shared in the pre-research interview and how her implementation of mandated curriculum invited or excluded multimodalities for meaning

making. I also observed what literacies skills students demonstrated in class to start to understand their possible strengths and learning needs.

From week 4-6, I started to support students' writing projects when they worked on their own digital books. There were two big table groups in the classroom. When Mrs. B worked with one group, I joined the other group to observe their composing process, resolve technological problems, brainstorm with students and ask questions to students about their writing and understanding of the topic.

In this phase, the instructional co-planning sessions focused on how I could start to participate in supporting students' digital book making projects and possible solutions for challenges we noticed about integrating digital and multimodal projects for next modules. Students' digital book drafts were collected every day after class for a discussion with Mrs. B about students' writing progress and possible next steps. Overall, this phase was mainly directed by Mrs. B following the mandated writing curriculum with my support when students started making their own digital books.

Phase 3. Co-designing and Implementing (Week 7-13)

Different from phase 2, in phase 3, Mrs. B and I collaboratively adapted and redesigned the original curriculum and implemented this new version of writing lesson with both groups of students. I started to play a more active role in this phase from planning and adapting lessons, facilitating instruction and scaffolding writing projects. Therefore, I had more opportunities to talk with students about their writing and with Mrs. B about what was going well and what was not in each session. I composed the dominant number of conversation notes and reflective memos in my data corpus during this phase. I also shared with Mrs. B my noticing about students' writing based on my notes.

This phase involved teaching two modules (module 2 and module 3) in each group. There were many co-designed lesson artifacts created (e.g. images relating to writing topics, videos, audio recording, posts) besides original curriculum lesson plans. I used Padlet boards as both a learning space and a platform to save all materials created. Module 2 involved making a digital book as module 1, so copies of digital books were downloaded every day to track each student's writing progress, generating questions for the next day to discuss with students, and discussions with Mrs. B to adjust teaching. Mrs. B sometimes left written comments on the digital books, and these comments were also saved as these books were downloaded. Due to limited time towards the end of the semester, we only used the Padlet board for learning and writing for module 3. Students made posts on the board as their writing samples instead of making digital books. These posts were automatically saved when they posted them.

Phase 4. Wrapping up and Exit the Field (Week 13)

Moving towards the end of the semester, I wrapped up the research and prepared for my exit from the site. During the last week, after students finished their posts, Mrs. B helped me assign two new Padlet boards to both groups of students as end-of-semester surveys. Students wore headphones and recorded their responses to each question. After the last class, also the last lesson Mrs. B taught in Sunrising elementary school due to her new position in the school district, we had our teacher interview regarding her experiences and her perceptions of students' learning. I also sent a follow up email that day to check and confirm her answers to my interview questions. Table 4.4.2 shows my data corpus with various pieces of data collected.

On the last day of the semester, together with other classroom teachers, we hosted a hot coco celebration for all students when I was able to give them thank you letters to express my appreciation of their hard work and progress in this semester.

Table 4.4.2

Data Corpus

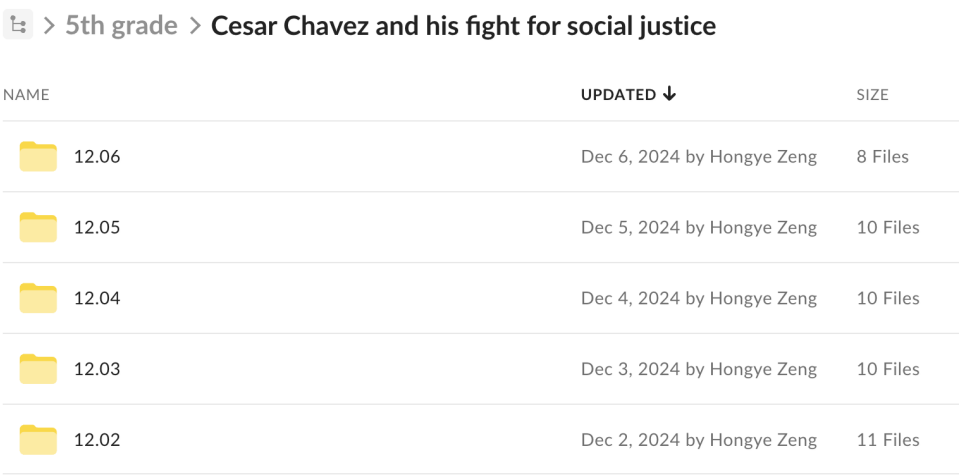
Category	Total
Class observation	59 sessions (30-45 minutes/session)
Instructional co-planning	12 hours
Teacher interview	2 semi-structured interviews
Field notes (including class observation notes, conversation notes with teacher and students, researcher reflective memos)	46 documents
Student post-research survey	14/20 students responded (6 students were absent from school)
Lesson artifacts (original curriculum + co-designed lessons)	● 3 modules for 4th grade ● 3 modules for 5th grade
Student writing artifacts (copies of digital books of multiple drafts & Padlet posts)	● 237 drafts of digital books ● 31 student-created Padlet posts

4.5 Data Management and Initial Analysis

There were two types of data being collected: artifacts and field notes. I created two folders in a password-protected cloud storage platform for each type of data. In the artifact folder, I made two folders, one for lesson artifacts by module and the other for students' writing artifacts and end-of-research surveys. The students' writing artifacts folder contained two sub-folders for 4th grade and 5th grade groups, under which writing samples were organized by module and dates collected (see Figure 4.5.1 for an example).

Figure 4.5.1

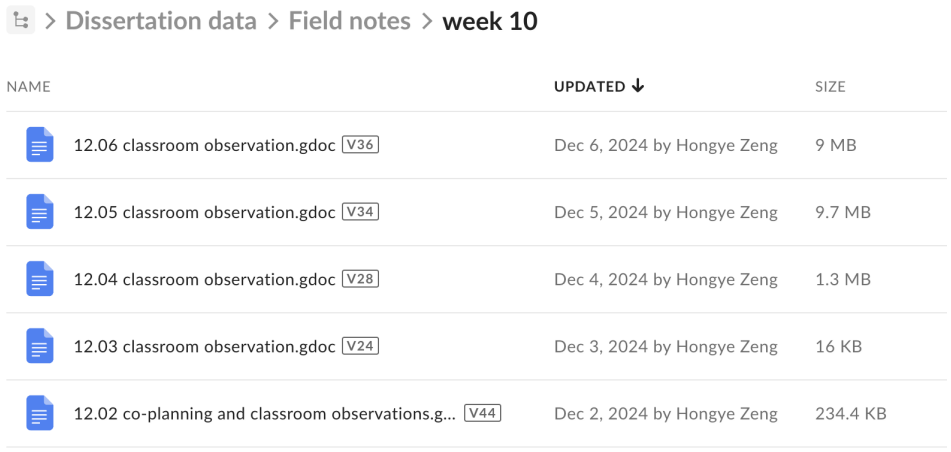
Sample of Students' Writing Artifacts Organization



Within the field notes folder, I created folders for each week where I added weekly instructional co-planning notes, classroom observations for each day in that week and teacher interview notes. Because conversations with Mrs. B and students can happen every day and I engaged in continuous reflection. I moved conversation notes to daily classroom observations to have a fuller picture of what happened that day. I also added my reflective memos at the end of each observation field note.

Figure 4.5.2

Example of Field Notes Organization



The data interpretation and analysis was a nonlinear and continuous process. I engaged in initial data analysis while I was collecting data. I read through various pieces of data collected in one day and composed my reflective notes. Oftentimes, I screenshotted students' writing samples and add them to my field notes to supplement my observation of students' writing process and conversation with them. I consider my daily researcher reflective notes as a record of my interpretation and preliminary insights of how learning evolved (or not and why), my noticing about students' literacies skills and needs, ideas that needed to be further discussed with Mrs. B to create a multimodal learning space. This reflective inquiry kept evolving, changing and revealing possible directions to answer my research questions as the research project unfolded gradually. Toward the end of my research, I had a sense about what tension moments and navigation of those moments were critical to foster a multimodal learning space, as well as multiple ways this multimodal learning space could be supportive to students' writing experiences. With this general initial understanding of the complex phenomenon, I started my formal data analysis after I officially exited the field.

4.6 Data Analysis

I had two research questions. The first research question focused on how Mrs. B and I collaboratively negotiated language-focused and assessment-pressured context to foster a multimodal learning space through three modules of writing lessons. The second research question examined 7 focal students' learning in this evolving and co–designed space. For each question, I adopted different analysis methods and different (although overlapping) pieces of data to best answer it. I explained in more detail in this section about how I used these methods to analyze related data.

Trustworthiness

Several strategies were used to ensure the trustworthiness of the analysis. Firstly, multiple sources of data were collected for triangulation. The interviews, conversations, observations and artifacts were used to contextualize the analysis and ensure my interpretation of what happened in the classroom is comprehensive. Secondly, although no video and audio recording were implemented in this research, conversation and interview notes were composed immediately after these sessions and were confirmed by the focal teacher and students to capture their ideas. In addition, the data analysis process was continuous and iterative. I engaged in initial data analysis while collecting data and wrote researcher's reflective memos to track this initial analysis. These analytical notes kept being revised and refined as the research project proceeded. After the end of the research, I conducted data analysis again and holistically. Lastly, committee members and other doctoral colleagues continuously provided valuable feedback during the data collection and analysis process to ensure the rigor of this research project.

Research Question 1: Thematic Analysis (TA)

I adopted thematic analysis to explore possible answers to the first research question: What are some design strategies to foster a multimodal learning space in elementary English language development (ELD) classrooms? Although there are different approaches to do thematic analysis (TA) in different disciplinary areas and with different theoretical frameworks, I followed Braun and Clarke's (2006) definition and approach to TA which emphasized its flexibility and agency of the researcher in the process. Taking this approach meant believing that themes did not exist waiting for researchers to discover and would not automatically emerge; instead, research analysis was an agentive and creative process "at the intersection of the data, their (researchers') theoretical and conceptual frameworks, disciplinary knowledge, and research skills and experience." (Terry et al., 2017, p.7). Therefore, the researcher's interpretation of the

phenomenon should be in depth, not merely describing what happened or counting frequency of code occurrence. The analysis process was inductive without any predetermined patterns and recursive involving continuous reflection and revision of codes and candidate themes. I followed the six-phase of TA (Braun & Clarke, 2006; Braun et al., 2015; Terry et al., 2017) to analyze data.

Familiarizing with the Data. Although I continuously engaged in analyzing data and composing reflective memos as the data collection process went on, I familiarized myself again with the whole data corpus after the research was wrapped up to examine them in a full picture. To answer the first question regarding lesson designing and teaching, I mainly used classroom observation field notes, instructional co-planning, formal and informal conversations with Mrs. B and my reflective memos as key sources of data analysis. I also referenced students' writing artifacts as necessary. I used Google Docs to keep record of these data sets and combined various pieces of notes together by dates. As such, I only had one document for each day. I highlighted excerpts that caught my attention and used the comment function to make annotations about my initial thoughts and interpretations about those excerpts. As I read through these data sources and annotations, I wrote “provisional analytical ideas” on a Google sheet (Terry et al., 2017), which means informal interpretation and sense of possible directions of interpretation before the formal stage of coding.

The process was iterative moving back and forth between data sources, annotations and early provisional ideas. The implementation of this research took the design-based research approach over three modules; thus, the co-planning, observation and conversation focuses were slightly different from module to module. Therefore, I analyzed the data corpus module by module.

Figure 4.6.1

Example of Provisional Analytical Ideas

A	B	C
module 1	**module 2**	**module 3**
mismatch between teacher's beliefs and practices	Keep the tool simple but with potential for multipurposeful use	more flexibility towards the end of the semester
REAL pressure and short-term goals to achieve	Teacher-researcher discuss spatial presentation of information	presenting multiple new genre texts (social media, maps, posters) to expand students' understanding of where to get information
digital and multimodal resources already in classroom	Padlet as a growing learning space recording learning progress	practice reading and interpreting information from multiple typ and modes of texts
willingness to take risk vs. structured curriculum	story/ information on and behind each photo/ photos as connection to real life experiences	connecting to assessment and standards in a more authentic and fun way
need and resource analysis for both teacher and students	KWL chart in a digital version (SMAR model)	hands-on manupulatives (textual resources)
context and need dirven research design	speaking, discussion, reading, watching, interpreting before writng	during co-planning and brainstorming stage: complementary focuses
mismatch between teacher's goals and researcher's initial plan (Monday vs. Someday)	multiple (new) genres of texts for accessing information	time pressure (2 weeks): posts as quicker writing practices

Generating Codes. I read again annotations and provisional analytical notes made in the prior stage and color-coding them into different categories. During the first round coding, I still analyzed module by module because the content, context, relationships between researcher and teacher and students kept changing. Investigating and interpreting tension moments, opportunities, strategies specific to each module was easier to capture the complexity and dynamics of the classrooms.

Using open coding as the first round coding method, the analytical ideas captured in module 1 had a focus on context, challenges, opportunities, teacher's initial practices, students' funds of literacies skills. Moving to module 2 when Mrs. B and I redesigned the original lessons, there were many notes about changes made, teacher's and students' responses to new changes, emerging learning moments, missed teaching opportunities and ideas for improvement. Lastly, notes about module 3 not only centered on aforementioned focuses on module 2, but also touched upon limitations and our envision for future as well as overall experiences. As shown in Figure 4.6.2, for each module, I categorized early analytical ideas and annotations into categories

of “challenge” “opportunities” “strategies” “changes and emerging learning” “missing opportunities” and “other ideas interesting but may not relate to research questions”. Under each category, I collapsed and combined similar analytical ideas as broader codes.

Figure 4.6.2

Example of Module 1 Codes in First Round Coding

1. What did some challengese and tensions emerged in the process of designing and implementing multimodal learning space 2. What are some strategies and practices we changes/ learning/ noticable moments throughout the three modules?		
module 1 mainly observe and support in the later stage of module 1 (challenegs, opportunities, boundaries, context)		
challenegs	**opportunities**	**strategies**
Teacher's beliefs and goals can be different from research's	**co-learning experience bwteen researcher and teacher**	**from "challneging" to "understanding"/ cultivating co-learning mindset**
mismatch between teacher's beliefs and practices	Teacher's changing perceptions/ practices about non-linguistic components	researcher continuously changing plan and quick decision making
willingness to take risk vs. structured curriculum	emerging issues/ problems as co-learning opportunities (with teacher and children)	from "challenging" to "understanding" (what is our common ground? Why Mrs.B explicitly enphasized "academic language"?): English-only, CRP, prioritize language as the only legitimate way of meaning making
mismatch between teacher's goals and researcher's initial plan (Monday vs. Someday)	Identify langauge learning goals (structure & summarizing key details)	proposing ideas and teacher played the role to make decisions or pick some ideas
different definition of learning "writing"	hope a space for sustaining practices	reay for and embrace messiness of fisrt project (learning curve)
multimodality as "extra" OR "integrated" components	mixed feeling about testing (how we understand students' learning)	context and need dirven research design
learn to write vs. write to learn?		
Constraints that make multimodal learning hard to implement	**Recognize and affirm funds of literacies knowledge and practices**	**continuous needs and resources analysis/ an intervention growing from the classroom**
time pressure (why time was a problem in implementing and moving forward, short class time, reviewing content, testing & other events)	Multimodal writing as a interconnected experience (researching online, reading text, writing, decision making)	multimodal writing experience is more than "writing" (throughout the whole learning experience, not just writing sessions)

Different from the first round coding, I identified codes across three modules to capture the whole process of the research project in the second round coding. After rereading the initial codes, I used focused coding to identify “the most frequent or significant codes” from key categories (Saldaña, 2016, p. 240) to understand what challenges we were facing throughout the whole research process, what strategies and adaptations we made module by module, what changes we noticed about the teacher, students, researcher’s perceptions and the learning space as time went by, as well as lingering challenges and missing opportunities that we didn’t effectively address. Table 4.6.1 shows codes and examples of those codes.

Table 4.6.1

Categories, Codes, and Examples of Second Round Coding

Categories	Codes	Examples
Interrelated Challenges	• Systemic and contextual constraints & time pressure • Teacher's beliefs and practices • Students' perceptions and skills of multiple literacies	**Example 1 (classroom observation):** Student: *Can I add a picture here?* Mrs. B: *We only focus on writing. No pictures today. If you finish your writing, I will check and then you can add a picture you like.* **Example 2 (conversation with students):** Researcher: *I saw you add some pictures on your book cover. Why did you do that? How did they relate to your ideas?* Student: *I don't know…(think for a while). The reading is about dog.* Researcher: *That makes sense, but why do you use funny dog memes?* Student: *I don't know. They just look fun.* Researcher*: How do they relate to what you wrote about the health benefits of owning dogs?* Student: *I don't know. They just look funny. (then immediately deleted those memes).*
Strategies & Continuous Adaptations	• Building upon available resources, practices, skills • Prioritizing academic requirements • Textual rich instruction and scaffolding • Multimodality for multiple types of connections • Promoting peer learning opportunities and agency • Community building (teacher, researcher, students)	**Example (instructional co-planning session):** Researcher: *What are some digital tools you often use for teaching?* Mrs. B: *I liked using technology in my class. Before I used flipgrid, NewsELA. Now I mainly use BookCreator and Nearpod. These kids have been working with me since last year. They already know how to use these tools. Last year we also presented student-created books in our library.* Researcher: *That is awesome and we should keep using the same tools to save time for teaching how to use them. Are you familiar with Padlet?* Mrs. B: *Yes, I used it a lot before but I haven't used it for a while.* Researcher*: I was thinking about also integrating Padlet for teaching. I read the lesson plan last night and I think we can use Padlet to modify the KWL chart activity.* Mrs. B: *Oh, KWL chart, I like that. Probably we can use the Padlet for some quick writing?* Researcher: *I would love to have kids create posts! I was also thinking about adding some posts relating to the module to give them more background knowledge and resources for learning. But I will for sure relate*

		them to the curriculum. Mrs. B: *This is a good idea. Do you want me to create a board and share with you? Can you organize things into different sections?*
Changes & Learning	● Teacher's perceptions of values of multimodality for academic learning ● Teacher's changing goals for teaching writing ● Students' use of non-linguistic resources for expression ● Students' writing improvement ● Relationship building	**Example 1 (conversation with the teacher):** Mrs. B: *I am glad you brought this tool back to our classroom. In the beginning I couldn't think about how we can use the Padlet to teach writing. I was thinking about doing some quick writing or probably an exit ticket at most. I think I will not only use it for teaching. I will also use it for my other and future work like doing presentations. I think it really helps us to keep and save all valuable conversations happening in the classroom. This really also helps us to go deeper into the topic compared to the original lesson plan.* Researcher: *Also, I saw them moving between Padlet and their writing frequently. They read their peers' posts and posts created by us! I think they are actively using available resources to support their writing.* Mrs. B: *Yes, this is really helpful. I know one student's parents helped her do homework at home and used this as a resource to know what the kid was learning in class.* Researcher: *wow, it is really good to hear about how it connects home and school learning.* **Example 2 (conversation with students):** Researcher: *How do you feel about your writing project?* *Student: I think I am doing so good!* Researcher: *I definitely agree and I really enjoyed reading your writing. Can you show me what parts you think you did really well and why?* Student: *I think my writing structure is good. I wrote an introduction and conclusion. I used a lot of good information.* Researcher: *What about your book cover and these pictures you used?* Student: *It is really good because I know the stories behind these pictures. (point to one of the photos) I chose this one because I want to show Cesar Chavez talking to a lot of migrant workers. (point to another photo) This one is about him forming a union and fighting for people's rights. So people can see why he is*

		a hero.
Missing Opportunities & Expectations for Future	• Needs for systemic and institutional support • Explicit teaching of metamodal awareness • Criticality of using, consuming, creating multimodal information • Teacher community collaboration	**Example (conversation with teacher):** Researcher: *Do you know why they are not open to it, although we shared our practices and materials?* Mrs. B: *They don't use technology in the classrooms. One teacher said her classroom didn't even have a touch screen. But these digital practices are what students are doing and familiar with. They like doing this. Or maybe they don't want to try new things because they don't know how to use it. They just want to focus on testing for 4 months and that's it.* Researcher: *Do you have professional training preparing teachers to use new tools and new practices?* Mrs. B: *We had that a few weeks ago. Someone came to teach us how to use Book Creator. But I know I am still the only one using it.* Researcher: *Honestly, I am very sad because when I chose these tools, I reduced the number of tools involved and only used tools that are popular among teachers…* Mrs. B: *Even tests are on the computer. It really surprised me that they would say no. I know they don't want to take extra kids. They want to do what they are doing for a long time. It is really unprofessional to shut down new practices and not be open-minded for the benefits of students. I showed them that this is even more rigorous than the curriculum. But I really don't know why. We didn't have a happy conversation yesterday…We never collaborate and I think they don't even want to see me today because they don't want to talk to me.*

Identifying Themes. After the coding process, themes of understanding the "boundaries" of doing classroom intervention, balancing the teacher's academic goals and researcher' goals, and seeking institutional professional community's support became "candidate themes" (Braun & Clarke, 2006). With these themes, I engaged in reading again excerpts relating to each candidate theme to see if they align with each other and capture information that can answer my research question. However, these candidate themes turned out to be too general to capture the role of multimodality in this process and not being able to explicitly answer the research question

with some design insights. I revised themes and repeated the process to identify design insights that can directly answer my research question. In the end, five themes were developed. These themes will be explained in detail in Chapter 5.

- **Theme 1:** Understanding systemic challenges shaping teacher's choices and implementation of multimodality
- **Theme 2:** Identifying and leverage existing classroom resources to redesign curriculum and instruction
- **Theme 3:** Using multimodality as an anchor for academic, social and real-world connections
- **Theme 4:** Transforming multimodal learning into interactive and student-led experiences
- **Theme 5:** Seeking institutional and professional community support for sustainable multimodal practices

Research Question 2: Multimodal Analysis (MA) & Thematic Analysis (TA)

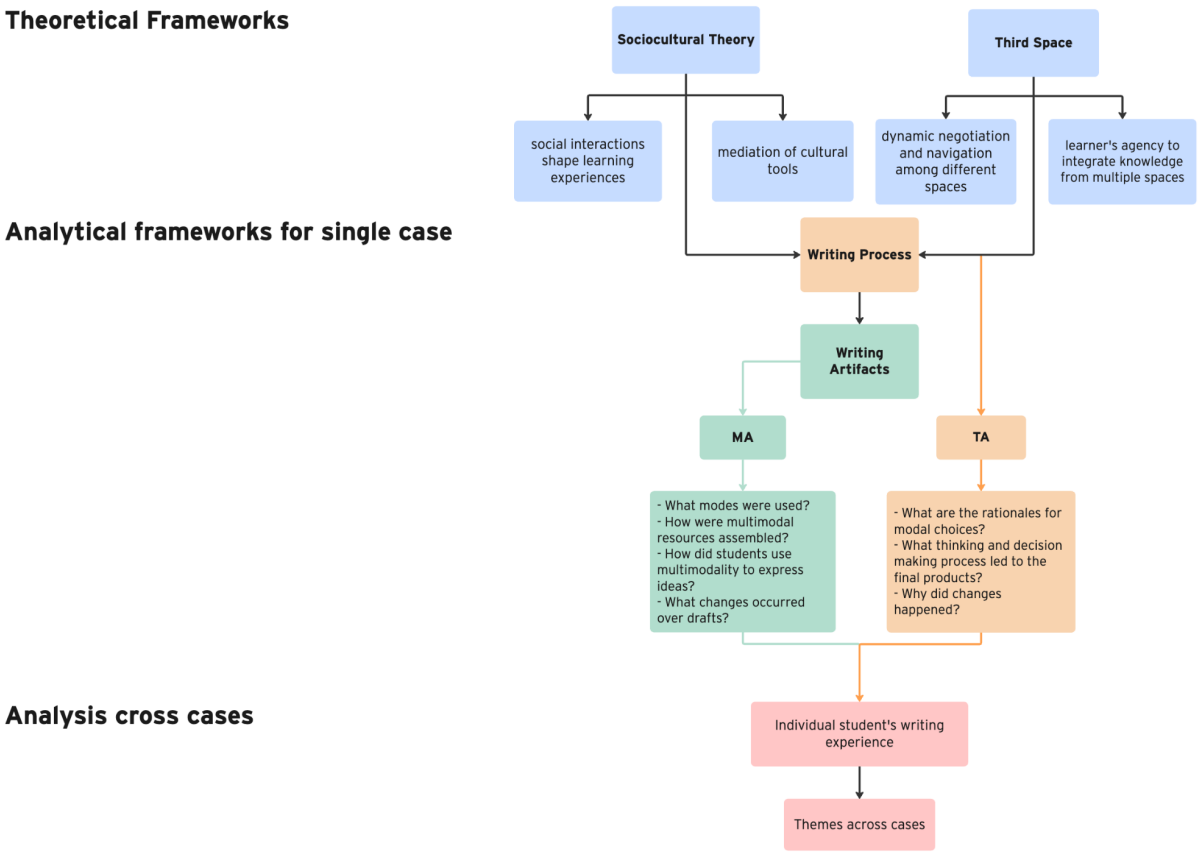
Research question 2 zooms in on the multimodal learning space and examines students' writing experiences within this dynamic and shifting context. In this question, I ask: How does this multimodal learning space offer multilingual learners more learning opportunities? Understanding students' multimodal composition experiences requires analysis of both students' writing processes and products. Grounded in sociocultural theory (Vygotsky, 1978), students' writing artifacts do not exist alone; instead, they are influenced and shaped by the context and interactions happening in the learning process. Additionally, third space theory emphasizes students' agency in integrating knowledge from different spaces to facilitate new learning. Due to the constraints of the research context, students were only allowed to use 1-3 pictures for each of their writing projects. It is critical to investigate students' thinking and negotiation behind the

choices of a limited number of non-linguistic resources. Therefore, thematic analysis and multimodal analysis were combined to analyze students' writing experiences in this multimodal space holistically and in-depth.

Thematic analysis was used to analyze students' writing process with data sources including observation notes and conversation notes; multimodal analysis (MA) was adopted to dissect students' multimodal composition artifacts. These two analytical tools provided different but complementary perspectives, especially on how the multimodal learning experiences shape the final writing products. Figure 4.6.3 shows the data analysis mind map for research question 2. MA and TA were combined for investigating each individual student's writing experience. Followed by that, themes across different cases were identified to answer the research question.

Figure 4.6.3

Data Analysis Mind Map



Creating Portfolios for Focal Students.

Identifying Focal Students. Although 20 students participated in this research project, I identified and focused on 7 students (see table 4.6.2) for in-depth investigation (all names are pseudonyms). The first reason is that a few students missed some sessions due to different academic and personal reasons. There were two students who transferred from other schools and joined us three weeks after the start of the research. I chose students who consistently came to class. Secondly, because of the short class period and packing lesson schedules, I was only able to have conversations and closely observe maximally 4 students for each session (1-2 students in each table group). Therefore, I analyzed students who I had the most opportunities to work with in both classes to ensure the richness of data. Lastly, I chose students who were most willing and active to share their ideas with me to understand their writing experiences. In the end, 3 students

in the 4th grade group and 4 students in the 5th grade group were identified as my focal students. These students usually sat together so that I could listen to their conversations at the same time. These students provide the richest set of information that contextualize their writing artifacts and thinking behind their designing.

Table 4.6.2

Focal Students

Name (pseudonyms)	**Race**	**Home Languages**	**Gender**	**Grade level**
Amelia	Latinx	Spanish	Female	4th
Edgardo	Latinx	Spanish	Male	4th
Yuna	Latinx	Spanish	Female	4th
Elisa	Latinx	Spanish	Female	5th
Nina	Latinx	Spanish	Female	5th
Jamie	Latinx	Spanish	Male	5th
Eddie	Asian American	Vietnamese	Male	5th

Selection of Focal Modules. I made portfolios for each focal student using Google spreadsheets to track and record information regarding different drafts of writing, researcher's day to day memo about students' writing, class observation notes, conversation notes with the student. Instead of analyzing writing experiences over three modules, I chose to only highlight students' experiences from module 1 to module 2. There are several reasons for this decision.

- Firstly, module 1 and 2 took up the majority of the semester, whereas module 3 only took 3 weeks. Due to the hectic schedule during module 3, students didn't have opportunities and sufficient time as prior two modules to write and design their final multimodal

project. Instead, we adapted the planned writing activity as making quick Padlet posts, which only included one picture and a short paragraph of writing. Students didn't engage in revision and redesigning their compositions over multiple drafts as the other two writing artifacts. Therefore, the writing artifacts from module 3 might not reveal as rich information about students' multimodal decision making as prior two modules.

- Secondly, writing in module 3 took a relatively short time (the last 2 class sessions), and I didn't have the opportunity to have a deep conversation with students. Therefore, module 1 and 2 has more information regarding students' thinking about their experiences.
- Lastly, module 1 and 2 presented a great shift in ways that multimodality was integrated in the class. This shift can be reflected in students' processes of composing and their final artifacts, which may reveal valuable insights about in what ways engaging in multimodal learning space influence (or does not influence) students' writing process and products.

Initial Data Screening and Organization. After initial thorough reading of all data sources again, I realized it was insufficient if I only analyzed data from writing sessions because writing is a process that starts before students formally write down ideas and instructions affect students' later writing. Therefore, there are three main stages of the writing process in this research: pre-writing, language-focused writing, and multimodal composing/ designing. In the prewriting stage, students engaged in learning new knowledge and new skills and creating graphic organizers for later writing. Different from module 1, module 2 also involved creating several Padlet posts at this stage before making graphic organizers. In the second stage, students drafted their writing with a focus on their language skills. Moving to the third stage, students had more flexibility in making multimodal designs of their composition. The boundaries of these three stages are not clear-cut. For different students, they might move forward on different dates

depending on their own preferred way of writing and their levels of completing Mrs. B's writing requirements.

Table 4.6.3

Writing Stages and Related Writing Artifacts

StageS	Writing artifacts
1. Pre-writing	Module 1: Graphic organizers
	Module 2: Graphic organizers, student-made Padlet posts
2. Language-focused writing	Writing drafts
3. Multimodal composing/ designing	Multimodal drafts

With the aforementioned two decisions about what data to analyze for this research question, there are 7 student portfolios created with 2 data tracking spreadsheets (one for module 1, the other for module 2) in each student's portfolio. Each data tracking spreadsheet has corresponding parts to the three writing stages. Specifically, in the pre-writing section, I summarized student's practices during instruction sessions and how their graphic organizers (and Padlet posts in module 2) reflected learning and needs. In the sections for second and third stages, I pieced together different data sources in several columns. The first column of the spreadsheet records students' drafts of compositions with specific dates. Based on the date, in other columns, I added observation field notes taken on that day about the student, my researcher's memos and initial interpretations of students' drafts, students' responses to my questions and interpretations, as well as a summary of writing progress. This way of data tracking provides an overview of process and product for each writing session, and changes over multiple drafts. Table 4.6.4 shows the template of the spreadsheet.

Table 4.6.4

Example of Data Tracking Spreadsheet

Stage 1	**Summary of practices in class**			**Graphic organizer/ Padlet Posts**		
Stage 2	**Drafts**	**Class observation**	**Writing feedback**	**Conversation with student**	**Researcher reflective memos**	**Summary of progress and changes**
date						
date						
Stage 3	**Drafts**	**Class observation**	**Multimodal feedback**	**Conversation with student**	**Researcher reflective memos**	**Summary of progress and changes**
date						
date						

Thematic analysis is used across all three stages to understand students' writing process, whereas multimodal analysis is used specifically for stage 3 when students start to bring in multimodal components to their projects.

Multimodal Analysis (Focusing on Writing Artifacts). There are many branches and approaches (e.g. multimodal interactional analysis, multimodal discourse analysis, visual methodology, critical multimodal analysis, multimodal microanalysis) to do multimodal analysis, depending on researchers' interest and focus of the research. In this research, I chose the social semiotic approach of multimodal analysis (Kress, 2003; 2010), which focuses on 1) the semiotic functions of modes and 2) the agency of sign makers. Paltridge (2022) summarized key questions to investigate with this analysis approach:

> What meaning is being made in a text? How is meaning being made in the text? What resources have been drawn on to make the meaning in the text? In what social environment is the meaning being made? Whose interest and agency is at work in the making of the meaning? (p. 111)

The semiotic metafunctions approach to multimodal analysis originated from systemic functional linguistics which focuses on metafunctions of languages. Kress and van Leeuwen's (1996) semiotic metafunctions of images attend to non-linguistic modes, interpreting how meaning is achieved through visuals. There are three semiotic metafunctions: Representational function attends to how images symbolize meaning (Shanahan, 2013), Interactive function focuses on how different visual resources can construct attitudinal and evaluative meanings between composers and viewers (Shin et al., 2020), and Compositional function relates to the layout, organization and salience of visuals. Unsworth (2008) further explored the image-language interrelationship to illustrate how meanings were made across linguistic and visual modes. This attention to intermodal relation in construction of meaning aligns with the notion of synesthesia, an essential component of multimodal social semiotics framework. Taking these lenses together, the analytic coding attends to both linguistic and nonlinguistic functions, as well as how these multimodal resources interact with each other to express meaning.

As shown in table 4.6.4, I conducted preliminary multimodal analysis during the research process to generate feedback and questions for students to obtain information about students' agency and thinking of multimodal usage. After wrapping up the research, I conducted multimodal analysis again, building upon the preliminary multimodal analysis and taking the social semiotic lens. Taking into account the three multimodal metafunctions, I developed my own multimodal analysis tool (see Table 4.6.5) to ground my focuses and interpretations of

students' writing artifacts. The purpose of this analysis is to highlight students' learning. Therefore, I didn't rate students' compositions, instead, I conducted qualitative interpretations of their final version of writing artifacts.

Table 4.6.5

Interpretation Tool for Students' Multimodal Compositions

Interpretation Focus	Module 1	Module 2
Representational Function		
Overall content (How well does the student respond to the writing prompt?)		
Accuracy and richness of information (If the student captures most key information from different sources of texts accurately?)		
Compositional Function		
Variety of multimodal resources (What modes/ resources are used?)		
Language skills (What expected language skills are demonstrated in this project?)		
Layout/ Formatting (Is the writing artifact neat and clear to read?)		
Modal Coherence (Do these multimodal resources align, complement or enrich each other to better demonstrate student's learning and knowledge?)		
Interactive Function		
Audience awareness & engagement (If and in what ways does the student engage with readers?)		
Connections		

(What personal, academic and social connections does the student make about the writing topic?)		

Multimodal analysis provides a lens of how focal students respond to digital multimodal composition experiences. I composed a description for each student based on MA, summarizing the interpretations of their multimodal compositions. I reread, highlighted and annotated what modes were used, how did students orchestrate those modes, if the use of modes mediate meaning making, and what are some noticeable changes/ strategies/ considerations students made. For example, based on multimodal analysis, I noticed several pieces of evidence of students' progress: meaningful and effective use of visuals to express ideas, drawing upon information beyond the required reading text to enrich the writing content, improving accuracy of informational writing, and demonstrating different types of intermodal relationships (e.g. visual-language corresponding, complementing).

Thematic Analysis Cross Cases (Focusing on Writing Process). According to Paltridge (2022), the biggest critique of multimodal analysis is that it is very interpretive and only focusing on the multimodal product itself might miss the voices of creators. Therefore, after understanding composition content, multimodal assemblage and audience awareness of students' final drafts of digital books in two modules, I wove the data tracking sheet (Table 4.6.4) created earlier, which includes contextual and ethnographical information of the composing process leading to the final drafts, with the multimodal analysis notes (Table 4.6.5).

Following the thematic analysis procedure as the research question 1, I started from initial coding of these descriptions, with a focus on how the multimodal learning space might contribute to progress identified by the multimodal analysis. The initial coding process was iterative. I referred to my written description, writing artifacts, multimodal analysis notes of each student in order to identify codes. After the initial coding process for all seven focal students, I

read through these codes to categorize, collapse similar codes, and select codes I considered as relevant to the second research question. From these codes, I identified five key themes related to students' writing experiences, which will be discussed in detail in chapter 6.

- **Theme 1.** Digital multimodal composition is a differentiated writing experience for students with different learning styles, goals and language skills
- **Theme 2.** Multimodal learning space allows more opportunities for active peer learning
- **Theme 3.** Multimodal learning space deepens students' perceptions and meaningful use of multimodality for expressing ideas
- **Theme 4.** Multimodal learning space supports and deepens students' understanding of dense informational texts
- **Theme 5.** Multimodal learning space support students' affective engagement in writing tasks

Chapter 5 Redesigning and Fostering a Multimodal Learning Space

5.1 Chapter Introduction

This chapter aims to address the first research question: What are some design strategies to foster a multimodal learning space in elementary English language development (ELD) classrooms? This chapter has two sections. The first section "*Understanding, Adapting and Redesigning Writing Instruction*" introduces module by module the original and redesigned curriculum, teachers' practices and noticed challenges that led to adaptations and changes in two classrooms to unfold how the multimodal learning space was gradually established. The second section "*Design Insights to Foster a Multimodal Learning Space*" presents five design strategies identified through the implementation across three modules to navigate challenges and integrate digital and multimodal learning experiences to support students' writing learning.

5. 2 Understanding, Adapting, and Redesigning Writing Instruction

Mrs. B used a curriculum designed by local curriculum specialists and mandated by the school district's ELD office. The curriculum specifically focused on teaching different genres of writing (e.g. narratives, opinion writing, informational writing). The curriculum package included scripted 6-day lesson plans and slides for each module, reading texts (articles from Newsela or link to digital picture books), writing rubrics and other supportive teaching materials. For both 4th and 5th grade multilingual students, the structure of lesson plans in each module was the same, only the reading texts and writing topics were different. The 6-day lesson procedure includes: building up background knowledge and new vocabulary (day 1), close reading with scripted questions (day 2), making graphic organizers based on the reading text (day 3), independent writing (day 4), mini lesson and teacher conferencing (day 5), sharing and

assessing writing using a language-based rubric (day 6). It usually took Mrs. B at least 4 weeks to fully implement the 6-day lesson procedure because of short class time (20-35 minutes), cancelation of instruction sessions due to other events or testing, as well as children's learning progress. Mrs. B focused on teaching informational writing in this semester because she considered this genre as most challenging for her students due to its requirement for both reading and writing skills. Also, she mentioned that students were learning narrative writing during their ELA period, so she wanted to use the ELD session to support other writing genres. Despite the demand the use a scripted curriculum, Mrs. B still had the flexibility to choose which modules from the curriculum package to teach first based on her instructional goals, in this case, two modules on informational writing and one module of opinion writing were selected during the period of this research project.

Module 1. Teacher-Led Instruction

Mrs. B's Initial Practices of Digital Multimodal Composition. During the first module, I observed how Mrs. B used digital and multimodal resources for teaching in the first 3 weeks, and then I planned lessons with her as I got more contextual information. The first module in both classrooms took about 6 weeks to complete because it took some time in the beginning of the semester to set up the learning routine, build up literacy skills and teach the use of various digital tools (Google classroom, Google slides, Nearpod, Book Creator). Mrs. B mainly followed the procedure of the curriculum with some adaptations. For example, every Monday or Friday she specifically focused on supporting children's speaking skills instead of teaching the writing curriculum because she wanted to prepare students' English language skills in all aspects. Using Nearpod, she helped students listen to her reading of some key information about the topic of the writing module and students needed to respond to her questions with

recording. In this way, students could not only practice speaking skills but also be more familiar with the module's topic. Mrs. B encouraged students to use Book Creator to do their end of module writing project, although the original curriculum required paper-based essay writing. Table 5.2.1 and Table 5.2.2 show reading texts, writing prompts, as well as major teaching and learning activities in the first module for both classrooms.

Table 5.2.1

Module 1 Reading Text and Writing Prompt

Module 1	**4th grade**	**5th grade**
Reading text	Apex predators (YouTube picture book read-aloud)	If you live alone, owning a dog can reduce the risk of a heart attack (Newsela article)
Writing prompt	Write about three Apex predators and at least two features that make them Apex predators	Write about the health benefits of owning a dog. Include details from the article to describe how dog ownership improves the health of its owners

Table 5.2.2

Module 1 Teaching and Learning Activities

Week	**Teaching and learning activities**	**Digital and multimodal resources used**
Week 1 **Reading instruction**	- Teaching vocabulary - Building up background knowledge - Reading and discussing an article	- PowerPoint slides with visuals - Digital copy of reading text
Week 2-3 **Writing instruction**	- Reading and analyzing sample informational essays - Teaching how to write an introduction - Practicing distinguishing topic sentences and supporting details - Working on graphic	- PowerPoint slides - YouTube video about writing strategies (e.g. how to hook readers?) - Google slides for filling graphic organizers

	organizers	
Week 3-5 **Independent writing and revising**	- Reviewing vocabulary - Independent writing - Teacher conferencing	- Book Creator (designing function, comment function)
Week 6 **Multimodal composition/ Digital book making**	- Adding pictures - Doing final editing - Recording	- Book Creator (image searching function, recording function)

Mrs. B's teaching integrated all four aspects of language learning (listening, speaking, reading and writing) together. Although the curriculum focused on building up students' writing skills, Mrs. B intentionally added speaking practices via the tool Nearpod, and the genre of informational writing involved strong reading-writing connection. Therefore, she was eager to explore teaching approaches that can develop students' multiple skills simultaneously. Another feature of Mrs. B's teaching is that her procedure of doing multimodal composition seemed to be relatively linear: from reading texts, explicit instruction of writing skills, to drafting the writing and ending with adding pictures after writing was finished. Following this routine, students needed to finish drafting their written draft before they were allowed to explore and add other multimodal components to their work. In this way, the instruction and writing process were still mainly unimodal, and multimodality was postponed until the end of the writing project.

Lastly, despite that Mrs. B kept her teaching routine structured, there were a lot of interruptions making the process messy and much slower than expected. For example, several class sessions were canceled due to events and testing which made Mrs. B must speed up instruction to cover required content, leaving little room for other creative literacy practices. Additionally, the inconsistency of instruction resulted in the challenge for students to retain knowledge newly taught, so Mrs. B had to spend time almost every session rereading, reviewing

and reteaching. In the end, we spent a long time on finishing graphic organizers and writing drafts. Some children expressed losing engagement as time went by. For example, one child said at the end of the project that: "*I don't like it. It took so long*." Another student expressed resistance to rereading texts to make her writing more accurate and was reluctant to make any revision of writing partly due to losing interest and wanting to finish the project.

This initial experience in the class revealed both opportunities and challenges of digital and multimodal integration. Although Mrs. B tried to open a flexible space, her implantation of digital book making project was influenced by scripted curriculum and everyday teaching demands, and was situated within the messiness and liveness of classroom ecologies. Therefore, the design of this current study needs to focus on what teacher and researcher can *realistically* do within this context. This led to my analysis and interpretation of tension moments emerged in the first module, which were foundational for a context-responsive curricular redesign.

Tension Moments Emerged. Mrs. B and I engaged in continuous conversations and reflections about this initial implementation of digital bookmaking, attending to challenges, needs and possible ways to integrate more multimodality into daily instruction. Four tension moments caught my attention, which deepened my understanding of the context and greatly shaped the way we redesigned the teaching approach.

Tension moment 1. The roles of multimodality in writing instruction. In the pre-research interview, Mrs. B shared her understanding of using multimodality in her lessons. Mrs. B mentioned that multimodality provided different ways and options for students, especially newcomer students to express their ideas. She also emphasized the importance of multimodality for preparing students' success not just in this classroom but in their daily lives as well as the possibility of multimodality to foster students' critical thinking skills. However, despite Mrs. B's

appreciation and passion to integrate multimodality for writing, it seems that there was a gap between what she desired to do and what she was able to do in class.

Pictures were the most frequently used multimodal resources in the class. However, these pictures were mainly used on the curriculum slides for teaching vocabulary. There were few opportunities in class explicitly relating to pictures. The visual mode was used as "illustrative compensation" for language instead of expressing meaning on its own or generating deeper conversations (Grapin, 2019). The 5th grade reading text had only one picture of a dog which did not convey too much information to support students' comprehension (see Figure 5.2.1). The only picture in the curriculum reading text only broadly represented the broad topic of "dog" without providing further information relating to "health benefits" which was the core of the writing prompt. Although the 4th grade reading text was a picture book, Mrs. B didn't explicitly refer to illustrations when reading the book to students. In addition, although Mrs. B used Book Creator as a platform for students to design their digital book, she explicitly emphasized several times in class that "*We only focused on writing. No pictures today.*", so students needed to finish drafting their writing before they got the "reward" to make their books fun with pictures. This process only took two class sessions among 6 weeks of the module. Mrs. B's practices indicated that she might perceive non-linguistic resources as separate and peripheral instead of an integral part of meaning making. Pictures are just for fun or "extra" for legitimate literacy learning without cultivating students' awareness of how to orchestrate different modes together to support better meaning expression (Lim et al., 2022; Tour & Barners, 2022).

Figure 5.2.1

Samples Visuals in Reading texts in the Curriculum



If you live alone, owning a dog can reduce the risk of a heart attack

By The Guardian, adapted by Newsela staff on 11.22.17
Word Count **663**
Level **1050L**

Pet dogs may bring health benefits by reducing stress and motivating people to live healthier lifestyles. Photo by: Saso Novoselic/Getty Images/iStockphoto

(5th grade text)



(4th grade text)

Noticing the marginalized role of multimodality in writing instruction and process, we discussed the possibility of adjustment. Towards the end of the project, we decided to ask students to record themselves reading their own writing, which added students' own aural resources as part of the composing experience. Despite the fact that recording motivated students to further proofread, revise and reflect if their own writing sounds clear, the recording still only took 1-2 sessions when all writing concluded. The aural mode was mainly for the purpose of proofreading and making mechanical edits rather than for expressive reading. Our initial effort to integrate multimodality essentially did not differ from the traditional process of teaching writing, even with some minimal components of visual and aural resources.

Tension moment 2. The purposes and effectiveness of technology use. Mrs. B was tech-savvy and open-minded in exploring different digital tools to support students' learning, as she said, she was among the very few teachers who consistently used tech tools for teaching. However, the short class time (approximately 30 minutes) might restrict what digital tools and digital projects she might choose to use. YouTube videos and Google slides were the two most-

frequently used tools for instruction with the main purpose to facilitate presenting content rather than creating more opportunities for collaboration and discussion.

When moving to the composing task, the "writing first, designing second" approach to multimodal composition actually was using the digital platform (Book Creator) merely as a substitution of paper and pencil instead of using it to augment, modify and transform learning experiences (Puentedura, 2014). Mrs. B said that "I want to use Book Creator for writing because all testing was done online. I hope students will be familiar with the digital writing experience." Another motivation Mrs. B mentioned was that digital tools can make the writing experience more interesting for children.

Taking together, Mrs. B worked hard to create a technology-rich classroom, and she recognized the potential of these tools to engage students. However, her role as a language specialist, who had to prepare students for standardized language assessments, made her deprioritize affordances of these tools for multiliteracies learning experiences.

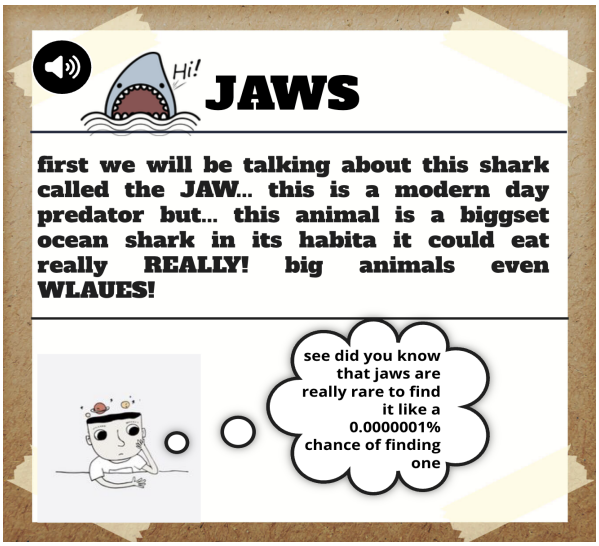
Tension moment 3. Students' agency vs. Structured curriculum and instruction. The essence of multiliteracies and multimodal composition is to recognize and highlight students' designing thinking and agency. However, in the first a few weeks, I found it was difficult to find time and opportunities to talk with students in class. Time pressure and scripted curriculum left little room for Mrs. B to explore alternative practices and follow-up students' ideas after covering required content, even though we noticed students' activeness in participating in class discussion and sharing their perspectives . In the end, these student-generated ideas were not be used as resources for instruction.

During writing sessions, most students demonstrated varied levels of digital skills in navigating different platforms to reread reading texts, searching information and exploring the

process of making digital books. Although Mrs. B explicitly required students to "only write sentences" before they can do other creative designing, many students agentively and strategically resisted the priority of linguistic mode. This is because navigating and thinking with multiple modes in a digital space is a natural process for students who might need multiple channels of support to engage in the composing task. For example, even without explicit instruction about multimodality, students used the embedded image searching function in Book Creator to find pictures relating to their ideas. They frequently changed images as they wrote more information and explored placing images at different places on each book page. However, Mrs. B seemed to be concerned about students' engagement with non-linguistic components during the writing process and she often directly asked students to focus on writing and wait for her permission for other modal resources. I noticed that even though some students followed Mrs. B's direction, they still used other nuanced aspects of linguistic mode afforded by digital platforms including the font, size, color and capitalization. For example, several students intentionally used capitalization, exclamation marks and underlining to emphasize information (see Figure 5.2.2). In addition, these students were collaborative in reading each other's writing and often taught each other how to navigate digital platforms.

Figure 5.2.2

Example of How a Student Use Capitalization to Emphasize Information



I shared with Mrs. B my noticing about students' engagement with multimodality and their collaborative learning style, aiming to figure out the possibility of including more students' voices and peer learning opportunities in class. Mrs. B encouraged students to talk with peers and praised students in class when they helped each other. However, when it comes to writing tasks, she emphasized that "I hope students practice writing a complete essay independently, because this would be what they need to do during the spring WIDA assessment." This reflected the pressure of standardized testing on Mrs. B's pedagogical decision and limited her focus (Tan et al., 2020). She was concerned that multimodal and collaborative practices might deprive multilingual students' opportunities to engage in "official" writing for improving linguistic competence (Sultana & Turner, 2021).

Tension moment 4. practices for "Monday" vs. practices for "Someday". Although both of us wanted to support students' language and literacy learning, there were some divergent points between us about the goals of this DMC project. Mrs. B had clear and prioritized goals of preparing students for language improvement and addressing school demands while doing DMC projects, whereas, as a researcher focusing on multimodal practice, my initial goals centered on increasing students' engagement with multimodality and multiliteracies learning opportunities.

Mrs. B and I have different positionalities in this research project, influencing our different perspectives and expectations of the same research. Therefore, it is important to note that these differences and tension moments are not for critiquing teacher's pedagogical practice, but for the urgent need of contextualizing and adjusting the research design to best support Mrs. B's pedagogical goals and students' learning. After experiencing technological issues in the beginning of the project and several canceled sessions due to testing schedule, Mrs. B said that "you see what happened every day in class. It is not we [teachers] don't want to support research or we don't understand research. It is just hard." What Mrs. B said highlighted the importance of research design to be responsive to challenges a teacher may be undergoing and negotiating when moving towards a different pedagogical practice.

I realized that before Mrs. B felt comfortable to think beyond language, we had to admit and recognize the short-term goals of helping students pass the language-focused assessments and exit the ELD program. As a teacher who was experiencing the pressure and responsibility to help students overcome hurdles to engage in academic learning, Mrs. B wanted a teaching approach that can explicitly respond to and address her teaching goals despite her understanding of the critical roles of multimodality for social futures. This was why it was challenging in the beginning to negotiate and persuade Mrs. B to take more creative risks with me. How to collaborate with Mrs. B to reimagine and redesign the teaching procedure to demonstrate the value of multimodality for academic learning as well as other literacy skills simultaneously were key questions I needed to address in this project.

Together, these four initially emerged tension moments revealed critical directions for a context-responsive curriculum redesign, including using digital tools to support students' agency

on self-expression, integrating multimodality as an integral part of instruction, as well as aligning and highlighting the academic value of multimodal practices for writing instruction.

Opportunities and Adaptations for Next Module. As I understood more about Mrs. B's practices and goals, as well as students' multiple literacy skills and learning approaches, I outlined our different perspectives and aimed to identify an instructional middle space (see Table 5.2.3) where initial practices can be further built upon while not making Mrs. B feel concerned about not being able to achieve her language teaching goals. Although Table 5.2.3 listed key divergent points between Mrs. B and me during the first module, there were many practices and students' multiple literacies skills observed making the middle space possible. For example, despite Mrs. B emphasizing language learning, she didn't simply focus on correcting students' grammar and spelling, instead, she aimed to support students to express their understanding of lesson materials. Her lessons were much more than mechanics of writing. In addition, most students in both classes were tech-savvy and would love to help peers with tech issues. With active peer collaboration and support, we could spend much less time on teaching how to use digital tools and managing digital glitches.

Table 5.2.3

Identifying an Instructional Middle Space

Teacher's initial goals and practices	**Middle space**	**Researcher's initial expectations**
Technology as a platform for practicing typing	Identify a digital tool that can embed various multimodal resources	Technology for multiliteracies learning
Multimodality as peripheral for legitimate academic writing and learning (language-dominant)	Analyzing lesson materials for possible multimodal adaptation	Multimodality support students' academic learning experience

Multimodality as "illustrative compensation" for language	Teaching lessons with rich multimodal resources	Multimodality as different approaches to make meaning
Writing instruction for preparing forthcoming standardized language assessments (learn to write)	Using multimodal approach to improve students' reading comprehension and informational writing skills	Writing instruction for deeper understanding and critical thinking of a topic (write to learn)
Teacher-led instruction	Use a digital platform to record, show and share students' thinking and ideas	Peer learning opportunities

As shown in Table 5.2.3, our first adaptation of the original digital multimodal composition project was to identify a digital platform to supplement the use of Book Creator. The purpose of a new tool is to front-load and integrate multimodality within curriculum and day to day instruction, instead of delaying it until the end of composing stage. In the end, we decided to use Padlet as a multimodal digital platform where teacher and researcher can collaboratively post multimodal posts relating to content during instruction. This tool was free to use in the school district, and it was familiar to Mrs. B and most students in the class. Secondly, in order to address the concerns of the academic value of multimodality, we used two strategies. The first was analyzing lesson plans together during weekly co-planning sessions to identify resources within the required curriculum that can be adapted, expanded and deepened by multimodal resources. This step ensured that we would follow the standards and curricular requirements while carving out a multimodal space in the curriculum. The other strategy was to embed multimodal resources and practices as pedagogical mediating tools throughout the whole teaching and writing experiences instead of waiting until the start of the digital book making. In this way, multimodality could play more critical roles to make students' thinking visible and then continuously inform instruction throughout the whole instruction and composing process.

Furthermore, realizing the pressure of standardized language assessments and the purpose of the ELD class to teach informational writing, rather than pushing Mrs. B to try different

creative projects (e.g., video making, infographic designing) in an already packed schedule, we decided to keep doing digital book projects while having a more explicit focus on other non-linguistic components through the teaching with multimodality approach mentioned previously. Most importantly, emphasizing the potential of multimodal learning on supporting accessing information and generating more valuable ideas about writing topics specifically responded to one of the biggest challenges we encountered when scaffolding students: understanding the reading text. The genre of informational writing closely connects reading and writing skills; therefore, without deep understanding and the skills to interpret information, students can struggle in summarizing and writing information accurately. This need further confirmed our decision to teach multimodally throughout all lessons. Lastly, we used Padlet where students could also share posts and leave comments assuming that this adaptation could create more opportunities for peer learning during the instruction sessions although we were not able to do collaborative writing tasks. Students had access to each other's posts at any point of the class time to check out peer's ideas, which promotes peer learning through discussion and reading peers' ideas.

We worked on these four interrelated areas of lesson redesign in the second module.

Module 2. Teacher-Researcher Collaborative Instruction

Moving to the second module, I started to engage more with lesson designing and redesigning, facilitating students' discussions and supporting students' multimodal book making projects. In this module, I played the role of a collaborator with Mrs. B to address some tension moments we identified in the prior module and worked on making the middle space possible. In the section of "*Redesigning Module*", I introduce the original lessons and adaptations we made. In the following section "*Addressing Prior Identified Challenges*", I explain how these

adaptations addressed four major challenges from the middle space table (Table 5.2.3) that we could work on together: (1) ineffective technology use, (2) limited use of multimodality in writing instruction, (3) concerns regarding the academic value of multimodality on informational writing, and (4) few peer learning opportunities. In the last section "*Missed Opportunities and Implications for Next Module*", I will explore newly emerged challenges and missed opportunities that Mrs. B and I identified during the research process and retrospectively when the project was closed. This reflection led to our considerations and decisions of how to further adapt our project for module 3.

Redesigning Module.

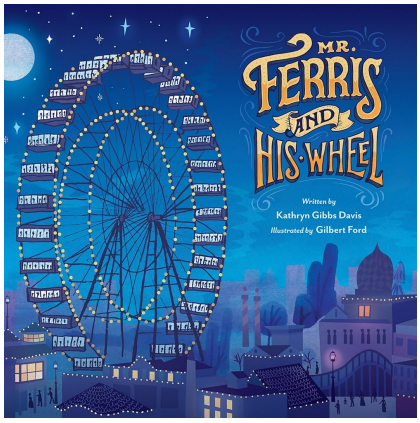
Introduce Original Modules. Although the curriculum was mandated, Mrs. B had the flexibility to choose the sequence of modules. She identified another informational writing module from the curriculum package. She mentioned that she tended to use the curriculum as a guide and would love to include more resources to supplement the curriculum. We decided to implement the following two modules for each grade group (see table 5.2.4) to keep strengthening students' informational writing skills.

Table 5.2.4

Module 2 Reading Texts and Writing Prompts for Two Classes

	4th grade	**5th grade**
Reading text	Mr. Ferris and His Wheel	Cesar Chavez's Fight for Social Justice[1]

[1] I am aware of the recent allegations concerning Cesar Chavez that became public in March 2026, and want to state clearly that I reject sexual misconduct and all forms of harmful behavior. The data for this study were collected during the school year of 2024-2025, prior to the public emergence of these allegations. Therefore, these development do not affect the integrity of the study, the context where the lessons were taught, or analysis presented here.

		
Writing prompt	Write about George Ferris and the struggles he encountered while making his invention. Use facts and details to show how he had to work extremely hard to make the idea for his invention a reality.	Write about what makes Cesar Chavez a hero to migrant farmworkers. Use details from the text to describe his heroic acts that improved the lives of farmworkers

The second module took about 4 weeks to complete. In the 4th grade classroom, students read a picture book about George Ferris who designed the first Ferris wheel in the world and wrote about how he overcame several obstacles in the process. We believed that a topic about Ferris wheels may easily relate to students' joyful life experiences, and the genre of picture books gave us more opportunities to foster multimodal reading skills. Also, the lesson plan explicitly mentioned the teaching of multimodal text features such as illustrations for meaning making, which can connect to the goal of promoting multimodality.

For 5th graders, we chose a social justice topic about Cesar Chavez's fight for migrant workers' rights. Students will read an article about Cesar Chavez's heroic actions and write about why he was a hero for migrant farm workers in the 1930s. We found the vocabulary (e.g. strike, union) and some concepts (e.g. protest, sit-in, boycott) in this article could be abstract to students, which opened the space for multimodality to support students' understanding of these concepts. Additionally, we noticed that compared with the first module about health benefits of

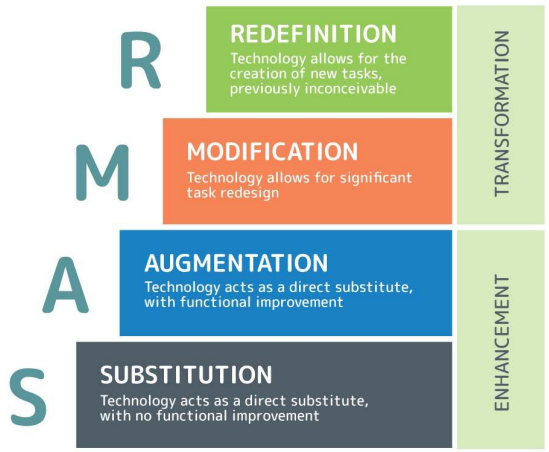
owning dogs, the reading text and lesson plan for this module included more meaningful visual support and explicitly invited students to talk about visuals (e.g., historical photos about Cesar Chavez's civil movements) to understand the social context of Cesar Chavez's effort. Most importantly, Mrs. B emphasized the importance of this topic for students who were also immigrants to engage in the powerful conversations of fighting for one's own rights.

Lessons Redesigned. After deciding the modules to teach, Mrs. B and I engaged in brainstorming which portions of the curriculum materials could be modified as multimodal learning experiences, and how Padlet and Book Creator could be effectively used throughout the whole teaching, learning and composing process.

The curriculum redesign was informed by the SMAR model (Puentedura, 2014) and textured teaching traits (Germán, 2021, p. 7) (see Figure 5.2.3). SMAR model shows different levels of technology use from simple substitution to using technology to transform students' learning experiences. The textured teaching is a culturally sustaining framework that highlights the importance of student-driven learning and the role of integrating students' lived experiences into instruction. Mrs. B and I aimed to use various digital tools to not just substitute the functions of paper and pencils, but to transform students' learning experiences by engaging more student-driven learning opportunities and integrating multimodality to mediate and promote students' various learning needs and styles. Table 5.2.5 (4th grade) and 5.2.6 (5th grade) listed the original six-day lesson sequences and how they were modified to be more multimodal. The highlighted parts were multimodal modifications we planned.

Figure 5.2.3

SMAR Model and Traits of Textured Teaching



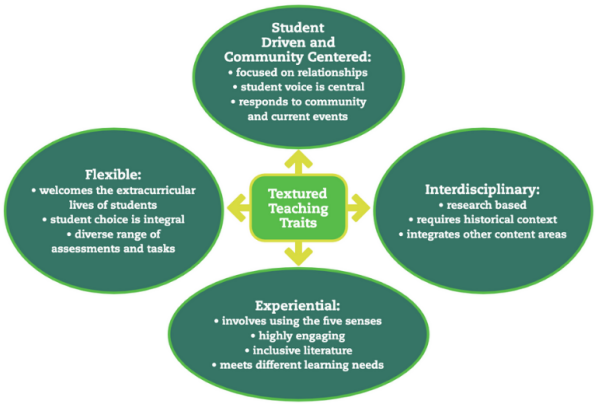


Figure 1–5 The Traits of Textured Teaching

Table 5.2.5

4th Grade Original and Adapted Lessons

Original lesson plan	**Digital and multimodal resources**	**Adapted lessons**	**Digital and multimodal resources**
Day 1 - Teach vocabulary - Build up background knowledge - Introduce reading text & show text features	- slides - digital picture book	**Stage 1** - Build up background knowledge • Landmarks for world fairs • Brief history of ferris wheels - Share personal story of riding Ferris wheels - Teach vocabulary	- slides - Padlet - photos - YouTube videos
Day 2 - Review vocabulary - Close read - Introduce writing prompt	- slides - digital picture book	**Stage 2** - Read aloud - Talk about text features (captions & illustrations) - Discuss where did Mr. Ferris get inspirations through illustrations	- YouTube video - illustrations from the book - Padlet posts
Day 3 - Review vocabulary - Review writing prompt - Work on graphic organizer	- Key language use anchor chart - Graphic organizer	**Stage 3** - Read selected illustrations relating to Mr. Ferris' challenges - Exit ticket - Discuss students' exit ticket - Work on graphic organizer	- illustrations from the book - Padlet posts
Day 4 - Independent writing	- Graphic organizer - Writing rubric - Key language use anchor charts	**Stage 4** - Formative assessment: make a post about Mr. Ferris's challenges and how he overcame them - Mini lesson about quicksand	- Padlet posts - videos
Day 5	- Graphic organizer	**Stage 5**	- Padlet

- Independent writing - Teacher conferencing	- Writing rubric - Key language use anchor charts	- Independent writing and designing - Teacher conferencing ● Mini lesson: read illustration to understand how Mr. Ferris overcame challenges	- illustrations from the book - Book Creator - Graphic organizer - Writing rubric - Key language use anchor charts
Day 6 - Final editing - Peer/self-assessment	- Writing rubric	**Stage 6** - Final editing - Recoding - Self-assessment through talk about texts	- Book Creator

Table 5.2.6

5th Grade Original and Adapted Lessons

Original lesson plan	Digital and multimodal resources	Adapted lessons	Digital and multimodal resources
Day 1 - Build up background knowledge - Teach vocabulary - Text read aloud	- Guided discussion about photos - KWL chart - Slides - Reading text	**Stage 1** - Build up background knowledge ● Understand life of migrant farm workers in 1930s ● Introduce Cesar Chavez with videos - Teach vocabulary - Exit tickets	- Guided discussion about photos - YouTube videos - Padlet - Slides
Day 2 - Review vocabulary - Close read	- Slides - Reading text	**Stage 2** - Review vocabulary - Discuss students' digital exit tickets - Read and discuss Padlet posts about Cesar Chavez's heroic acts - Read text	- Photos - Padlet posts - Slides - Reading text
Day 3 - Review writing prompt - Review vocabulary - Work on graphic organizers	- Slides - Graphic organizer	**Stage 3** - Close reading and discussion - Work on graphic organizer - Formative assessment of understanding based on graphic organizer	- Padlet - Reading text - Graphic organizer
Day 4 - Independent writing	- Graphic organizer - Writing rubric - Key language use	**Stage 4** - Connection to today's civil rights activities	- Padlet - Photos - Book Creator

	anchor charts	- Share related personal experiences - Independent writing	- Graphic organizer - Writing rubric - Key language use anchor charts
Day 5 - Independent writing - Teacher conferencing	- Graphic organizer - Writing rubric - Key language use anchor charts	**Stage 5** - Independent writing and designing - Teacher conferencing	- Padlet - Google Image - Book Creator - Graphic organizer - Writing rubric - Key language use anchor charts
Day 6 - Final editing - Self-assessment	- Writing rubric	**Stage 6** - Final editing - Recoding - Self-assessment	- Book Creator

During the Module 1, I noticed the relatively linear process of writing teaching and minimal roles multimodality played in curriculum. Moving to Module 2, there were three major adaptations of the original lesson plans. As shown in the two tables, the multimodal modifications (yellow and blue highlighted portion) were more evident throughout the whole teaching, reading and writing process. In addition, multimodal resources were explicitly used as important meaning-making resources for students to understand concepts, contexts and making connections to their funds of knowledge. As shown in the column of digital and multimodal resources, we included a variety of visuals and videos on Padlet boards during the instruction process. Lastly, formative assessments such as exit tickets, making posts and talking about texts were added to help us continuously adapt teaching and respond to students' ideas in a more iterative manner.

Addressing Prior Identified Challenges.

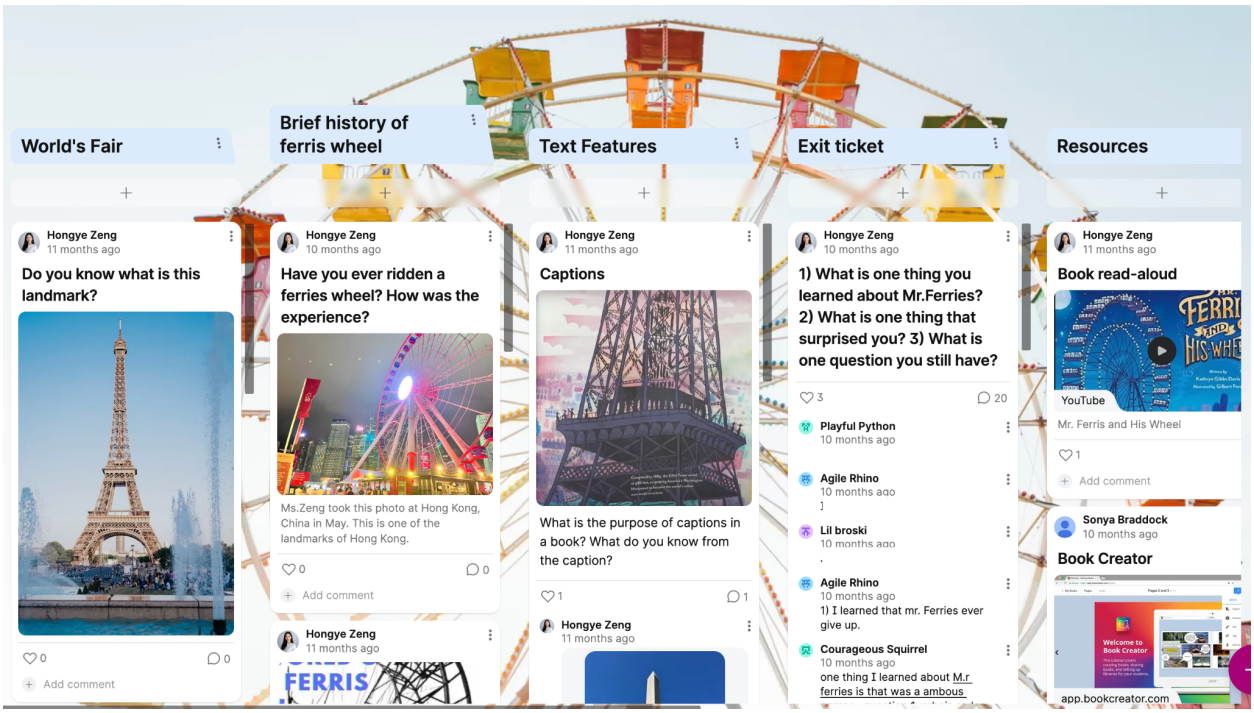
Limited technology use. In the redesigned module, both Padlet and slides presentations were used for teaching. I chose to use Padlet as the digital space to redesign teaching because this was a familiar tool to both Mrs. B and many students. Also, it has potential for multimodal design through the capability of embedding visual, aural and linguistic resources from and

beyond the curriculum. Most importantly, it may foster a stronger participatory and collaborative learning environment, by inviting students' comments and posts, compared to the one-directional teacher presentation of content knowledge. With these affordances, we started to shift the function of digital tools for passively presenting information to actively inviting multiple resources and students' funds of knowledge.

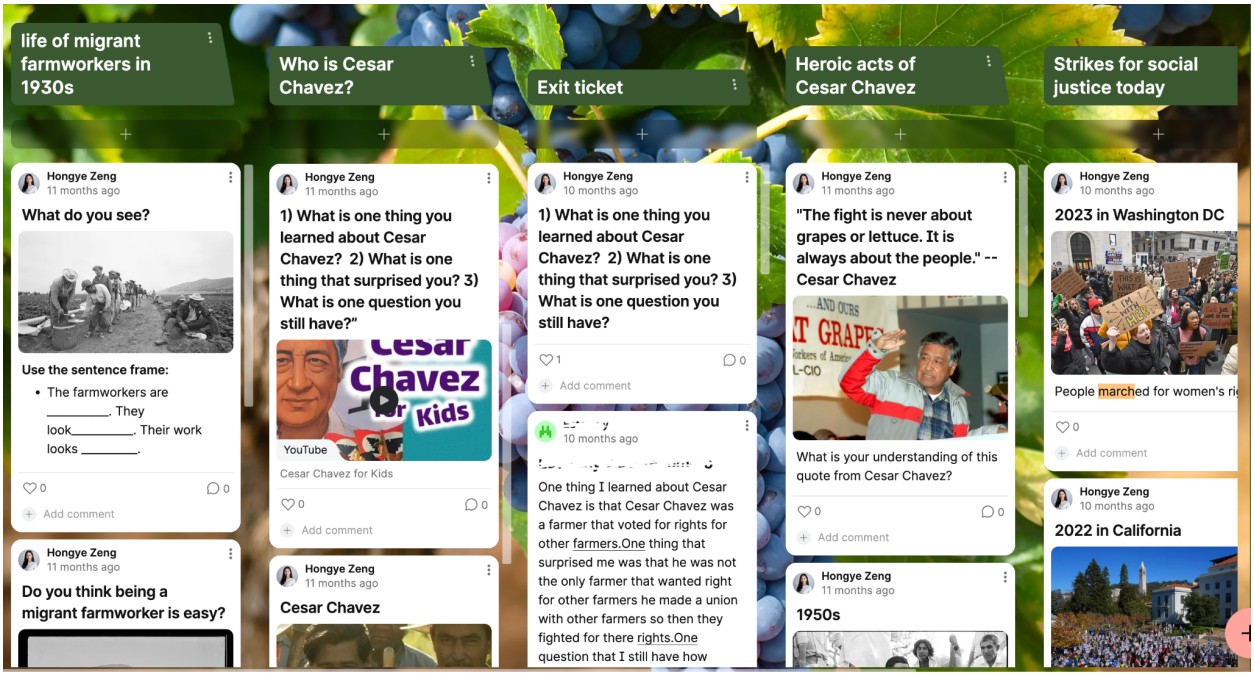
I analyzed the lesson materials of Module 2 with Mrs. B during our instructional co-planning sessions. We firstly mined multimodal resources in the curriculum materials, such as visuals for vocabulary teaching and background information to make professional judgement of if we will need extra multimodal resources outside of curriculum to supplement what we already have to support students' understanding of concepts. Then we identified important prompting questions in the lesson plan and made them as multiple multimodal posts to guide students' thinking and understanding of reading text. These became the "skeleton" of the initial Padlet board based on the required curriculum. The two snapshots of Padlet boards (see Figure 5.2.4) created for two classes showed how we first organized different lesson materials into sections and various resources (from and beyond curriculum) under each section.

Figure 5.2.4

Screenshots of Padlet for 4th and 5th Grades



(4th grade: Mr. Ferris and His Wheel)



(5th grade: Cesar Chavez's Fight for Social Justice)

Under each section, there were several multimodal posts with images, videos, captions, and links to other materials. These posts were made by me after the discussion with Mrs. B about what portions of curriculum materials can be added here and what other materials beyond curriculum can be brought to this space to provide extra resources for students. I focused on multimodal components of these posts and Mrs. B focused on providing feedback about how to align these posts with her language teaching goals. In this way, the digital tool was used as a space for gathering and presenting information to facilitate students' reading and writing in a more straightforward and interactive way.

Additionally, technology was used as a navigational space where students could engage with and explore various types of text besides the required reading text to have a deeper understanding of the content. Padlet allowed us to keep adding to original posts based on students' ideas, continuously expanding our original design. In this way, the content of the Padlet boards were co-constructed by teacher, researcher, as well as students. Mrs. B said that "I really appreciate you bringing this tool back to the classroom. All of our valuable conversations are saved, and students can use these resources to strengthen their learning." Her quote emphasized the function of digital tool in class to share resources and invite more ideas from students. In this way, learning was not a linear process, but a reciprocal process when multimodal pedagogical design invited students insight and students' ideas further informed instruction.

I noticed that when students worked on their writing project, they always referred back to the Padlet boards for more details to enrich their writing. Having a space recording and organizing all resources together also turned out to be an effective buffer for interruption of regular lessons. Students can quickly and agentively refresh their mind about prior learning by

skimming prior multimodal posts despite the disruption of testing and events that may lead to loss of instructional time.

Academic value of multimodal learning on informational writing. In module 1, Mrs. B seemed to be concerned about the academic value of multimodality in a writing class so she used visuals mainly for extra fun after students finished their writing drafts. To address her concerns, firstly, I explicitly aligned multimodal adaptations closely with required lesson plans and designed from the available materials (e.g., visuals and activities in lesson plans) to ensure that multimodal integration would not deviate from academic goals. For example, using a KWL chart in the 5th grade's lesson plan gave me the idea of using Padlet as a digital and multimodal version of KWL chart to continuously record students' knowledge, wondering, and new learning with resources in and beyond curriculum materials. Additionally, visuals in the curriculum materials were recentered to mediate students' discussion about content instead of being set aside as background. Below I presented examples from both classrooms to illustrate how multimodal integration can align with and promote Mrs. B's academic teaching goals.

4th Grade Example

4th grade reading text was a picture book, and the lesson plan introduced different text features such as captions and illustrations. Therefore, "illustrations" was not only introduced as a text feature, but as a springboard for students to discuss reading content, especially when text information was dense. Thus, I made several posts (see Figure 5.2.5) relating to the writing prompt and using illustrations from the reading book to invite students to discuss and understand that illustrations can provide rich unwritten information for a holistic understanding of an event. In this example, I explicitly drew students' attention to the gestures (e.g., shoveling snow, crushing icy ground, covering ears) of workers in the illustration to support their understanding

of how worker overcame the challenge of building the foundation of the Ferris wheel (e.g., workers needed to shovel think snow and using dynamite to crushing icy ground). This visual elicitation strategy was used several times on the Padlet board to support students to have a more accurate understanding of how Mr. Ferris overcame challenges to design and build the first Ferris wheel in the world.

Figure 5.2.5

Sample Post Using Visual Elicitation Strategy



Learning multimodally generated rich conversations relating to details that might not be noticed if only reading sentences (Rowe & Pennington,2025), which helped students go deeper into the topics which further support students' informational writing. For example, during 4th grade class discussions, the excerpt showed that Diego's noticing about several wheels on the illustrations led to the question of where Mr. Ferris got inspiration for his invention.

Diego: "*How did Mr. Ferris have the idea of inventing a big wheel?*"

Several students: "*Water wheels.*"

Mrs. B: *"Do you know what a water wheel is? Have you ever seen one?"*

(Students shake the heads)

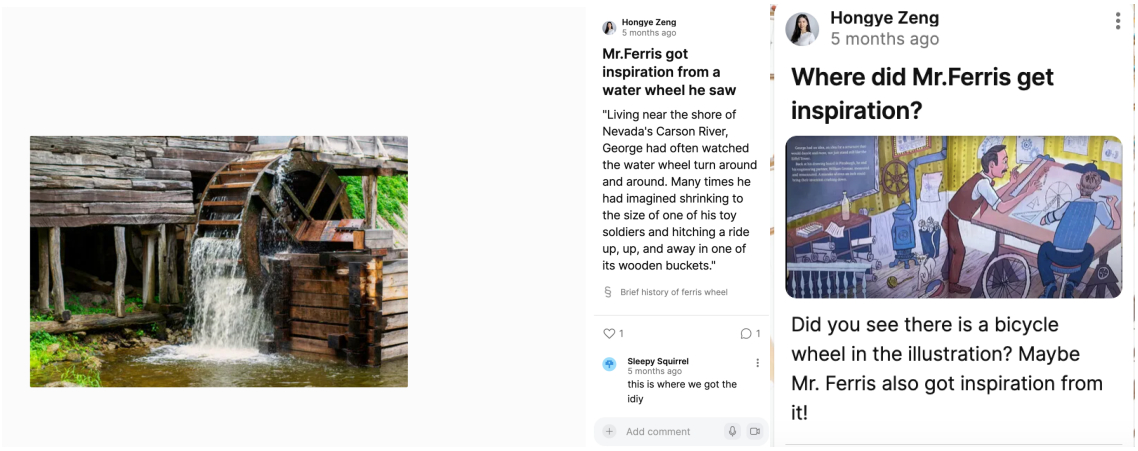
Diego: "*Are bicycle wheels invented before Ferris wheels?*"

Mrs. B: *Oh, this is really a good question! We should write it down and do some research after class."*

After class, Mrs. B expressed her surprise about the good questions and conversations in class. Based on Diego's questions, I added one post to Padlet (see Figure 5.2.6 post 1) showing what a water wheel was like with quotes from the reading text to explicitly make a visual-language connection. One of the students commented below the post that "*this is where I got the idiy (idea).*" Another post I added (see post 2) was an illustration from the reading text with several possible inspirations (including a bicycle wheel) leading to Mr. Ferris's invention, although not explicitly mentioned by the written sentences on the page. The purpose was to show students the value of interpreting non-linguistic information for hidden information, because multimodal resources can complement each other for a deeper meaning (Unsworth, 2008). Seeing his ideas being recorded and responded further motivated Diego to think deeper about his own inquiry. In the following class, Diego excitedly shared that he did research after class and found that bicycle wheels were invented before the Ferris wheel!

Figure 5.2.6

Two Posts Added to Padlet after Class Conversations



(post 1) (post 2)

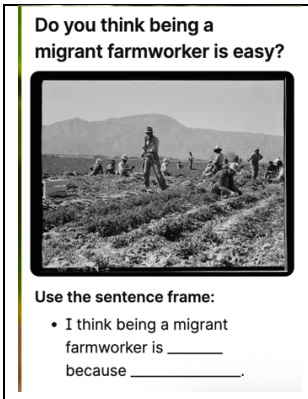
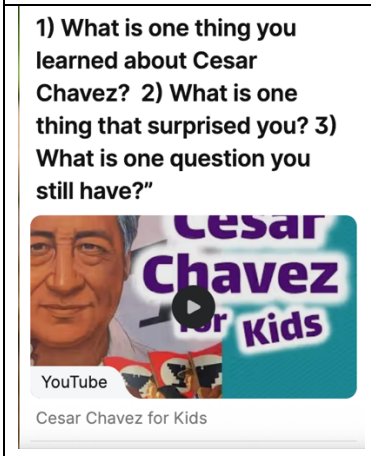
5th Grade Example

The reading text for 5th grade was an informational article with photos about marches and protests led by Cesar Chavez in the 1960s. Two initial multimodal opportunities we identified from analyzing curriculum were: historical photos embedded in the reading text and sentence frames in the lesson plan to facilitate students' discussion about photos. Although Mrs. B did not explicitly engage students in discussing visuals to support understanding in the prior module, using visuals in the curriculum provided a safe zone for her to explore multimodality without deviating from the required text. We combined historical photos and sentence frames as multimodal Padlet posts (see Table 5.2.7 Post 1 & 2) for students to view and actively inquire visuals.

Table 5.2.7

Multimodal Padlet Posts and Excerpts of Conversation

Multimodal Padlet Posts	Conversations around Visuals
What do you see?  **Use the sentence frame:** • The farmworkers are _____. They look_____. Their work looks _____. (Post 1)	Mrs. B: What do you see in these photos? Who are they? What are they doing? S: Farm workers. S: They wear straw hats. Mrs. B: Why are they wearing hats? S: Because working outside is hot in summer. S: I think they look tired and hungry. They are waiting for food. I saw the long line.

 (Post 2)	
 (Post 3)	Mrs. B: What did he do during the daytime? Think about what you do every day. S: We go to school and play with friends, but he needed to work very hard as a worker. Mrs. B: How do you feel if you can't go to school? S: Sad. Children should go to school. S: He didn't have a house, and they slept in a car. S: How can they live in cars with nothing? Do they have a blanket? S: I learned that he was not the only farmers wanted rights. He formed a union with other farmers so they can fight together. S: Do they get paid more after their fights?

In the conversations around post 1 and 2, Mrs. B achieved her instructional purpose by capturing students' noticing of straw hats and lone waiting line to scaffold students' understanding of harsh working conditions of farm workers in the 1930s. This visual thinking strategy (Clark-Gareca & Meyer, 2022) provides students a more flexible entry point to interpret and comprehend information, when students actively think, listen to and contribute to each other's ideas to build up understanding collaboratively. Researchers emphasize the importance of explicitly teaching and engaging students with interpreting and reading images as part of multimodal experience (Kress & van Leeuwen, 2021; Serefini, 2011).

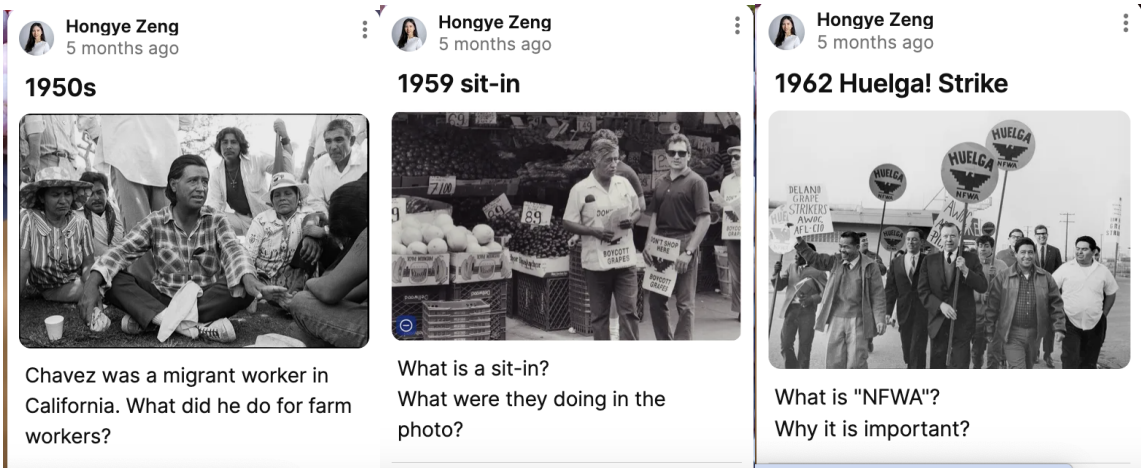
Not only grounded our multimodal redesign in the mandated curriculum, but we also brought in resources such as a YouTube video which previews the reading text content to

supplement photos (Post 3). This decision was based on Mrs. B's suggestion that audio input can be a supportive accommodation when students process dense informational texts. As shown in the conversation about Post 3, Mrs. B connected students' everyday life with Cesar Chavez's childhood experiences ("couldn't go to school", "slept in a car") to prompt their reflection on rights children of migrant workers didn't have and scaffold their awareness of the rationale behind Cesar's social movements ("form a union", "get paid more") in a child-friendly way.

Another example is that I made a list of posts under the Padlet section of "*Heroic Acts of Cesar Chavez*" chronologically with photos and questions, so students could interpret details of photos and read the reading text simultaneously to think about these questions. As students engaged in this multimodal reading activity, Mrs. B noticed students' fast understanding of the key themes of the text with these multimodal scaffolding moves.

Figure 5.2.7

Samples Posts Building upon Lesson Plan and the Reading Text



(sample posts for Cesar Chavez's key protests in chronological order)

In both 5th grade examples, learning multimodally promoted students to ask questions beyond the information of the required reading text and created opportunities for both students and Mrs. B making real life connections. For example, after reading and discussing posts about

Cesar Chavez' efforts, several students including Elisa, Jamie and Eddie asked if Cesar Chavez's protests were successful in the end? If children can participate in protests? Mrs. B was impressed and inspired by students' ideas and we decided to add more posts responding to their questions. Mrs. B also brought up the idea of connecting Cesar Chavez's civil rights movement with today's life. Figure 5.2.8 (post 1) is a post I made answering the question of the outcome of Cesar Chavez's movement. I intentionally chose a photo with a child holding a boycott sign and highlighting in yellow the key vocabulary we learned in class. By reading a multimodal post, students can strengthen their vocabulary, visualize the engagement of children participating in civil rights movements, and get information about their questions. Figure 5.2.8 post 2 is another post I added after the conversation with Mrs. B and she shared in class with students her personal experiences of Black Lives Matter protests in DC a few years ago to show students the real-life example of civil engagement which turned out to lead to more conversations about why people protest. By using her personal narratives to scaffold students' understanding of fighting for social justice, she not only played the role of langauge teacher, but a storyteller and an advocate who disrupted the boundary between curriculum and lived experiences, as she said "this is not just a writing module, not just a task, but a space for kids to understand what is happening in our everyday life."

Figure 5.2.8

Two of Posts Added after Class

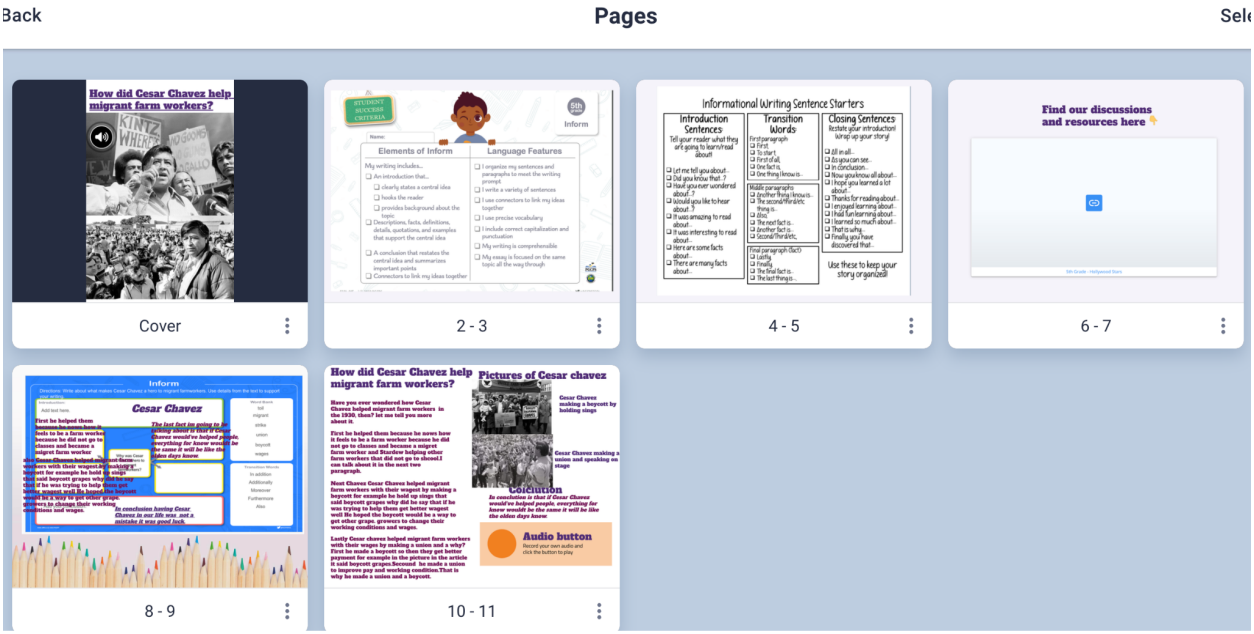


(post 1) (post 2)

Engaging in reading and discussing multimodally, students were prepared with a deep understanding of the writing topics. Writing multimodally doesn't mean to devalue language-focused practices, instead, we are finding a hybrid space where students can use all available resources to mediate their writing experiences. Different from module 1 when students simply typed writing on Book Creator and added a few pictures, in this module, we organized and linked all resources we used in class on the platform so students could actively navigate and refer to these resources. Figure 5.2.9 is an overview of students' digital book pages, with language rubric (2-3), sentence starters (4-5) and graphic organizers (8-9). Although Mrs. B required students to compose within one page to imitate the style of standardized writing test, the designing of book cover, link to Padlet (6-7) and visual representations on the essay page (10-11) made the writing process more multimodal. In this way, we aimed to strike a balance between language learning goals and using multimodality in a more meaningful way.

Figure 5.2.9

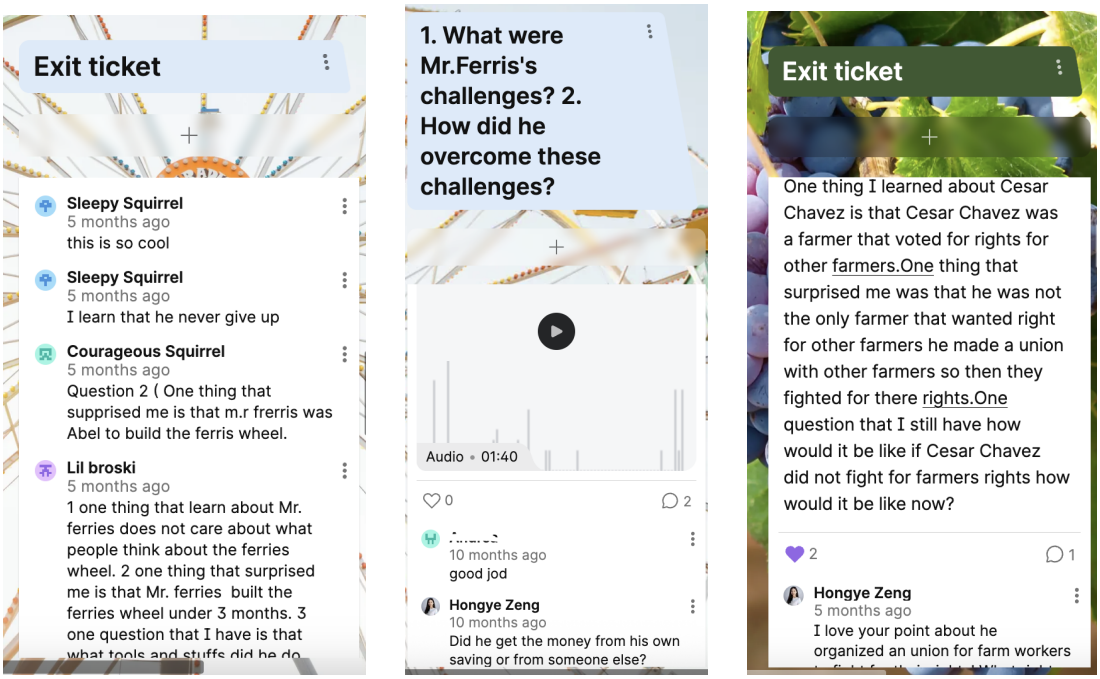
Overview of Students' Digital Book Pages



Peer learning opportunities. In module 1, we noticed that teaching and learning was teacher-directed because Mrs. B had to cover a lot of content within short class time, so there were relatively few peer learning opportunities except some whole class discussion. The choice of Padlet to supplement slides presentation also addressed this issue. Unlike slides, Padlet can be more participatory because students can easily read, comment and react to each other's posts. They can also click different links and resources and record their own ideas. Students-created posts and comments can always be accessible to peers when they need some ideas. For example, we did exit tickets (see Figure 5.2.10) and explicitly discussed students' exit tickets in class to establish peer learning culture. If we had less instructional time left, we adapted writing posts to recording to save time while still keeping students' ideas. As such, students' ideas can play a more important role in the process of constructing knowledge. I noticed that students actively listened to and read each other's ideas when they were writing. Oftentimes they expressed their admiration of peers' work by physically giving each other a thumbs up and fostering more discussions.

Figure 5.2.10

Examples of Students' Comments and Recordings



The role of multimodality in writing instruction. Although in the prior module Mrs. B intentionally separated writing and visuals during composing process, the strategic use of Padlet and Book Creator in module 2 made the boundary between linguistic and non-linguistic modes blur during instruction. As the module gradually unfolded, Mrs. B saw and experienced how simple steps of integrating multimodality can support students' learning and expand original lessons, which in the end led to richer details and deeper thoughts in students' writing projects. In this process, digital and multimodal resources were not only used for engagement, most importantly, they were used to mediate students' understanding of the content, generate more questions, and inform real time teaching decisions. These changes supported Mrs. B to make strategic changes and use multimodality as an integral part of learning instead of an auxiliary tool only for engagement. Mrs. B said that "*I think what you did is not interrupting the lesson at*

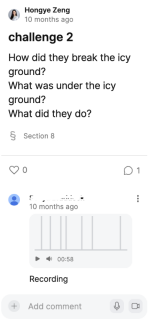
all. You made all these to help students learn." This quote shows that Mrs. B recognized the potential of multimodality to support students' learning and align with her teaching goals.

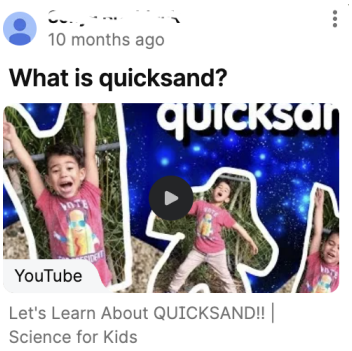
Seeing the easiness of multimodal integration based on available resources and students' deep learning through engagement with multimodality, Mrs. B gained pedagogical inspiration to actively use multimodal resources (photos, illustrations, videos, recording) to help students who were confused about certain parts of the reading text. For example, in the 4th grade classroom, we noticed that although students were able to identify three challenges Mr. Ferris encountered to build a Ferris wheel, most of them didn't understand how he solved the three challenges when only reading the written text from the required book. To better support students' understanding of why laying foundation for the first Ferris wheel was challenging, Mrs. B created a post (see Figure 5.2.11) with a YouTube video introducing what is "quicksand" because most students recognized this word when they read. After watching the video, Mrs. B used quicksand as an entry point to facilitate students' discussion and thinking about why quicksand was a hard ground condition to work and ways workers needed to take to deal with it. Additionally, she also recorded herself reading the text to provide extra audio support as an pedagogical modification for students. In this example, Mrs. B actively and adroitly captured students' responses and build on that with multimodal scaffolds.

Figure 5.2.11

Posts that Support Text Understanding







These examples showed that when teachers are supported to have opportunities to authentically experience interweaving multimodality into literacy instruction, they can come up with new ideas to keep responding and enriching students' learning. After class, Mrs. B expressed that "I really hope we could have more class time to let students continue these valuable conversations because their ideas are important and out of my expectation." This quote demonstrated that Mrs. B valued students' ideas and realized that multimodal integration can create a space for these conversations that otherwise might not be heard if following scripted curriculum. Mrs. B gradually shifted focus from covering required content and teaching discrete language skills to fostering students' deeper understanding of various texts delivered in different modes. In this way, teaching informational writing is more than teaching language skill itself, but also scaffolding understanding of texts and teaching for expressing ideas.

Missed Opportunities and Implications for the Next Module. Although we worked hard to redesign lesson materials to make meaningful multimodal learning possible and kept supporting students' understandings of multiliteracies, admittedly, our practices and design still kept being shaped and reshaped by systemic constraints (e.g. the mandated lesson materials, time pressure, language- focused standardized testing etc.) and emerging learning opportunities (e.g. collaborative learning culture, students' high motivation on learning, Mrs. B's actively responses to students' thinking) as we engaged in instructional process. Negotiating with challenges and

new opportunities made our module 2 a stronger version of multimodal learning than in module 1; however, thinking retrospectively, there were some missed opportunities needed to be analyzed for the next rounds of redesigning.

Missed Opportunity 1. Explicit teaching of intermodal relationships. Due to time pressure and the initial concern from Mrs. B to spend more time on teaching about multiliteracies and multimodality, the strategy I used was to embed multimodality into curriculum in a more implicit way without spending time (e.g. through explicit discussion, mini-lessons) on explicitly discussing affordances and limitations of multimodality (Kress, 2010) and intermodal awareness which focuses on how different modal resources are strategically assembled together to express meaning as a whole (Unsworth, 2008). However, this implicit way to integrate multimodal learning was insufficient when students needed multimodal scaffold and skills to understand dense information accurately.

Table 5.2.8 shows an example from the required reading book about a key challenge Mr. Ferris encountered and the solution he found. 4th grade students needed to identify this information for their writing. This page of text described the challenge of building up the foundation of the Ferris wheel due to cold weather and complex ground conditions (snow, ice and quicksand). Workers had to use dynamite, pumps and shovels together to deal with the situation. Although in the beginning of class, Mrs. B mentioned the importance of various text features such as illustrations and captions for understanding the text holistically, when it came to writing, students seemed to still only focus on written text instead of drawing on illustration to fully interpret text information.

Table 5.2.8

Example of Challenges and Solutions to Build a Ferris Wheel (4th Grade Text)



Written text:
"*In January 1893, George's construction crew began work on the foundation. Shovels broke as the workers tried digging into the frozen ground. It was one of the most brutally cold winters in Chicago history.*
Blast! George ordered his crew to dynamite the icy earth. But what they found under earth was scarier still.
Quicksand! The deadly muck could suck manor machine under in seconds."
Caption (lower right side):
"The frost at the wheel site was three feet deep: the quicksand was 20 feet in depth and saturated with water," said Luther V.Rice, construction and operations manager.
"Pumps were kept running night and day to keep out the water and live steam had to be used to thaw the sand and broken stone."

Challenges:
Cold winter, frozen ground, quicksand under icy ground, water

Solutions:
Shovels, pumps, dynamite

The three excerpts below (I didn't change misspellings of students' writing because these grammar mistakes didn't hinder understanding of their ideas) show students' early drafts of writing samples after reading this page. These examples revealed that they could capture the challenge of icy ground and quicksand, but the understanding of how to solve the challenge remained incomplete and inaccurate: they only mentioned that workers kept digging and digging. Also, although Lily noticed the "blast" sound and characters' facial expressions on the illustrations, based on her writing, her interpretation of illustrations was that workers were scared by the blasting sound, instead of workers dynamiting the ground so they covered their ears. This indicates that she might not connect the interpretation of illustrations with written texts and captions together to fully understand what was happening in the story. This example might suggest that despite the fact that visuals can spark students' rich interpretations of a story,

without situating visual interpretation within the whole textual context (together with written text and caption), the understanding of the text is partial.

> Sample 1 (Amelia): "*It was a challenge because he has to dig throw ice and the shovels broke. Then there was quicksand in the ground. He overcame by having hope he dig throw the quicksand and it work."*
>
> Sample 2 (Lily): *"They didn't expect this "BAST". They were so scared that they didn't want to work anymore. But the boss yelled at them and said "KEEP WORKING"."*
>
> Sample3 Yuna: *"One challenge that Mr.Ferris had was there was quicksand on the ground. Other challenge that Mr.Ferris had was that the ground was ice and it was hard to break. He overcame that challenge by digging down and never gave up so he diged down and did it."*

This example reveals that it is not an automatic process that students can adroitly interpret texts multimodally by only presenting multimodal information. Instead, they need guided discussions, scaffolding and multiple opportunities to practice to move from only recognizing the coexistence of multimodality to actively deploying intermodal awareness (e.g., how visual and language complement each other to convey information) to mediate holistic understanding of texts. After reading students' writing samples, Mrs. B and I discussed how we should make the skills of intermodal awareness more evident through whole class discussions. Therefore, we made three new multimodal posts on the class Padlet board for discussion, one for each book page with the goal to draw students' attention to read across illustration and written text. However, due to short class time, the process was still hectic. After class, Mrs. B mentioned that "I think it would be much better if we could have time to focus on interpreting one challenge

Mr. Ferris encountered each class with the posts to reach the depth of understanding." However, we were running out of time, and we had to move on to the new module.

The lesson learned from this experience is that it can be worthwhile if teachers spend some time in the beginning to build up the skills for students to learn about multimodality, such as the affordances and limitations of different modes (Kress, 2010); the concurrent, complementary and connected modal relationships of multimodal orchestration (Unsworth, 2008); and pedagogical metalanguage (Lim et al., 2022) that students can use to discuss multimodal texts. Serafini (2011) provides some examples of this metalanguage, including vocabulary (e.g., salience, font, layout, color, contrast) and questions (e.g., what captures your eyes first? What is the context and purpose of this image?) for teachers to guide students' noticing and interpretation. Teachers can explore visuals together with students to help their meaning making, especially when the written text is challenging (Jimenez & Meyer, 2016). This skill can be transferred to future learning or projects, so students can be adroit in actively identifying multiple meaning-making resources to map out a more accurate understanding of texts (Cope & Kalantzis, 2009).

Missed Opportunity 2. Student's agency and peer learning throughout the module.

When I chose Padlet as the main digital tool for teaching, I tried to use its participatory feature to open up more opportunities for peer learning. Students' agency and engagement for peer learning was intentionally promoted in three ways: students being able to create posts for exit tickets, students having access to read and listen to peer-created posts, and posts informed by students' ideas.

However, reflecting on the whole module, students' agency was not supported in a consistent way. Firstly, both groups of students were only engaged in making 1-2 exit ticket

posts as formative assessments. Although we took notes about students' questions and ideas in class, students were not asked to investigate and make multimodal responses based on their own inquiry. Mrs. B and I searched for resources and made new posts. In this way, students were relatively passive in accepting and experiencing information provided by Mrs. B and me instead of being active in researching, creating and presenting ideas. Additionally, there were few direct peer learning opportunities when moving to the composing stage of the module. Students were required to focus on their own writing projects because Mrs. B considered independent writing as an important practice to prepare students for language assessments. Lastly, towards the end of the project, there was also no time for students to share and reflect on their writing projects as a whole class to strengthen the awareness of multimodal designing for better expression. Time constraint and packed schedule of the class leaving little room for in-depth peer learning, scaffolding and presentation of multimodal learning experiences.

In my researcher's reflective memo, I wrote "I feel this is a space for me to be creative and make changes, instead of a space for all of us. I cannot stop thinking about where children's voices and opinions are." Despite the fact that we moved one step further from the prior module, students' active role in contributing to the knowledge building based on their prior knowledge and skills was not evident enough. Their participation stopped at summarizing their understanding of new knowledge rather than expressing more ideas connecting to past knowledge and present experiences.

Missed Opportunity 3. Criticality of interpreting multimodal information. How to foster students' criticality of interpreting multimodal information was another emerging challenge during the implementation of the research project. As we redesigned the lesson materials and observed students' practices, there were two aspects of the criticality that caught my attention:

critical understanding of the possible biases and inaccuracy of information, and critical understanding of a topic. For example, in the 4th grade classroom, I noticed although some students actively did quick research about questions they had during reading and writing, without any opportunity to guide students to practice critically reading information online, they seemed to use whichever information/ opinions showed up on the top of the searching page. Another noticeable example is several 4th grade students' inaccurate interpretation of illustration in the picture book. Although visuals are prevalent in students' worlds and are usually straightforward to understand, they are also subjective and allows for multiple ways of interpretation. If we spent more time to share and discuss students' different understanding of illustrations and connect that to the written text, students may have a deeper, more accurate and holistic understanding of the text. These moments revealed that critical digital and multimodal literacy is challenging for many students without explicit guidance (Forzani, 2018) and having prior multimedia experience does not automatically lead to skills of critically consuming and composing multimodal texts (Jiang et al., 2022).

Although how to search and evaluate information critically may not be the main focus of a language learning classroom, the opportunity to discuss how multimodal information can be exploited for biased opinions may be worth a lesson to foster the understanding of how information can be manipulated, created and shared. Similarly, the opportunity to discuss different understanding of the same visual and situate the understand of a text across different modes should be a part of a multimodal language classroom. These sets of knowledge are important parts of multiliteracies skills.

In conclusion, by the end of module 2, our goal in module 3 was to continue to strengthen students' intermodal awareness for holistic text understanding, invite students in the knowledge

co-construction process, and support students' critical thinking when engaging with multimodality.

Module 3. Teacher-Researcher-Student Co-constructed Learning Space

Selecting Module Topic and Identifying Learning Goals. The missed opportunities in module 2 informed how we kept improving our new module. In module 3, we aimed to keep strengthening students' intermodal awareness and make the Padlet board as a co-constructive learning space where students can play a more active role to shape instruction. However, different from prior modules, moving towards the end of semester left less time for instruction. We only had three weeks for a new module. Mrs. B expressed the concern of not being able to sustain the multimodal effort and projects we did in prior modules. Therefore, she was considering to shift the instructional focus back to reviewing language skills – the language of compare and contrast, which would be a key assessment point in spring. When asking reasons, Mrs. B said that "digital book making takes time and we don't have time. I really hope we can continue what we did before but the end of semester can also be messy. I am thinking about reviewing compare and contrast. They already learned it before and it should be fast to review and finish." It is important to note that, Mrs. B's hesitation at this specific moment was not because of her lack of motivation and belief of multimodal practices, it was her perception of digital book making as a time-consuming and sophisticated project (compared to directly reviewing language points) that influenced her decision making.

Trying to confirm Mrs. B that multimodal projects can be flexible and adaptable in response to emerging time pressure and contextualize Mrs. B's language teaching goals and my goals to redesign modules to further improve the multimodal learning space, I proposed that we should find a module from the curriculum package to situate language and multimodal goals as

the first step to navigate challenge. Mrs. B immediately pointed to the module of plastic straw ban because "the topic relates to students' lives, and they can practice compare and contrast different kinds of straws!" I added on to her idea that we can still do multimodal Padlet board to invite students' knowledge and opinions of the ban and modify the digital book making project as composing multimodal posts to save time. Retrospectively, this moment shows that contextual constraints (e.g., time) can continuously influence teacher's agency or perception of if they can continue a practice realistically, having a share-minded person/ community to confirm and support is critical to sustain teacher's agency for new practice.

Together, we brainstormed possible ways we can integrate language learning, review prior knowledge and skills, and reinforce multimodal learning together. For example, Mrs. B proposed to ask students to compare and contrast straws made with different materials to support students' evidence-based arguments about if plastic straws should be banned. This topic also opened possibilities for students to express ideas about a controversial but real-life related issue, which can be redesigned to engage students in exploring the criticality aspects of multimodal information which was not evident in prior modules. This new possibility may help students' engagement with multimodal information both creatively and critically.

Redesigning the Module. After a semester's relationship building and experiences with multimodal learning, Mrs. B was much more flexible and confident to apply multimodal strategies. After reading through the module materials, we decided to only use part of the lesson materials and add on other outside resources to enrich the module. Compared to prior modules, Mrs. B was much more confident and comfortable to deviate from the curriculum and tailor it based on her goals. As she said when discussing how to build up students' background knowledge about plastic straw ban, "the warm up activity in the curriculum is not deep enough

compared to what we did. It only asks if students agree/ disagree with some statements about protecting the environment." Mrs. B chose to change the background building activity because she valued students' rich insights and recognized that strategical multimodal adaptation can invite students' funds of knowledge. In addition, due to limited time at the end of the semester, we used the same sets of lessons and materials for both 4th and 5th grade students. Another difference of this module from the previous two modules is that we didn't have time to compose digital books using Book Creator. We adapted the final writing task as making posts about one's opinions based on learning. Lastly, prior modules focused on informational writing. While this module leaned towards the genre of opinion writing, we believe the learning process will still involve rich information interpretation and creation skills which can strengthen students' informational literacy skills and reasoning skills simultaneously. Table 5.2.9 shows the reading text and writing prompt of the curriculum. Our goal was, by the end of the module, students will be able to engage in interpreting rich multimodal information from different perspectives and make a post about their opinions of plastic straw ban.

Table 5.2.9

Original Module 3 Lesson Information

Reading text	"People need them": The trouble with the movement to ban plastic straws
Writing prompt	In 2018, Starbucks started phasing out plastic straws from its stores. Write a persuasive essay to convince Starbucks to make plastic straws available for people with disabilities. Be sure to support your position with reasons from the text.
Writing genre	Opinion

The writing prompt was from the curriculum module, but the final writing topic was different. This change of prompt was driven by what we noticed about students' ideas and what we believed can best presented students' learning about this topic. Table 5.2.10 below showed

original lessons and modified multimodal lessons, as well as different multimodal resources used.

Table 5.2.10

Original Lessons and Modified Lessons

Original lesson plan	Digital/ multimodal resources	Modified lessons	Digital/ multimodal resources
Day 1 - Vocabulary - Build background knowledge (giving students six statements and students explain their agree or disagree) - Read aloud	- slides - Newsela reading text	**Stage 1** - Vocabulary (based on all reading texts and posts) - Discuss and investigate the harm of plastic wastes	- Padlet posts - photos - infographics
Day 2 - Vocabulary - Re-read - Make close-read notes - Introduce writing prompt	- slides - Newsela reading text - close-read notes	**Stage 2** - Reading and watching people's efforts to reduce plastic wastes - Creating a post about if plastic straw ban is a good idea	- A reading text from TIME for Kids ("Why should plastic straws be banned?) - Video (children's efforts to reduce the use of plastic straws) - Starbucks twitter post - maps - An infographic made by our district's government
Day 3 - Graphic organizer for arguments	- graphic organizer	**Stage 3** - Vocabulary (based on texts used and posts) - Discuss possible problems of banning plastic straws	- Photos - Padlet board
Day 4 - Independent writing	- Graphic organizer - Writing rubric - Key language use anchor charts	**Stage 4** - Experiment with different types of straws - Practice compare and contrast different straws	- Photos - Different straws - A table that compares and contrasts straws made of different materials - Sentence frames
Day 5 - Independent writing - Teacher conferences	- Graphic organizer - Writing rubric - Key language use anchor charts	**Stage 5** - Reading more texts about problems of plastic straws ban - Discuss if plastic straw ban is necessary	-Newsela reading text - Photos

Day 6 - Final editing - Sharing, peer review and self-assessment	- Writing rubric	**Stage 6** - Make a Padlet post about possible solutions of the issue	- Reading text from Time for Kids ("What is your opinion?") - Padlet

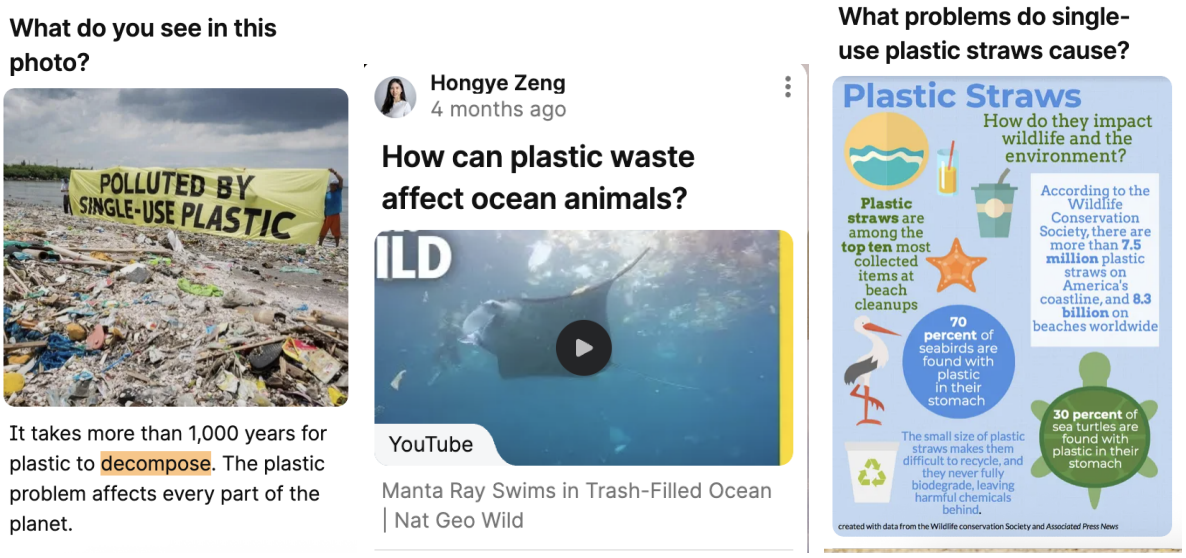
This module was greatly different from the original lesson plans and procedure of learning (see the highlighted part). Only the reading text and writing prompt were kept initially, and all other materials and lesson plans were newly designed by Mrs. B and I. With the goals of practicing critical thinking skills when interpreting multimodal texts, improving students' agency in the learning process, and reviewing compare and contrast, we made the following redesigning decisions.

Redesign Move 1: Choices of Richer Genres of Multimodal Texts. Firstly, I selected a richer set of multimodal texts besides images to show students the prevalence of multimodal texts in daily life for accessing information. As students were engaged in discussing what they noticed and learned from these multimodal texts, they could reinforce the multiliteracies skills we built up in prior weeks. To intentionally present plastic waste as a big environmental issue and how it may harm humans and animals, I made several posts (see Figure 5.2.12 for examples) using photos, videos and infographics. This process of interpreting (different types of) visuals not only prompted rich conversations about the environmental issue, but also helped students understand the power of visual mode to straightforwardly and shockingly present reality. When first presenting the video of a ray swimming in plastic polluted water (post 2), many students expressed their shock and concern by shouting out "oh no" and used this as an example in their post to argue for banning of plastic straws. Additionally, when I searched related multimodal texts online, I found infographics can be a valuable resource for this specific topic and it can also be used for discussing how strategically combining visual and language can convey important messages in an engaging and concise way. When I presented several infographics to Mrs. B, she

immediately expressed her excitement of this idea and pointed out a possible interdisciplinary connection: “I love infographics because they can be a good way for students to also engage with interpreting numbers and figures which were critical skills in other content areas.”

Figure 5.2.12

Examples of Multimodal Texts to Prompt Students’ Thinking



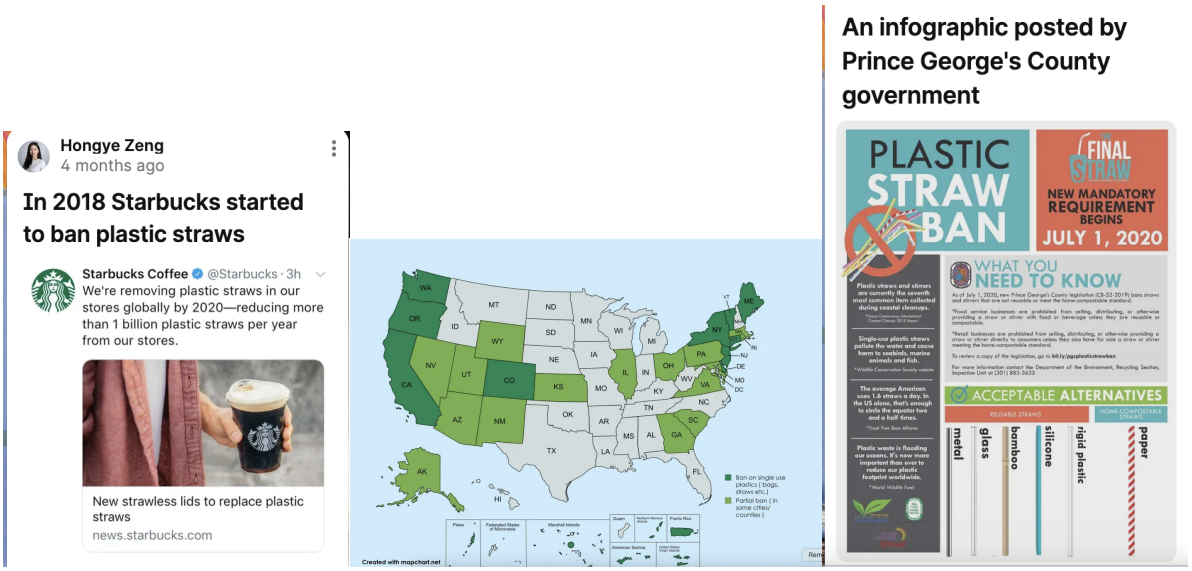
(post 1. photo) (post 2. video) (post 3. infographic)

Being encouraged by Mrs. B’s recognition of multimodal texts and her willingness to be as flexible as she can for the last project, I also included social media posts (twitter/ X) from Starbucks and McDonald to build up background knowledge about how big companies responded to the harm of plastic wastes, maps that show which states adopted the plastic straw ban, and an infographic created by our local government (see Figure 5.2.13). This multimodal experience helped students to reflect on their own experiences and observations of straw using in restaurants or other stores. Most importantly, I aimed to convey the message that knowledge came from not only print-based texts, but also everywhere, especially in today’s digitalized world. At the end of each session, Mrs. B expressed how she was impressed by the creative use

of multimodality for learning and students' rich knowledge prompted by this learning experience.

Figure 5.2.13

Samples Posts about People's Responses to the Plastic Straw Ban



(Twitter/X) (map) (infographic)

Redesign Move 2: Promoting Critical Thinking through Multimodal Learning. The second redesign choice we made was to promote students' critical thinking skills about a controversial topic. The original lesson plan mainly focused on the problems of the plastic straw ban, which will bring inconvenience to people with disabilities. We decided to present rich information for both sides of the issue and prompt students to make informed choices of which side they would like to take. This decision also opened the opportunity for me to present to students how information can be biased based on the purpose of the creator. To do this, in the first few sessions, I intentionally only presented multimodal texts with shocking facts regarding how plastic waste can be harmful to promote students' understanding and direct their attention to the severity of environmental problems. After the instruction, most students expressed their care

for environments and agreed that plastic straws should be banned to protect beach environments and marine lives. However, students such as Elisa shared a different perspective. Elisa said that "but I like plastic straws more. I hate paper straws because they dissolve and then they become disgusting." This insight immediately generated agreements from many students. At this point, Mrs. B and I noticed that students' discussion about their personal experiences with paper and plastic straws can naturally led to teaching "compare and contrast". After class, Mrs. B proposed that "we can bring different straws! I have a rubber one at home. I will go to Dollar Tree today to get some plastic ones." Mrs. B was inspired by students' discussion, quickly captured a moment when multimodal experience can meet her language teaching goal, and actively responded with a hands-on activity. Building on Mrs. B's idea, I added a table (see Figure 5.2.14) with specific language for students to observe, experiment with and make conclusions about different alternatives of straws. In this way, the language teaching was authentic and multimodal, with a clear goal for supporting students' evidence-based arguments in their own writing. Additionally, we still added a photo of a ripped paper straw on the Padlet board to record students' experience. This visual and hands-on activity started to challenge most students' initial stance that plastic straws should be banned.

Figure 5.2.14

Discussion and Hands-on Activity





To further deepen students' thinking of the plastic ban, I used the reading text and supplemented it with two posts showing populations who need plastic straws for drinking safely (see Figure 5.2.15). Through this move, we tried to draw students' attention to whose needs were ignored by the ban.

Figure 5.2.15

Problems of Plastic Straws Ban







(post 1. article) (post 2. video) (post 3. photo and a quote)

After interpreting, discussing and writing posts about both sides of the ban, students were well-informed to compose their final post – possible solutions of this issue. Reflecting on the

overall design of the new module, Mrs. B said that "it really helps students to have deep conversations. The original activity is not deep enough." In the original curriculum, students were asked to simply show agreement or disagreement to a couple of statements regarding plastic straw ban without scaffolding as a warm up activity. Through intentional multimodal design, we shifted a warmup activity to elicit and further build on authentic perspectives for writing.

Redesign Move 3: A Co-constructed Space for Everyone. In module 2, one of the missed opportunities were that students didn't have many opportunities in class to actively explore the topics based on their curiosity and write about their own opinions. Building upon the informational literacy skills learned in the prior two modules, this new module combined informational reading and opinion writing together to open more room for students to do research online, reflect personal experiences, and compose posts to present opinions. This module was more than teacher-researcher collaborative instruction, but a co-constructed space for everyone. I played the role of designing the "skeleton" of the Padlet board with the specific focus on multimodal components; Mrs. B was the content and language expert who added rich language support resources and materials from the curriculum; students were our collaborators whose ideas direct the direction of the lesson designing and whose posts complement the overall design of the Padlet.

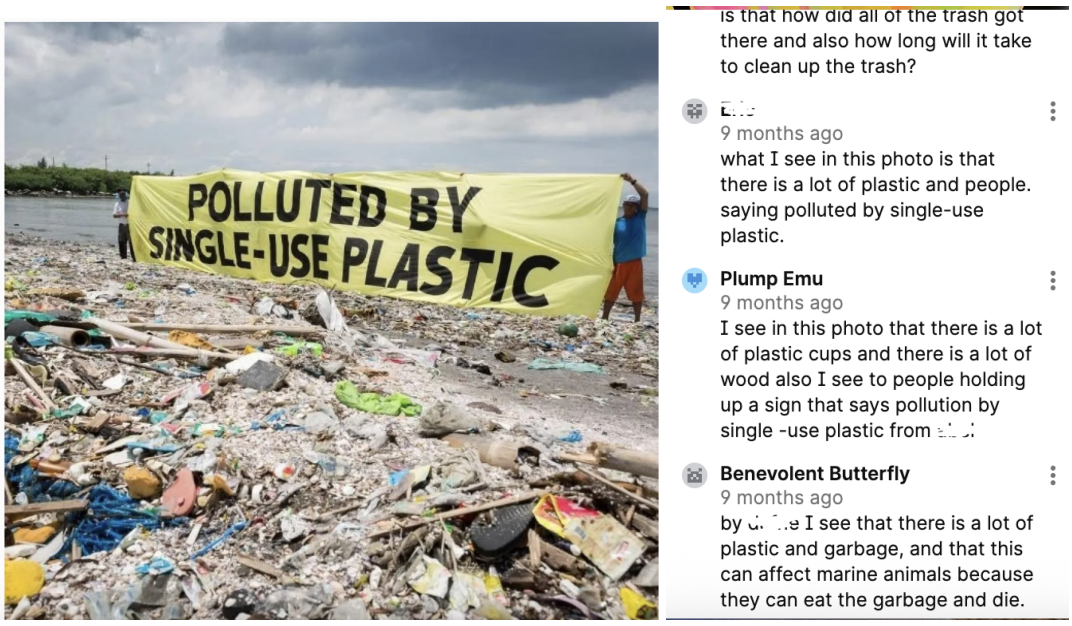
Throughout the three modules, Mrs. B became much more agentive in using multimodal resources and prompting thought-provoking questions with multimodal tools. For example, it was Mrs. B who firstly came up with the idea of using different textures of straws to engage students in experimenting and discussing the strengths and weaknesses of straws made of different materials. This idea went beyond her initial purpose to only review the language of

compare and contrast, instead, it simultaneously supported students to consider if eliminating the use of plastic straws was really a good idea (an essential question in this writing module). Another example was that she often drew students' attention to multimodal details of photos, videos and infographics we used in class. Her focus expended from linguistic skills to using various semiotic tools for deeper and critical understanding of the writing topic.

Most importantly, Mrs. B and I were impressed by the students' deep thinking. Unlike the prior module, students were only able to make posts as exit tickets to summarize their learning, in this module they were encouraged to write or record themselves sharing understanding and opinions all the time. For example, I encouraged students to think about their daily engagement with social media and left comments responding to an issue. Figure 5.2.16 showed a few comments left by students when they saw a photo about beach polluted by plastic waste. They quickly captured the problem of single-use plastic and expressed concerns for marine animals and time to clean up.

Figure 5.2.16

Examples of Students' Comments about a Photo



Despite my purposeful presentation of a single-sided opinion, some students chose to challenge it in the beginning. When I read students' posts and listened to their discussions, I heard that students were discussing not to pick a side but to find a solution for the dilemma such as "recycling plastic straws to make new products" and "teach people not to throw plastic waste on floor". There were some other students pointing out that banning plastic straws would not be effective to reduce the plastic waste because based on the data presented in the infographic, plastic straws was not the dominant type of plastic waste. Through discussion about both pros and cons of plastic straw bans with multimodal texts, these students demonstrated their critical insights about both sides of the same issue, and actively brought up possible solutions.

These debates and ideas led to our decision to revise the original writing prompt that students needed to write an essay to persuade Starbucks to provide plastic straws to some people. This marked an important moment of pedagogical shift when Mrs. B felt motivated and confirmed to deviate from the original curriculum to truly value students' ideas. Instead, our final writing prompt became writing about their own opinions regarding this ban and suggesting any possible solutions. To further support students' writing, Mrs. B also brought in articles from Times for Kids to provide extra opinion writing samples. In the end, students had more flexibility to express their authentic opinions based on their prior knowledge and new learning in this class.

Figure 5.2.17

Examples of Posts Made by Students



I think that plastie straws should be ban why? because more and more people are using it that is bad because all of the plastie straws that people is using is going to sea and animals live in the sea.And animals that live in the sea thinks that the plastie starws is food and if they eat they can die.

(post 1)



I say plastic straws should be banned because, as J. : said, animals can get confused and eat the straws thinking they are food and can die. Also, plastic can take up to 1000 years to decompose and it also pollutes our oceans, seas and beaches.

(post 2)



plastic straws should be banned because people throw away plastic straws on the world and people make animals get killed or make the world not a better place

(post 3)



It is not a good idea to ban plastic straw because you can use it to make something.And the paper straw is riping and you can not dink.And people need to learn that they need to take care about the earth and the people need to learn from there mistake.IT what they get for not caring about the earth.

(post 4)



I believe plastic straws should not be banned because many people like plastic straws better than glass,bamboo,paper,and also medale.*Im going to give you en example why plastic straws are better I'm going to compare it with meddle straws meddle straws can be dangoures for people and kids let say there is this kid called little Timmy and bit on the meddle straws and moand and whent ahh it hurts and his teeth fell of that is why it plastic is better.*

(post 5)



I think maybe because bad people throw it on the floor and good people throw it in the treah or clean it and use it of a other time but the beat straws for me it the silicone.

(post 6)

Figure 5.2.17 showed six posts made by students. Even without any guidance that they need to make the post multimodal, all students added photos for their posts because they have been exposed to many multimodal posts throughout the semester. Post 1-3 supported the banning of plastic straws, and they specifically used visuals to directly emphasize the importance of protecting the environment. For example, post 1 was made by Eddie (5th grade) using a photo from a viral YouTube video in which scientists pulled a plastic straw out of a turtle's nose to

help it be able to breathe. In an article we read together in class, the author mentioned this information and Eddie searched online to find out the video to emphasize the importance of banning plastic straws to protect marine life. Whereas posts 4-6 were proponents of plastic straws ban. They all directly highlighted plastic straws as the visual components. In these posts, all students drew upon information they learned through in-class discussion. For example, post 4 and 6 proposed the solutions of plastic wastes and post 5 drew upon our compare and contrast straws activity to make the argument that plastic straws cannot be perfectly replaced by any other materials.

These posts demonstrated that integrating rich multimodal resources in teaching can promote students' understanding of affordances of multimodality. Students had opportunities to discuss their own interpretations and connections with multimodal texts which help them to also actively engage in using the power of nonlinguistic modes to reinforce their key arguments. In addition, when students had access to information and knowledge through multiple channels, they also had the agency to pick up, select and further expand information that can support their opinions. In this way, writing is more than language skills. Instead, it involves complex critical skills to interpret and curate information for their own purposes. Moreover, reading, seeing, touching and listening to knowledge from diverse sources make it easier to connect to personal experiences and learning in different spaces. For example, during in class discussions, many students pointed to the photo of coffee with ripped paper straws and said they had "*exactly the same experience. I really hate that*." "*It is disgusting if it dissolves. It made the drinks taste terrible.*" "*My sister is a baby and the baby can swallow the straws. It is harmful.*"

These connections and multimodal information boosted students' confidence as knowledge holders to share their learning which led to great motivation to write and express.

When it comes to independent composing of posts, the classroom was quiet with only the clatter sound of typing. Everyone was focused and seemed to be so engaged in their thinking and composing. When the bell rang and the class came to an end, everyone was saying "oh no!!" Nina (5th grade) asked if we could give them a little bit more time because "*It is important. I have so much to say but I just don't have time. I really need to finish this!"* Elisa (5th grade) was the last student who left the classroom with a post she was really satisfied with. She came to me and said "*you must read my post! It is so good because I have different ideas than you thought.*" Mrs. B was surprised and she talked with me after the class and said "*Did you see that? They are "crazy"! These kids have so much to share. The conversations and arguments are deep. They are so different today. I think this (point to the Padlet board) really helps a lot.*" Students' motivation and agency made this multimodal space alive rather than being a one-directional instructional tool. Students had the ownership of this co-constructed learning space which in the end reshaped the direction and depth of learning.

Lingering Challenges and Future Opportunities. The module 3 ended in a hectic way within three weeks when many transitions, testing and events happened at the end of the semester. We tried our best to navigate lingering systemic challenges such as time pressure, the unimodal scripted curriculum and assessments, as well as other challenges emerged in prior modules, including the lack of peer collaboration opportunities, few opportunities for explicit instruction of multiliteracies skills, and missed chances for promoting critical multimodal awareness. However, we didn't have opportunity to continue and extend more iterations due to the closure of research project. After our last class session, Mrs. B expressed how much she hoped we could have more time to continue the project and dig deeper into thoughts brought up by students. Reflecting retrospectively, this multimodal learning space could be further improved

with interdisciplinary collaboration and venues for students to present and share their writing artifacts with broader audiences.

Interdisciplinary Potential of Multimodal Learning. When Mrs. B and I initially selected the topic of module 3 and planned lessons, we didn't realize its great potential for interdisciplinary learning until many 5th grade students excitedly shared with us that they just learned a module in science classes about environmental protection. When we presented our new Padlet boards to students, many students immediately raised their hands and said that "*we learned about protecting the environment in other classes!*" "*Can I share? I really want to share! I know different types of pollution.*" Then they started to chat with each other about their prior learning and how that learning related to our module. We were surprised by students' active responses to the new module where they immediately saw themselves as knowledge holders and made academic connections to in school learning. In addition, when we presented infographics about plastic waste to students, many of them shared insights based on mathematical thinking. For example, they mentioned that people may need to use many paper straws to finish one drink compared with only using one plastic straw. They also noticed that plastic straws only took up a relatively small portion among all plastic waste and ocean pollutants. Therefore, only banning plastic straws may not effectively solve the issue of plastic pollution. Moreover, although our lessons implicitly raised students' awareness that multimodal information can be exploited based on the producers' intention, this critical skill could be further taught in other courses such as social study and English language arts.

These examples reveal the possibility of interdisciplinary collaboration between language teachers and content teachers to reimagine language classrooms not only for teaching language skills, but also for supporting students' disciplinary literacies skills through language learning. In

this way, language education is neither considered as separate from other class learning, nor as a remedial space for multilingual students. Instead, a multimodal language classroom can be conceptualized as an intersection of different disciplinary knowledge where multilingual students can feel safe, confident and being supported to engage in fruitful learning of multiple literacies (e.g. conventional literacy, digital literacy, critical literacy, data literacy, visual literacy).

Venues for Students to Present and Share Projects. The other regretful moment of our instruction is that we didn't have time and venues to present and share students' writing projects because we finished the final writing project on the last day of class. There were some moments that could have been better captured and built upon to elevate the impact of practices and students' progress in our classrooms. For example, one of the videos we watched and discussed in the class was about a child's effort to persuade local restaurant owners and governors to reduce the use of plastic straws. Before students worked on their own multimodal posts, they asked me "*do people really listen to us (children)?*" and Elisa asked "*will governors also read my writing?*". All the students immediately looked at me and waited for my answers. Realizing students' eagerness to be heard by broader audiences, I told students that although I don't know if governors will read it, we will share their writing with other teachers in this school, researchers in university and with many other people all over the country through conferences. Everyone was greatly motivated and they kept asking me "really?" "No way!" and worked hard to demonstrate their knowledge.

Although my response to students greatly boosted their motivation because they knew their writing and ideas were meaningful and there were real audiences besides Mrs. B and me, I still admitted that this moment was not fully captured and sufficiently expanded for more authentic and critical learning. For example, I should plan ahead of time for students to present

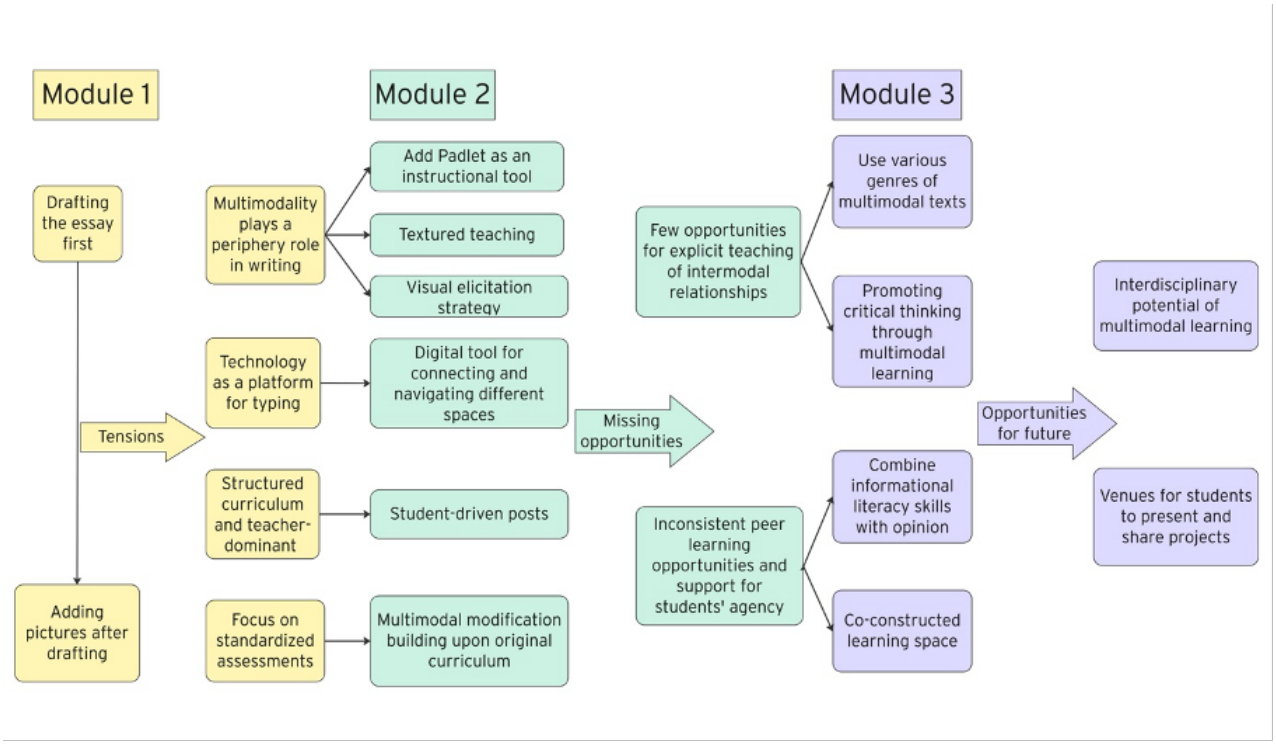
their own writing artifacts in the school library inviting other teachers and peers to celebrate their progress together. In this way, students took the active role in sharing their learning. Another idea can be connecting the experience of making posts for this class to experiences of writing on social media. I could plan follow-up lessons to explore together with students how to use multiliteracies and multimodal skills we had learned throughout the semester to augment one's voices and visibility on digital space. I believe this could make teaching for the moment a step further towards preparing students for future social engagement.

5.3 Design Insights to Foster a Multimodal Learning Space

The prior section unfolded how the multimodal learning space was gradually developed and adapted based on specific contexts over three modules. Figure 5.3.1 is a flowchart summarizing the emerging challenges and strategies to navigate those challenges in this research project.

Figure 5.3.1

Flowchart of Multimodal Learning over Three Modules



Note: The tension moments and missing opportunities identified in each module of practices led to starting points for redesigning in the following module. Although the research ended in module 3, the missing opportunities led to potential directions for the future.

Anderson and Shattuck (2012) pointed out that it is hard to determine if a design-based intervention is complete and how many iterations can make it complete. There may always be new challenges that need to be addressed because the educational system is complex, dynamic and keeps changing. Therefore, instead of considering this research project as not fully complete, I believe it is full of potential for the future to continue. Not making any statements about how this intervention can be readily and fully replicated in different contexts, the next section provides five design insights/strategies rather than design principles to help different educational stakeholders to make their own informed decisions to tailor and create contextualized multimodal learning space.

Design Insight 1. Understanding Systemic Challenges that Shape Teacher's Pedagogical Decisions regarding Multimodal Integration

The design insight 1 focuses on the planning stage of a multimodal learning space. This section firstly explains how context, teacher's practices and students' responses to multimodality interrelated with each other and followed by how this understanding can shape the direction and expectations of the multimodal learning space.

Multimodal Learning Space is Negotiation between Teacher's Agency and Context. The initial integration of multimodality (module 1) was not smooth. Despite the fact that Mrs. B understood the value of multilingualism and multiliteracies and her willingness to use different digital tools to teach, there was a mismatch between what she believed to be beneficial to students and what she was able to do in the classroom. This resonates with what Nash (2024) found about mismatch between teacher's belief and practices: although teachers celebrate the use of multimodality "on a theoretical level", in practice, they still use it "as adjunct resources". As a researcher and lesson co-planner, it is important to understand what might lead to this mismatch and how to continuously redesign and adapt the research intervention to respond to it.

Throughout the whole research process, we experienced and navigated various systemic constraints. Prior multimodal research revealed that constraints including assessment pressure (Tan et al., 2021), persisting hierarchy of literacies that positions language as the only expected mode of communication (Lim et al., 2022), class routines and time (Sultana & Turner, 2021)) may negatively impact teachers' capacity to implement DMC projects. In our case, the standardized tests and mandated curriculums were language-focused, which shaped Mrs. B's scopes of focus to prioritize teaching discrete language skills. For example, in the beginning, one of Mrs. B's motivations to use a digital platform for writing was "most testing was conducted

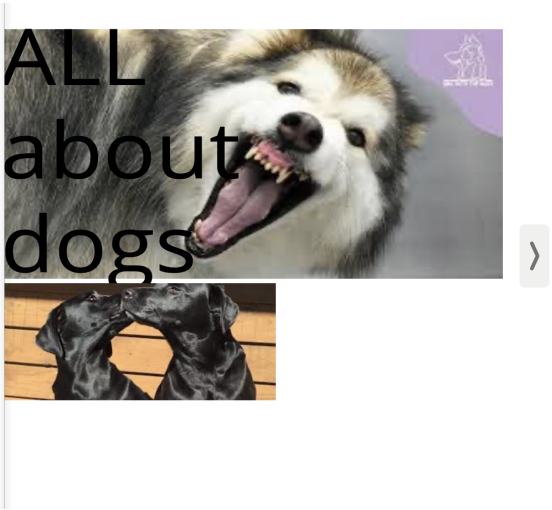
online", which revealed the influence of testing culture on teachers' pedagogical decision. In class, multimodal practices were only allowed after finishing the required writing task for extra fun. If teachers cannot find and see multiliteracies and multimodality in curriculum and in assessments as more than add-on, they may not be able to imagine the possibilities of thinking beyond language. Additionally, although Mrs. B pulled multilingual students every day to ensure consistent support, the short class period (30-35 minutes) and frequent disruption of testing pressured her to cover required content first before being willing to "do something else", as she said. Time pressure was a lingering challenge we experienced through all three modules and a concern reported by many teachers in prior research (e.g., Humairoh et al., 2024; Li, 2020). Therefore, we had to make quick decisions to skip some activities and brainstorm multimodal strategies that might efficiently and effectively address both academic needs and multiliteracies possibilities simultaneously. Otherwise, teachers may choose to immediately return to the original instructional approach instead of sustaining newer practices. Therefore, a multimodal learning space should always be ready to be changed and adapted in response to classroom realities (Lim & Unsworth, 2023).

These systemic and contextual challenges shape teachers' practices and perceptions regarding multimodality in practice. Teachers' perceptions will also affect students' understanding of the purpose of multimodality because teachers are the mediators between a new pedagogical approach and actual practices (Lim et al., 2022). For example, during module 1 after students finished their writing draft and started to add pictures to "decorate" their books, I noticed Nayla started to search and add funny dog memes in her composing project (why dogs can bring health benefits) (see Figure 5.3.2). When I asked her why she chose these memes and how these pictures relate to the theme of her writing, she seemed to be confused and responded

that these pictures were funny. Not the only case in class, several students described their use of pictures as “funny” “look cool” instead of directly relating to the content of writing itself. Therefore, the systemic constraints, teachers’ practices and students’ understanding are interrelated. When multimodality was marginalized and positioned as decoration, students might not automatically use it for meaningful learning without guidance, scaffolding and practice. Fostering a multimodal literacy learning space requires the considerations of these complex interrelationships (Cao & Mao, 2025). Promoting students’ multiliteracies skills requires not only a teacher's recognition of the existence of digital tools and multimodality, but also contextualized and ongoing support for curriculum designing and assessment.

Figure 5.3.2

Nayla’s Initial Picture Choices



Contextual Constraints Need to be Explicitly Recognized, Considered, and Addressed. Recognizing pressure and challenges teachers may face when integrating digital multimodal resources into their instruction is the first step (Michalovich, 2025). Systemic and contextual constraints including time pressure, language-focused curriculum and teacher dominant instruction always interplay with the intervention. They need to be explicitly

considered and addressed. Therefore, multimodal design is using available resources to strategically and realistically make changes. The changes are not content-wise, but more about adjusting pedagogical moves to teach content. For example, in this research project, we intentionally used digital tools (e.g. Padlet, Book Creator) that are freely available in the school and child-friendly to ensure students have access to all multimodal learning resources in and after class. With the intentional choice of digital platforms that allow students to navigate and refer back to resources recorded on the platforms, we reallocated more time for building on students' ideas instead of spending much time on reviewing in each session.

Secondly, I recognized that Mrs. B has institutional demands, as she said "They [administrators] always asked me if I am using this curriculum. They want us to use it and teach with it." "I need to prepare these kids for assessments so they can exit the program." Despite Mrs. B tried to only use the curriculum as a guide and maintain a digital space in her classroom to resist some norms, the institutional demands leaving her little room for more creative and flexible multiliteracies projects. Therefore, the redesigned lessons should center on carving out a multimodal instructional middle space where teacher's daily demands can be satisfied while exploring multimodal practices. To do this, we distributed multimodal resources across the whole teaching, learning and composing process to disrupt the hierarchy of literacies which not only provides multilingual students with multiple channels of meaning making but also opening up opportunities for engaging in multiple types of literacies practices through rich selection of multimodal texts (e.g., infographics, videos, social media posts) beyond the curriculum. At the same time, we grounded all our multimodal design in the curriculum to ensure it fulfilled content teaching goals. We wove skills of interpreting multimodal texts into background building,

reading and discussion processes to prompt students to notice hidden or non-written information in order to deepen their understanding of multiliteracies and writing topics.

Lastly, Mrs. B valued students' ideas, but contextual constraints often made her feel challenging to respond to and build on students' thoughts, making her earlier lessons one-directional teacher-directed. As we purposefully using multimodal texts to elicit students' funds of knowledge and using Padlet to keep students' emerging ideas and questions (through commenting, posting and voice recording), she mentioned that these multimodal redesign practices "record students and idea and make her feel surprised about how much insights these kids have." In this way, we moved from letting students' ideas go after discussion to intentionally record all emerging ideas that can inform following pedagogical decisions.

Moving from Challenging to Understanding and Responding to Teachers' Professional Decisions. Recognizing the existence and the influence of these systemic and contextual limits also means admitting different motivations and expectations between researcher and teacher to foster a multimodal learning space. Lim et al. (2022) found that many teachers took a "utilitarian" perspective towards multiliteracies and multimodalities for academic learning because they were experiencing real pressure to achieve short-term goals. This finding resonates with my observation of Mrs. B's teaching that she needed to set students' up for WIDA language assessment to exit the program, so she chose to only leave a minimal space for other literacies in class.

However, as I developed deeper trust and relationship with Mrs. B, I started to realize her care about multilingual students' equitable access to other content classes which pushed her to only focus on teaching English language skills. The assumption of language skills as the main barrier for successful content learning, her role as a language specialist, strong sense of

responsibility for multilingual learners' academic success and Mrs. B's beliefs about the importance of multiliteracies skills continuously pulled and pushed her agency to teach multimodally, and determined her level of comfort regarding to what extend multiliteracies and multimodalities can be integrated into her classroom. Therefore, multimodal learning space is less about challenging or critiquing teachers' practices to make teachers on the opposite side of researchers, instead, it is about co-creating a learning space where teachers can also feel uncomfortable to gradually think out of the box and enact what their deep beliefs about what is beneficial to students. The initial divergent understanding and motivations for multimodal projects challenged my researcher's assumption of what should be and could be implemented in the specific classroom. Therefore, the multimodal learning space should directly highlight its academic value among many other benefits. If teachers see how these multimodal practices support students' traditional writing, they may feel more motivated to implement it in a test-oriented and language-focused classroom (Pandya, 2021). For example, in this research, Mrs. B and I focused on reflecting on how multimodalities supported students during co-planning time and debriefs to authentically build up her trust of this new approach to affirm her statement that "I would love to try approaches that can really benefit students' academic learning".

Reframing Multimodal Learning Space as an Ever-changing Process. Another consideration when planning multimodal learning space is to reconceptualize the expectation of it. Rather than viewing goals of designing this space as fixed points or checking checklists, it should be understood as a continuum, allowing for adaptations and growth over time. Grapin (2019) brought up the idea of the strong version and weak version of multiliteracies and pointed out that teachers usually took the weak version of multiliteracies in language classrooms to use multimodality as an auxiliary tool for language learning instead of recognizing them as valid

literacy practices on their own rights. However, there should be a growing space in between for teachers to gradually experience and move from one end to the other. This process takes time and a lot of effort. Researchers point out that recognizing the existence of multimodality is still far away from grasping multimodal pedagogical competence (Cook & Sams, 2018; Paesani & Allen, 2020; Veliz & Hossein, 2020) which requires skills to strategically design with available multimodal resources to support meaningful learning in a context-sensitive way. Therefore, iterations of multimodal learning space in this research are a continuous process when Mrs. B and me navigate the context and learn together.

After each iteration, both Mrs. B and I reflected about what worked, what might not, and how to move one step further. These reflective conversations are foundational for gradually improve our multimodal design. Instead of considering each iteration as a reductive version of multiliteracies, I perceive it as multiple developing versions of multiliteracies shaped by different contexts and teachers' growing multimodal skills. This is important to motivate teachers to move forward by recognizing each step, especially for teachers who may have much less autonomy in deciding what curriculum and materials they can negotiate. Therefore, there will not be one standard version of multimodal learning space to follow. Teachers and researchers will need to embrace how the context may keep reshaping the direction of the intervention and create a best multimodal space at that specific moment and in response to the specific context.

Design Insight 2. Identifying and Leverage Existing Classroom Resources to Redesign Curriculum and Instruction

Design insight 2 focuses on the question of how to identify and select resources available when planning multimodal lessons and instruction.

Reorganizing Available Resources instead of Creating from Scratch. Designing a multimodal learning space that is different from a conventional language classroom does not necessarily need to create everything from scratch, which can be overwhelming for teachers who are already experiencing pressure and large workloads. The rule of thumb in this research is "less is more". Although I designed and planned a sample procedure of implementing multimodal compositions based on my pilot study in an after-school program and prepared a list of possible multimodal composition project ideas (e.g. digital storytelling, making poster, infographic etc.), these ideas and pre-planned procedures were greatly modified after understanding how Mrs. B's pedagogical choices were continuously influenced by contextual constraints.

Mrs. B had rich prior experiences with digital tools such as Book Creator and Padlet. Instead of requiring her to learn new tools, we continued to use tools that she was familiar with and confident in using. We only used these two most available free tools throughout the whole semester because it could be overwhelming and time consuming for teachers and students to learn many new tools in a short time (Humairoh et al., 2024), especially under the pressure of coming language assessments (Tan et al., 2020). In addition, we planned all lessons grounded in the original lesson curriculum, using reading texts, slides, prompting questions, writing prompts and language support materials as the starting point for designing. Then we marked multimodal resources (mainly visuals) in the curriculum module package to examine how to recenter these visuals during instruction to elicit students' ideas. In this process, we often added resources beyond the curriculum materials to supplement background information and deepen the topic. Most importantly, students' digital expertise and Mrs. B's teaching strategies were recognized and reconciled as part of the redesigned multimodal learning. For example, Mrs. B always wrote down and wanted to respond to students' new ideas during in class discussion. Her practices

were adapted as encouraging students to make their own posts to record their ideas. After class, we can listen to, read and discuss how we can build on students' ideas to make students' perspectives part of instructional design. Taken together, Mrs. B and students' digital skills, class routines, as well as required curriculums were foundational to lesson redesign to ensure fewer extra workloads for teacher and alignment with course goals.

With strategic tweaking of materials, tools and practices already in the classroom, and adding on multimodal components throughout the whole process, Mrs. B said that "*I don't think you are doing anything interrupting the instruction at all. It was so easy. It just took one hour per week to plan.*" This quote demonstrated that Mrs. B recognized the feasibility of this context-responsive multimodal redesign and her willingness to continue the practice when it is beneficial to students, accessible for teachers' busy schedule, and aligning with curriculum mandates. Teachers may not feel teaching multimodally a burden or disruption of their teaching plans, which lead to greater agency in retaining the practices. Most importantly, with small changes, "*the conversations are so deep and knowledge is retained so well*", said by Mrs. B, emphasizing how multimodal modifications changed the learning outcomes. Recognizing the easiness of creating a multimodal learning space from original lesson resources can relieve teacher's concerns and hesitance.

Growing an Organic Intervention from the Site. Imagining a classroom as a complex ecosystem where, "injecting" a generic outside intervention that is not contextualized for the classroom can lead to unexpected push back and reactions that detriment the goals of an intervention (Pak et al., 2020). Therefore, an organic intervention that is grown from the site is the key to make a newer learning approach more sustainable.

Recycling and redesigning resources and practices already in the classroom, as discussed in the prior section, was the first step. An organic multimodal learning space also needs to prioritize teacher and students' agency, curiosity and learning needs. Therefore, a context-responsive multimodal design may be different from one iteration to another, vary from one classroom to another and need to be flexible for ongoing adjustments. For example, the context, learning content and my relationship with Mrs. B and students continuously changed throughout the three iterations of multimodal composition projects. As Mrs. B developed more trust and confidence of how multimodal practice can support academic writing purposes, we had increasing flexibility to draw on more out-of-curriculum multimodal resources and even redesigned the curriculum based on students' ideas. This deepened teacher-researcher relationship and adroitness in multimodal integration made later iterations different from the initial round of practice. In addition, as we engaged more with multimodal design, new learning needs and opportunities that beyond our plan, such as supporting students' reading comprehension, promoting students' criticality in interpreting multimodal texts, gradually emerged and needed to be addressed. To respond to new learning opportunities generated by multimodal design, we continuously added on to original design. Although this dynamic design process inevitably led to our uncertainty about what the project would turn out to be, it also provided us with more opportunities to critically reflect our own designing and teaching. This became an authentic experience not only for students but also for me and Mrs. B to actively discuss, adapt and redesign our teaching. Mrs. B said that "*In the beginning, I only can think of using a Padlet for some quick writing. I really appreciate you bringing it back to the classroom and being creative*." This quote highlights that engaging in co-designed multimodal experience helped Mrs. B expand her imagination of how digital tools can be used for integrating

multimodality and support students' learning in a more creative way. As she saw more examples and multiple possible use of Padlet board for multimodal learning, she also became more active and adroit in brainstorming new ideas, searching outside resources, creating posts and scaffolding students to use multimodality to mediate understanding.

In summary, a more organic multimodal design is not pre-determined by researcher, but inviting expertise of teachers and students, taking into considerations of classroom dynamics, and learning through collaboratively experiencing the pedagogical design process.

Design Insight 3. Using Multimodality as an Anchor for Academic, Social and Real-world Connections

During the designing and implementation stage, the question of "what the purposes and roles of multimodality in writing instruction are" is important to consider. The hierarchy/sequence of literacies or the weak version of multiliteracies (Grapin, 2019) reveal the peripheral and auxiliary role of multimodality in many language and literacy classrooms. However, in this research project, we reframed multimodality as an anchor for teachers, researchers and students to make personal, academic and social connections through multimodal redesign. Multimodality is not only a design feature of a writing project, but an important mediating tool for learning (Vygotsky, 1978).

Using multimodality as an anchor for connected experiences and learning requires embedded multimodal resources throughout the whole instructional and writing process, instead of restricting them as rewards of writing. In our research project, I assembled various genres and modes of texts to engage students in exploring deeper about the writing topic and related issues because multimodal texts allowed multiple interpretations with multiple channels to access information. Most importantly, showing students various types and modes of texts they may

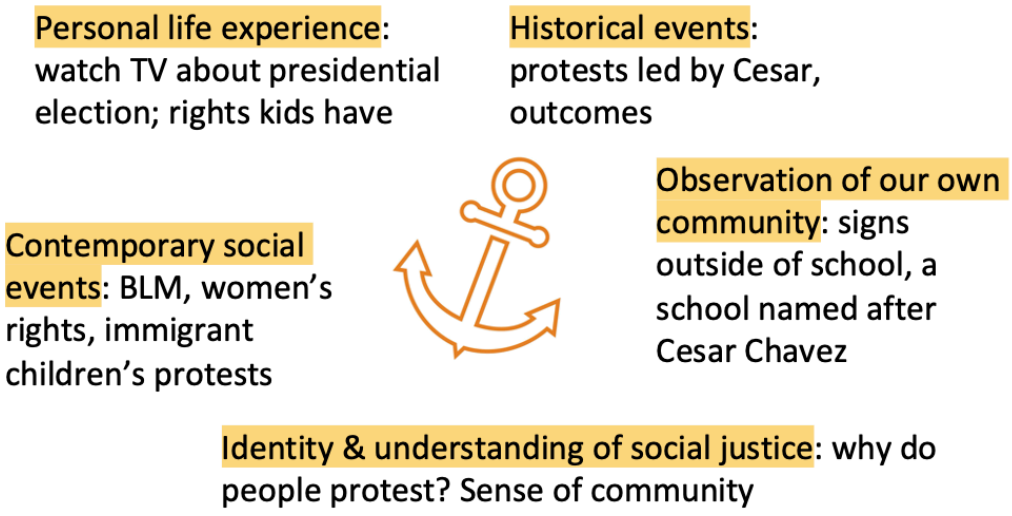
encounter in daily life (e.g. social media posts, infographics, posters, videos, news) justified different ways of knowing and challenged print-based reading articles as the only valid source of information in school. Through multiple connections multimodal texts can make, we can see students' funds of knowledge which can inform conversations and inspire new pedagogical adaptations. For example, in module 2 (Cesar Chavez and his fight for social justice), as lesson designer, Mrs. B and I firstly discussed our own personal connections with the writing topic and brainstormed students' possible connections to the topic when we designed the initial Padlet board. The topic of civil right movements and protests reminded me of recent news I read about researchers in the University of California system stroked for better salaries. I also thought about Cesar Chavez's childhood experiences as migrant worker might generate some connections for students to think about rights (e.g. education, proper living conditions) they have as children.

Seeing so many initial multimodal text ideas, Mrs. B immediately proposed that we should connect Cesar Chavez's effort and spirit to today's life and we created a new section with contemporary civil rights movements to have students to make real life connections between historical events and sociopolitical lives. With this idea, she started to make connections to her personal experiences of participating in Black Lives Matter protests and other protests supporting women's rights in DC a few years ago. Mrs. B asked me if we can make posts based on protests she attended and she can share her experiences in class. In this way, Mrs. B was not only a teacher but an activist whose storytelling provided first-hand information about "why do people protest". These connections to personal civil movement participation helped us to connect the curriculum to real life experiences and significance for students to explore reasons for these movements.

The next day in class, many students noticed the signs people were holding in photos and brought up they saw similar signs on TV and in the neighborhood because of the presidential election. Elisa also excitedly told me after class that she found there was a high school nearby named after Cesar Chavez. These connections (see Figure 5.3.3 for a summary) helped students see learning in the classroom alive and everywhere in their life experiences which also showed in their writing. For example, in Elisa, Eddie and Jaime's wiring artifacts, they all reflected about how lives today would be different if without Cesar Chavez as well as other social justice fighters' efforts. Despite the fact that when I designed and selected multimodal prompts for making connections, I had some predictions about what connections might be made, there would always be a lot of unexpected new connections. Students, teachers and researchers are all knowledge holders who bring in different perspectives and experiences to co-construct new learning. As summarized in Figure X, students, Mrs. B and I all engaged in making connections with the writing topic through interpreting, adding, responding to multimodal texts. This experience was grounded in curriculum teaching goals and was expanded through funds of knowledge from all of us in the class. As Mrs. B reflected that "this is not only about the writing module" and through using multimodal texts to anchor our experiences (in and out of schools), "kids can see and understand what is happening in their everyday lives and this understanding is important, especially for them [as culturally and linguistically diverse groups]."

Figure 5.3.3

Connections Students Made through Multimodal Engagement



Moreover, in order to maintain teaching multimodally, we kept referring to the multimodal Padlet board and emphasized connections we made to inform thinking and writing. In this way, the use of multimodality is a reciprocal process for both teachers to adapt teaching and for students to mediate writing (Byrnes-Cloet & Hill, 2022). Different from a KWL chart activity which teachers often don't refer back to after background building, this explicit guidance for students to continuously use discussions and co-constructed resources to anchor and strengthen their writing helps multimodality play an active role in the whole process. As we moved on to module 3, I noticed that students actively explored and drew upon resources that hadn't been taught yet on the multimodal board during discussions.

Design Insight 4. Transforming Multimodal Learning into Interactive and Student-led Experiences

Design insight 4 focuses on promoting students' agency in this multimodal space and shifting the classroom from teacher and researcher-directed to a more student-driven experience. With rich digital and multimodal resources, student-driven and peer learning can take many forms. For example, in this research project, it can be as explicit as teachers created posts

responding to questions students ask and comments students left to keep reshaping the direction of lessons, or students made their own multimodal posts to express ideas to inform teaching; it can also be as implicit as students read each other's comments and listened to peer's recording of thoughts to support their writing; it can be collaborative when students actively taught each other how to navigate different digital platforms (Padlet, Google Image, Book Creator) for better multimodal resources they want to express themselves. It is important to note that the transformation from a relatively more teacher/ researcher directed space to a more student-centered classroom is not necessarily due to the use of new tools, but how the pedagogical design changed our relationships with the tools and resources. In all modules, materials (curriculum, tablets, learning apps, space) remained similar. However, in the module one, digital tools and multimodality were positioned as adds-on, whereas in later modules they were reframed and used as natural part of learning. This changing relationships with materials/ tools/ semiotic resources helped us broaden our imagination of how to make visible students' ideas by taking advantages of digital affordances (e.g., real-time and asynchronous responses and communication, recording students' ideas in multiple formats, linking to outside resources).

When all students had access to information (linguistic, non-linguistic, peer-created, teacher and researcher-created) and teachers were responsive to students' ideas to decide what to learn deeper, what questions were important for students, what experiences they wanted to highlight, students developed a stronger sense of ownership of this learning space and motivations to contribute to this space (Lim & Nguyen, 2023). For example, the following quote from Diego (4th grade) in the end of project survey represented many students' perspectives about how excited they can make their OWN writing projects and engaging in reading and commenting on other peers' good work. Diego's reflection resonated with Lim and Nguyen's

(2023) argument that multimodal pedagogical design needs to promote students' agency by giving them choices and helping them feel taking control of their own learning. This is especially important in that, as teachers and researchers, we are teaching for supporting students' interests as meaning maker.

> *"I enjoy Book Creator because you can make whatever story you want, you can make your own stories, you can also add pictures and record. Like what I am doing. When you can do anything, you can take a picture, you can search up images for your book. And for Padlet, the recorder and the music right now is that be kind of fun because actually when someone starts recording, you can comment on the recordings like good job, good work, or whatever you can put on your own comments if you like it. I am proud of I do a lot of writing, I said a lot of questions about it, and I just make my little story about writing." (Diego, end of research survey)*

A student-driven and student-centered multimodal learning space is transformative in the sense that it also legitimizes knowledge that students have and further supports multiple literacies skills students can apply to different spaces in schools or in their everyday lives (Honeyford, 2013; Turner, 2011). For example, students' learning about Cesar Chavez's social movements (module 2) and plastic straw ban (module 3) through multimodal experiences highlighted their personal, academic and social knowledge beyond the specific curricular materials. These student-generated connections make a writing module more than a school task, but a space for growing awareness of issues that related to everyone's lived experiences.

Most importantly, it affirms the transmodal expertise (e.g., translingual practices, inferring information through multiple modes) and experiences many multilingual students already have in English-only and unimodal literacy/ language classrooms. A multimodal learning space explicitly recognizes, legitimizes, and promotes these sophisticated meaning-making skills instead of considering them as deficit in English language learning. In this space, multimodality is not any more simply an auxiliary tool to learn English, but a proud navigational skill to demonstrate students' knowledge and augment their voices.

Design Insight 5. Seeking Institutional and Professional Community Support for Sustainable Multimodal Practices

In addition to efforts from a classroom, a multimodal learning space requires continuous and collaborative institutional and professional community support (Nash, 2024). Without these ongoing and systemic support, teachers' efforts might not be easily sustained.

As mentioned in design insight 1, teacher's perceptions and practices are influenced and possibly restricted by language-only curriculum and standardized assessments when envisioning multimodal teaching. Due to institutional demands and narrow expectations for what counts as "right way" to teach English to multilingual learners, Mrs. B resisted these norms in a compromised way before lesson redesign: while she adapted curriculum to include digital tools and believed in the potential of multimodal practices, she used these resources as adds-on and minimized their roles in mediating learning. However, at the end of this project, Mrs. B proactively shared class examples and resources to the school district curriculum specialists, trying to provide suggestions for curricular improvement, we didn't hear back from them. Mrs. B expressed her confusion of this case because "they usually responded to me real quick." Although scripted curriculum can provide structures and guidance for standard alignment, it can also risk teachers' agency in exploring other research-based and equitable approaches that can better support multilingual students to access learning (Timberlake et al., 2017). Therefore, school districts, leaders and administrators need to create a more flexible space for teachers to explore and implement different approaches of teaching based on their professional judgement, as well as actively collect teachers' feedback and experiences of teaching. For example, school leaders should establish co-planning sessions for teachers to learn, explore, discuss and reflect on how to integrate multimodality for learning, and create opportunities (e.g., school events) for

students to present their multimodal artifacts to highlight its academic benefits to diverse learners. There should also be venues that accepting and responding to teachers' suggestions for continuous curriculum development for the benefits of learners.

Teacher educators and researchers need to play more active roles in collaborating and preparing teachers with multimodal pedagogical skills, which requires not only knowledge about the affordances of multimodality but also skills of using multimodality for teaching (Jiang & Hafner, 2024; Michalovich, 2025). When reflecting on professional development opportunities regarding multimodality, Mrs. B mentioned that "our school have professional training sessions. Experts from the district come to school to share new tools. Last month we had someone came and talked about how to use Book Creator." However, based on her observations, this knowledge didn't transfer successfully to many classrooms in the school, Mrs. B said that "after the professional training sessions, teachers still went back to their original teaching practices. They don't use these tools and resources. I am the only teacher consistently used these." When asking her opinion about why other teachers in the school community didn't use new tools despite these training, Mrs. B said that "I don't know. Maybe they just don't know how and they don't want to what they do every day. Or maybe they just don't care if these tools are important for children in today's life. One of the teachers said that she couldn't do any of these because there is no projector in her classroom." Although not having access to talk with other teachers, Mrs. B's observation may reveal two facts: firstly, professional development sessions that only share tools instead of pedagogical approaches for using tools are insufficient to change classroom practice; secondly, many teachers' hesitance to take up new practices might not necessarily due to lack of materials but actually more about ideologies. Although the teacher Mrs. B mentioned considered the lack of classroom infrastructure (projector) as a major barrier

for multimodal practices, all students have their own Chromebook and multimodal practices doesn't necessarily require digital access.

The gap between material availability and pedagogical skills to meaningfully use available materials highlights that professional training and researcher-practitioner partnerships should be contextualized to local teachers' needs and follow up teachers' practices continuously and constructively (Fowler & Leonard, 2021; Lim, 2023). One-shot professional development sessions that simply shared resources positioned teachers as technicians who need procedure knowledge (Crowley, 2017) rather than designers who need pedagogical skills to integrate and meaningfully use these tools. Teachers need to authentically experience multimodal teaching with support from institutions and professional communities before they may feel comfortable and ready for taking risks independently. Multimodal learning space is not only for students, but also a growing space for teachers to rethink and update their teaching practices, as well as for researchers to adjust research procedures to best serve teachers and students' learning goals.

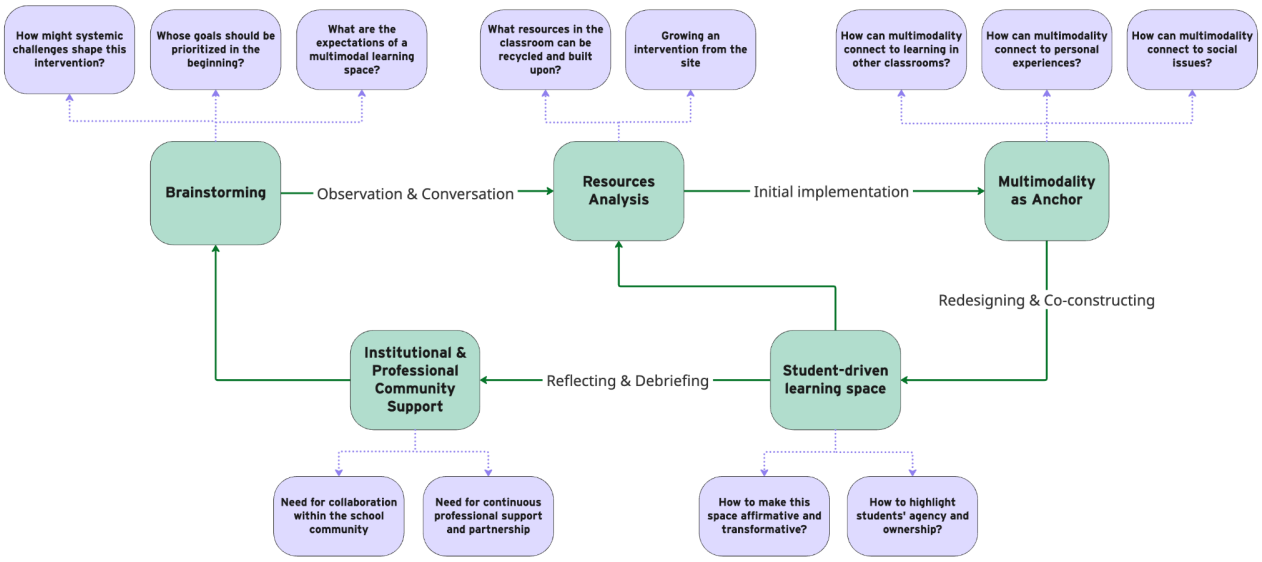
Moreover, support and collaboration within the school community is also critical to sustain a multimodal space. During module 3, we realized the great potential of interdisciplinary learning in a multimodal space, which requires collaboration between classroom teachers and language teachers to identify possible disciplinary connections. For example, statistical literacy in interpreting infographics can be further developed in a math classroom and critical digital literacy might relate to social study class. In this way, language classroom is not separate from other disciplinary learning nor merely a bridge to other content areas learning. Mediated through multiliteracies and multimodality, a language classroom should be reframed as a space where multiple learning goals can be achieved.

Even though we are eager to expand multimodal experiences in our classrooms to other classes in the school, towards the end of this research project, we experienced some implicit push-back from other language teachers to continue this multimodal approach who prefer to go back to paper and pencil, despite our efforts to present our lesson artifacts and students' writing samples. Mrs. B was frustrated when found out "I feel they don't even want to talk to me this morning because they don't want me to continue to persuade them." Mrs. B said that sometimes she felt so lonely because she did things differently and she was the only teacher in the school who consistently used digital tools to support students' learning. This professional isolation raises the question of how long the multimodal space can be sustained without a supportive and collaborative community when researcher exit the site. However, this is not only one teacher's responsibility to push the boundary, but also responsibilities from various educational stakeholders to collaboratively make multimodality a legitimate part of language and literacy learning.

In summary, Figure 5.3.4 shows a flowchart of designing considerations. There are some prompting questions and points to reflect for each stage of designing a multimodal learning space, responding to the call from researchers (Howell, 2018; Smith, 2025) for more guidance to use multimodality as more than engagement and for authentic academic learning.

Figure 5.3.4

Multimodal Learning Space Design Flowchart


How might systemic challenges shape this intervention?
Whose goals should be prioritized in the beginning?
What are the expectations of a multimodal learning space?
What resources in the classroom can be recycled and built upon?
Growing an intervention from the site
How can multimodality connect to learning in other classrooms?
How can multimodality connect to personal experiences?
How can multimodality connect to social issues?
Brainstorming
Observation & Conversation
Resources Analysis
Initial implementation
Multimodality as Anchor
Redesigning & Co-constructing
Institutional & Professional Community Support
Reflecting & Debriefing
Student-driven learning space
Need for collaboration within the school community
Need for continuous professional support and partnership
How to make this space affirmative and transformative?
How to highlight students' agency and ownership?

Chapter 6 Students' Writing Experiences in the Multimodal Learning Space

This chapter focuses on research question 2 which investigates how does this multimodal learning space offer mulltilingual students more learning opportunities. As discussed in Chapter 4 methodology, I specifically focused on and dissected students' practices in module 1 and module 2, in which students finished the same type of multimodal project. The beginning of module 1 was mainly taught in a language-focused way with implicit and minimal use of non-linguistic resources. As we continuously analyzed and adapted lessons, module 1 gradually shifted to a more flexible and multimodal approach of composing which became a good transition to module 2. In module 2, we integrated rich multimodal learning opportunities from the start of the module instead of waiting for students to finish their writing drafts. This change in the timing of multimodal engagement (writing first and designing second vs. a more integrated approach), reframing of our relationships with technological multimodal tools, as well as the teacher's and students' growing familiarity and confidence with multimodal resources for academic learning influenced students' writing experiences in multiple ways. In this chapter, I will discuss each of the five identified themes with examples from focal students.

Theme 1. Digital multimodal writing can be a differentiated writing experience for students with different approaches to learning, goals and language skills

Although all being categorized as WIDA level 3 in English proficiency, the seven focal students showed different approaches to composing and varied levels of conventional reading and writing skills, which influenced their responses to and experiences with digital multimodal writing projects. In both modules, Mrs. B explicitly required students to finish language-focused

writing drafts first and work on other multimodal components later; however, these students responded to the requirement and the linear writing process differently.

Firstly, students such as Jamie who had stronger conventional reading and writing skills in the class followed Mrs. B's guidance and spent most of his time on drafting and revising the writing part of the project. During module 1, because of curiosity, Jamie searched and used one picture of a dog in his first draft. However, he immediately deleted the picture and only focused on the writing component, which might indicate that he prioritized language as the only expected mode of expression in class despite this being a multimodal composition project. He shifted back and forth between the reading text and the writing draft to ensure the accuracy of his informational writing. Jamie had the highest reading level in the 5th grade group, which may explain his less engagement with multimodal resources because he didn't necessarily need them to mediate his understanding of the texts. Based on his graphic organizer, he was the only student in the class who captured all the key information from the reading text and was able to quickly write an initial draft to demonstrate his understanding of the reading text without extra scaffolding. Because of his strong writing skills, Jamie often served as the little writing expert in class when Mrs. B shared his writing to the whole class as good models. Peers also often asked for his feedback. Additionally, having a clear goal to pass the standardized language assessment in the spring semester to exit the ESOL program, he worked extra hard to improve his language skills. His expertise in conventional writing and goal to pass a language assessment influence ways and extends to which he actively explored multimodal resources during the composing process. It was at the last two sessions of the module 1 project (which lasted seven weeks) that Jamie started to add visuals to his digital book. He intentionally searched for visuals that could accurately match his writing part, and he didn't make any changes to his writing at this stage,

which suggests that using visuals/ multimodal resources didn't necessarily support his writing process.

Different from Jamie, other students in the 5th grade group (Eddie, Elisa and Nina) all experienced some challenges in accurately understand key information in the required reading text in module 1, which was shown in their incomplete graphic organizers. They either missed part of the key ideas in the reading text or wrote about inaccurate information. Although they understood Mrs. B's guidance for composing procedure, they strategically resisted the linear process by firstly composing a "rough" draft to satisfy teacher's requirement and then felt legitimate to start to explore online resources to support their understanding of the writing topic. These students started their multimodal exploration in the third writing session which was much earlier than Jamie. For example, when reading Elisa's daily composing drafts with her observational notes, I noticed that she shifted back and forth between interpreting online visuals and revising her original written draft. When I read Elisa's first draft in the module 1and encouraged her to reread the reading text to elaborate and explain points she wrote about dogs' health benefits, she seemed to be hesitant to reread because "I don't remember and don't understand some paragraphs.", as she said. Although Mrs. B read aloud the text two times in class and engaged students in discussing the topic, when it came to composing, students such as Elisa expressed challenges to transfer learning to her drafts. Also, the short class time limited Mrs. B and my time to spend on each kid scaffolding their learning. Mrs. B had to allocate more of her time for students who had learning disabilities and needed more attention. Elisa used her strong digital expertise to search online about the writing topic and browse related visuals. One time she found an infographic that explained multiple health benefits of dogs, she immediately added it to her book. After I asked her what she learned from the infographic and how it related

to the reading text, she seemed to be comfortable to open the text and then revise her draft. This process was ongoing. In this example, digital multimodal resources became an important mediating tool for accessing information when students didn't have immediate support from teachers. Due to this iterative process, their multiple writing drafts across two modules showed evidence of frequent change of both visuals and writing content till the last draft, revealing their agentive negotiation of meaning.

Fourth grade students (Edgardo, Yuna and Amelia) showed another approach to multimodal composition. During the module 1 project, these students didn't have the language-only composing stage as 5th grade students. Their whole writing process was integrated with exploration of visuals. This was because the reading text is a picture book which was multimodal so that students needed to read both language and illustrations to gain full understanding of the text. Because of the multimodal feature of required text, these students often started from writing down specific Apex predators they were interested in as headings of their digital book pages, then they immediately searched visual representations before rereading the text for more details. They also often searched online information and revised visual choices to expand the information provided by the reading text. Their writing process seemed to be less linear and structured than the 5th graders. This may be due to different features of reading texts, and 5th graders were facing immediate pressure of language assessments, so Mrs. B tended to have a more linguistic-focused expectation for these students.

These differences on students' timing and process of working with multimodality show that even with a relatively structured instruction, students can still find flexibility in deciding their own writing process: strictly following teacher's requirement to deprioritize visuals or strategically resisting teacher's expectation by fulfilling requirements first and agentively using

multimodality to support writing. These choices might relate to students' different goals, needs and expertise. For students like Jamie, they intentionally prioritized practicing language skills and using their strong writing skills to finish task, while many other students such as Elisa who had strong digital and visual interpretation skills had the goal of best expressing oneself through reading and using multimodal resources beyond language. Therefore, a multimodal classroom should recognize students' a wide spectrum of composing and establishing an optimal space for these diverse possibilities to better support students' meaning making for their own interests and in a more inclusive way.

Theme 2. Multimodal Learning Space Allows More Opportunities for Active Peer Learning

Mrs. B fostered a collaborative and supportive classroom. During the module 1, students often discussed with each other about the task and read each other's writing even without the teacher's requirement. Noticing active peer learning, when designing the second module, we intentionally considered different ways to use Padlet to further build on that (see design insight 4), including opportunities for students to leave comments and make posts about their learning, as well as creating new multimodal posts based on students' questions and discussions so that students could always have access to peers' ideas.

This intentional collaborative design influences students' writing experiences. Firstly, students can have access to and gained inspiration from peers' posts and ideas to add on to some points they might not mention in the beginning and enrich their writing. This is especially important in class when teachers cannot provide immediate support to all students at the same time. In both classrooms, Mrs. B spent more time with a few students who had IEP and needed more scaffolding. A venue for peer support is important to overcome the challenge. For example,

Amelia who was disengaged and seemed to be confused about what to write in module 1 showed stronger engagement and progress in her composing process in module 2. Amelia was excited because of the opportunities to listen to, read and comment on peers' posts. When she commented on the Padlet for the first time, she wrote that "*this is so cool!*". She often reread peers' posts before writing and left encouraging comments such as "*you did well*" "*good job*" which indicating her enjoyment to read peers' ideas. This experience supported and reinforced learning about the reading text. Different from her practice in the prior module, she turned out to be the first student who finished her composing and Mrs. B used her work as a sample to share in class because its richness and accuracy of information. In the end of research survey, when reflecting which part of the multimodal learning experience supported her the most, Amelia confirmed the benefits of peer learning by saying that "*the biggest benefit of using Padlet to learn writing is I can see what other people think and also comment*."

Another example is from Eddie who gained ideas from Jamie to add on to his writing. In the class, Jamie asked a question on his post about the outcomes of Cesar Chavez's civil rights movements "*one question I have is that will the farm workers get paid more or not?*". This information was not provided in the required reading text. Mrs. B and I made a post to respond to Jamie's question (see Figure 6.1 Jamie's post and post answering Jamie's question). This student-inspired new knowledge circulated in the class. Eddie picked up this information and added it to the conclusion of his writing (see Figure 6.1 Eddie's conclusion). This example shows how a multimodal space can elicit students' ideas, inform new pedagogical moves, and create new information beyond curriculum to enrich students' understanding of the topic.

Figure 6.1

Circulation of Ideas from Jamie to Teacher and Eddie

1. One thing I learned about Cesar Chavez is that Cesar Chavez had to work as a migrant farmworker when he was a little kid.
2. One thing that surprised me is that Cesar Chavez is fighting so hard to help farm workers to get paid more and treated fairy to 1966 to 2003.
3. One question I have is that will the farm workers get paid more or not .

(1. Jamie's post)

Delano Grape Strike was a victory



Children joined the strike

After 5 years, the strike and boycott ended in victory. Many grape growers eventually signing union contracts, giving farm workers better pay, healthcare benefits, and protections from pesticides.

(2. post answering the question)

THE VICTORY

And then one day all of the farmworkers strike because they want to get better pay and less moving and after 5 years the strike and boycott ended in victory for the migrant farmworkers.

(3. Eddie's conclusion paragraph)

Secondly, a multimodal learning space requires literacies skills beyond the language skill so that all students can be experts of different skills which further add to the collaborative feature of the class. For example, in the beginning of module 1 when the instruction was still language-focused and unimodal, only advanced students such as Jamie often served as the expert in class to provide language support and feedback to peers. As we gradually brought in more digital and visual resources to the writing process, many other students started to demonstrate their various expertise. For example, Elisa had good digital literacy skills, and she often navigated and integrated outside resources to her writing projects. The tool Book Creator has a built-in image

searching platform where students can quickly search visuals through it. However, during one of the writing sessions, Nina seemed to be frustrated to find visuals she wanted to use, and she complained that "*I try to search different things, but these are not what I want. They are not what I want to say in my writing.*" so she turned to Elisa and saw what she was doing. Elisa was adroitly searching, downloading, and adding visuals from Google Image where had a much wider selection of images. Here is an excerpt of a conversation that happened between Nina, Elisa and me.

> Nina: *How did you do the copy paste thing from Google image to your book?*
> (Elisa quickly demoed to Nina)
> Nina: *You are a genius! Sometimes it is just hard to find what I want! I want something about what I wrote.*
> Elisa: *I think you should go to Google.*
> Elisa (talk to Hongye): *You must see this (point to one of her book page)!*
> Hongye: *wow! You added how people feel so uncomfortable when a heart attack happens!*
> Elisa: *So dogs can really help people to go through these bad things.*
> (Nina was also very impressed by it)
> Nina: *Let me also try it! (explore how to search and add pictures outside the book creator). Oh, I did it! This is so good.*
>
> (excerpt of a conversation with students)

This excerpt captured a moment of peer support that emerged when Nina felt stuck trying to find visuals that she considered could best express her ideas. She noticed the limitation of the digital platform and immediately found that Elisa was able to navigate across different platforms to identify a wider range of multimodal representations. Elisa demonstrated and taught Nina the digital skill of where to find good visual resources and how to integrate outside resources to the required digital platform to have greater choices for composition. This digital skill helped Nina to find a way to better present her thinking and make her feel excited to apply the new skill in her writing immediately. In this example, Elisa was the digital expert to open Nina's opportunity to access visuals that can better present her ideas for the writing task. In addition, this peer learning

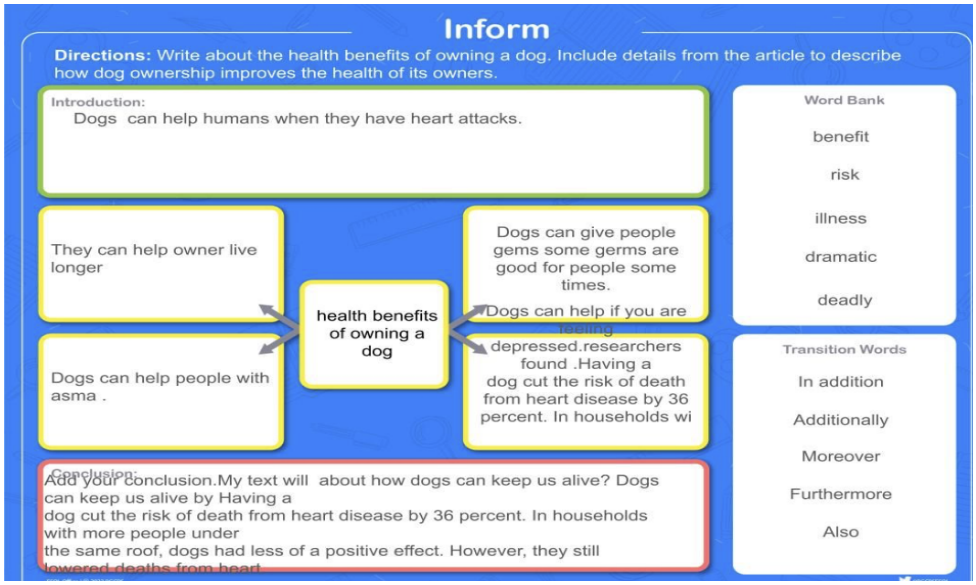
experience extended to more students in the class: Jamie noticed that Nina and Elisa found rich visual resources for their digital books, he asked Mrs. B how to do that and Mrs. B invited Nina to teach Jamie. In the end, many students in the class learned skills of navigating various websites and meshing different resources together from peers. A more flexible multimodal classroom can prompt peer learning beyond negotiating language and highlight the value of different expertise in meaning making process.

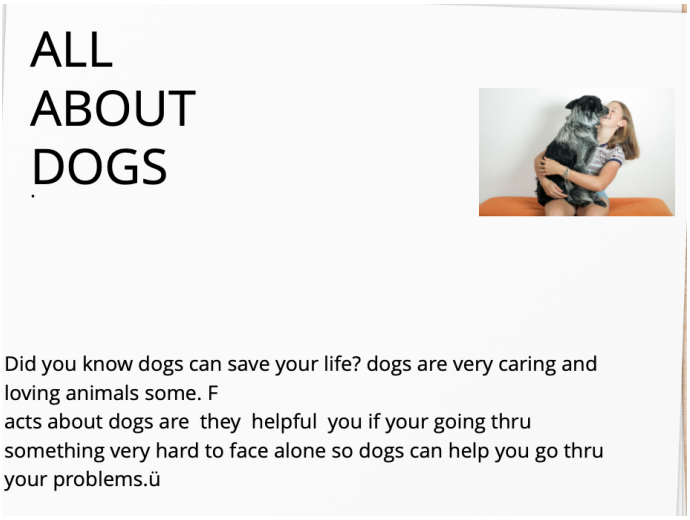
Lastly, there are many cases of active sharing and discussion about visuals among students when writing multimodally. During composing process, students showed curiosity about each other's visual selection, which naturally prompted conversations among students about their interpretation of visuals and reasons for these choices. This discussion often helped students to have a deeper understanding of the reading text. After reading the module 1 reading text, Nina didn't identify the key point from the text that dogs can help people feel less lonely, as shown in her graphic organizer (see Figure 6.2). However, moving to the later stage of module 1 when many peers in the class engaged in exploring visuals, she was influenced by the trend. Reflected in her draft, she started to write about the mental benefits of owning dogs in her book: "Dogs are very caring…they help you if you go through something really hard…". She added this point to her draft after she saw another table group peer using a picture of a dog and a person holding hands. They started to share where to find the picture, what searching terms used ("dogs and people" "people hug dogs"), and why this picture was chosen. In the process, one of the themes – relationships with dogs – of the reading text emerged. Nina opened the reading text again to reread the paragraph about loneliness and start to compose. On the page, she added a picture of a girl hugging a dog and she explained that "I used the same picture as (another student's name), but I changed to a different one. I just want to show that we (dogs and people) have good

relationships." This example shows that discussion of visuals is an important informal peer learning activity besides giving language feedback to scaffold each other's content understanding. Visuals might provide more explicit scaffolding for students to access information and sharing pictures supports their active inquiry of the choice.

Figure 6.2

Nina's Graphic Organizer and Writing Sample in Module 1





Theme 3. Multimodal Learning Space Deepens Students' Perceptions and Meaningful Use of Multimodality for Expressing Ideas

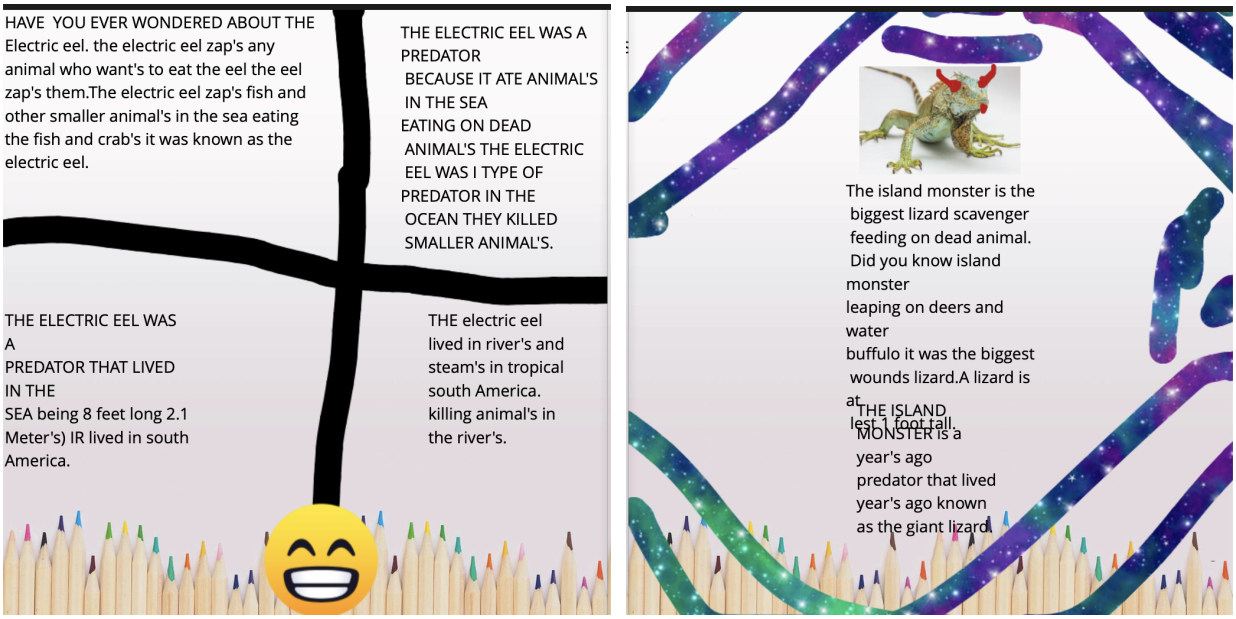
The exploration of creating a multimodal learning space started in the later stage of module 1 when most students finished their language-focused drafts and Mrs. B was comfortable with giving students more flexibility and choices to explore multimodal texts to enrich their digital books. However, the use of multimodal resources during instruction was minimal in module 1 and there were no explicit teaching and discussions of how multimodal resources can afford rich meaning in class. Therefore, students' initial perceptions and use of multimodal resources in their writing samples often did not reflect intermodal awareness or only showed rudimentary awareness of multimodal relationships.

Firstly, the peripheral role of multimodality in initial instruction and Mrs. B's emphasis of "language first, visual second" influenced students' understanding of multimodality as simply for fun or distraction of writing. Fast writers such as Yuna finished her writing draft early, so she spent a whole class session adding irrelevant visuals to her writing of Apex predator. In the Figure 6.3 below, Yuna added an emoji and doodled on her book pages. Although understanding that she wanted to draw lines to split the layout of her page, these lines were distracting to readers. Additionally the happy face emoji was irrelevant to her writing about Apex predator. When asking Yuna her purpose for doing these, she said "I don't know. It is cool and why not! I can change the color, if you don't like black color." Not the single case, in both 4th grade and 5th grade groups, there are several students adding irrelevant visuals to their writing, such as adding pictures of flowers when writing about Apex predators, and adding funny dog memes when writing about health benefits of owning dogs. In these examples, students used visuals for fun purposes, which showed that only recognizing the existence of multimodality and exposing

students to multimodal resources without careful teaching and scaffolding do not necessarily lead to meaningful use of these resources for academic purposes. Students' curiosity of and engagement in visuals won't automatically add on to their writing experiences if without guidance and practice.

Figure 6.3

Two Pages from Yuna's Project in Module 1

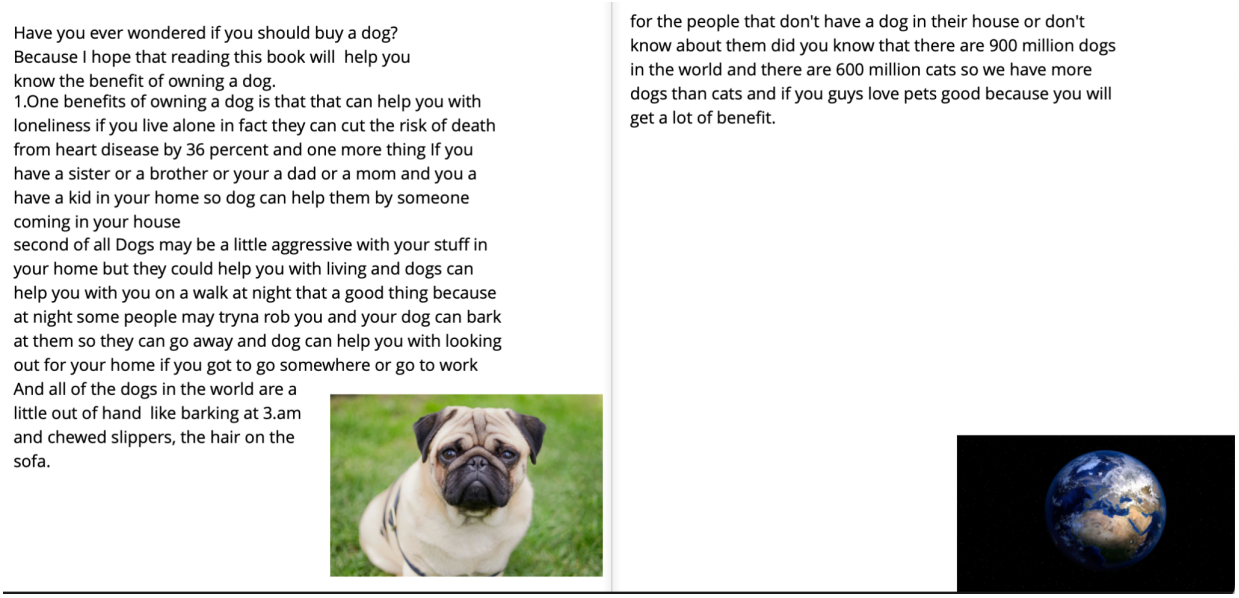


Although there were some cases of irrelevant use of visuals, most students were able to match visuals and language to convey similar meaning even without explicit teaching. This is one of key modal relationships in which visual and language reinforce each other without adding more information (Unsworth, 2007). Using Eddie's first draft of the health benefits of owning dogs as an example (see Figure 6.4). Eddie explained his visual choices and said that "this is a picture of a dog because my writing is about dogs. I searched "dog" and I saw this one." Then he pointed to the picture of the earth and said that "there are more dogs than cats in the world. I want to show it is the number of dogs and cats in the whole world." Eddie's explanation of visual selection reflected many other students' rationales for multimodal use. Students perceived

visuals as simply a representation and correspondence of language. However, this visual-language alignment was too general in a sense that they didn't reflect the essence of the writing topic. Although Eddie wrote a lot of information about the benefits of dogs, this picture didn't specifically relate to any of the details or add more information about "health benefits". Similarly, the picture of the earth was used to match the phrase "*in the world*" but not relating to the key information of the paragraph which is people's preferences of owning dogs than cats based on some online statistics. Although understanding Eddie's purpose to emphasize this statistic in a global scale, the visual-language connection might need readers' extra efforts of interpret. Most importantly, in this example, multimodal composition didn't support Eddie's writing experience or deepen his understanding of the writing topic, because it is a quick add on to the writing component. Removing the visuals might not affect the overall meaning of the project.

Figure 6.4

Eddie's Writing Sample in Module 1



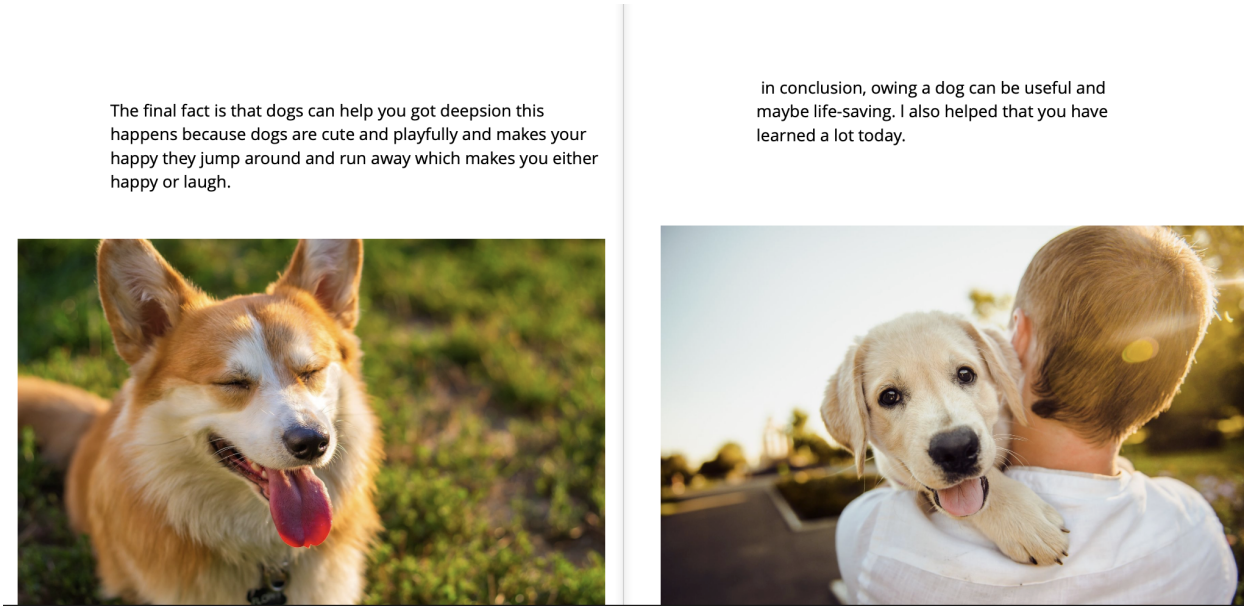
Noticing students' initial use of multimodality, I started to ask questions and give feedback to draw their attention to other possibilities of multimodality beyond general presentation of the writing topic during the later stage of module 1. This explicit and direct discussion with students about how they might use visuals to enrich their writing was helpful for some students such as Jamie and Elisa who had more advanced digital skills in the class. When first permitted to search visuals, students usually used the search term "dog" to find pictures they liked to add to their book. After these conversations which prompted students to reconsider their purposes of using visuals and how to better engage readers through multimodality, students started to specify their searching terms more, such as "happy dogs" "dogs and people" "hug dogs" "dogs protect people" to make their visualization more concrete, which indicates students' stronger awareness of visual-language connections that visuals can convey nuanced emotions (happy, feel loved, feel protected) through gestures and facial expressions of characters in the visual.

Figure 6.5 shows two pages of Jamie's book as the module 1 moving to the later stage. Jamie not only put his efforts on the language use but also was able to use visuals to convey more nuanced meaning. For example, the page on the left side describes why dogs can help people feel less depressed. Jamie firstly searched "happy dogs" and chose this picture among many options. He mentioned that dogs are like humans and they have emotions. He wanted a picture of a happy dog to show that a dog's delightful nature can influence people and make them happy. In addition, he intentionally selected a picture of the dog playing outside with warm sunshine which aligned with what he wrote "they jump around and run away" (in an outside space) and his own experience of playing with his own dog. Through careful visual selection, Jamie created a safe, happy and warm atmospheric context for his writing though the dog's facial

expression, description of gestures (jump), and warm and soft grass background of the photo. On the right side of the page is the conclusion of his book. Throughout the whole book, he used visuals highlighting dogs and this was the only place where he made a different choice. He elevated the theme of his writing from dogs to relationships between dogs and humans, as he said: "*because dogs are friends of humans.*"

Figure 6.5

Jamie's Writing Sample in Module 1



Similar to Jamie, Elisa also used visuals to convey sophisticated meaning. Her sophisticated multimodal skills were reflected not only through her attention to emotions visuals can convey but also her exploration of spatial mode (layout of the page) to emphasize ideas she wanted to express. Elisa firstly searched and saved multiple pictures in her computer for later choices. When I asked her which picture she wanted to use, she started to brainstorm the spatial layout of this page in order to use all pictures she found because "they are all very important" as she said. With limited page space and multiple images, she added a line in the middle of the page to split the page for compare and contrast: depression and loneliness, happy with the company of

dogs (see Figure 6.6). She used this layout design to visually emphasize and persuade readers why having dogs is important for mental health. Then she wrote captions on each half part of the page: “when you have dogs this is how you feel” “when you don’t have dogs this is how you feel” to make her design more explicit to readers. Also, when she recorded herself reading the book, in the recording, she said “do you see differences? Look at these pictures.” This shows that her spatial and visual design were intentional. She used her voice, multimodal design, and writing together to help readers see and understand why dogs may play a crucial role in mental support. In this example, her use of multimodality was different from general visual-language match because they complemented each other for a more sophisticated meaning. On the right-side page, she wrote about how dogs can reduce the rate of heart attack, which was another major point in the reading text. When she explained the pictures, she mentioned that “looking at these people, they are having heart attacks, they are so uncomfortable. If they have dogs, dogs might ask other people to help.” She used visuals to emphasize the importance of having a dog which can be life-saving sometimes.

Figure 6.6

Elisa’s Writing Sample in Module 1



It was notable that Elisa's composing process was iterative. Exploration and composing with multimodal resources continuously informed her understanding of the writing topic and prompted ongoing revision of her drafts. The revision was not only about rewriting sentences, adding new details, but also changing visuals to better capture the overall themes of her writing. After designing the prior two pages, Elisa realized the communicative potential of visuals so she returned to her book cover page to redesign it. Figure 6.7 shows the early draft and final draft of Elisa's book cover. In the beginning, her book cover shows several pictures of dogs "because this book is about dogs", as Elisa said. In class, Elisa changed images on the cover page several times until we had more conversations about visual for nuanced meaning, she proposed that she wanted to revise the cover page one more time because she had new ideas. After discussion and guided exploration of visuals, Elisa made a new book cover showing cartoon dogs wearing superhero capes to reflect the theme of her writing. She also rewrote her book title as "*dogs save the day!!*" which matched her depiction of dogs as heroes in many situations (e.g. depression, heart attack) in her book. This change shows that with some explicit guidance on the purposes of

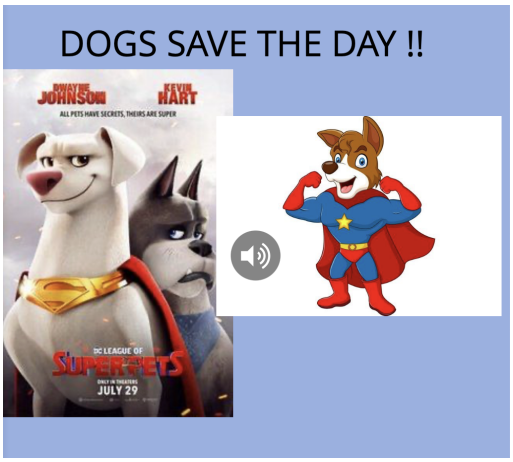
using multimodal resources as more than decoration, Elisa developed a deeper understanding of multimodality to show symbolized meaning.

Figure 6.7

Two Drafts of Elisa's Book Cover in Module 1



(first draft)



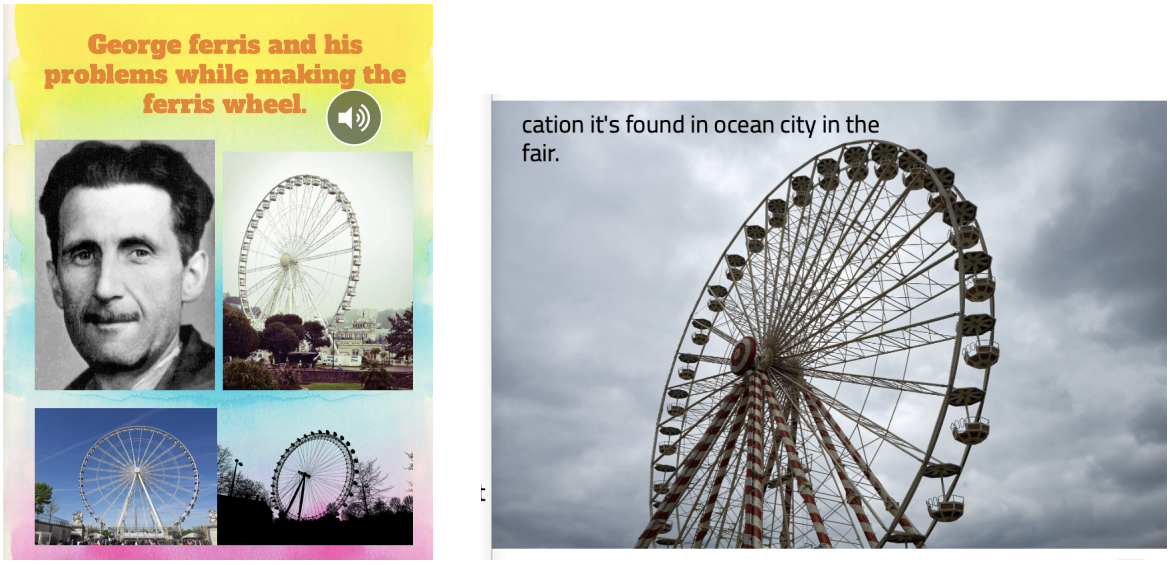
(second draft)

However, building up students' multimodal awareness and skills took time. By the end of module 1, not all students developed the same levels of multimodal understanding as Jamie and Elisa who were relatively advanced in digital skills. Therefore, in the module 2, Mrs. B and I created multiple opportunities during the instruction to engage students to interpret photos for understanding the reading text and discuss how multimodality might be used to show important information. This explicit use of multimodality to mediate content learning and multiple opportunities in class to practice how to use it to access meaning and prompt new ideas were important to create a more inclusive multimodal classroom for all students. By the end of module 2, I observed more and more students developing a deeper understanding of the affordances of visuals. For example, the Figure 6.8 below shows visuals Yuna used in her module 2 digital book project about how Mr. Ferris overcame challenges to build the first Ferris wheel in the world. In the module 1, as discussed previously, Yuna was distracted by multimodal features of the project

and used several irrelevant visuals (e.g., emojis and scribbles) in her book, whereas in the second module, she provided detailed rationales for her visual selection and page layout. She explained that the two photos on the first row of the cover page showed the history of the Ferris wheel. She used historical photos of George Ferris and the first Ferris wheels in the world. On the second row, she added two pictures of contemporary Ferris wheels to show how popular and influential this invention was until today. On the left side of Figure 6.8 is the photo Yuna used in her writing page. In her caption, she explained that this is a Ferris wheel in the ocean city. She used the photo to show her personal experience connected to the writing topic, and she said that "this is the Ferris wheel I rode with my dad and mom last summer." Through this visual selection and her explanation, Yuna demonstrated her growing multimodal awareness that went beyond simply searching photos of Ferris wheels but considering how they related to her writing in different ways.

Figure 6.8

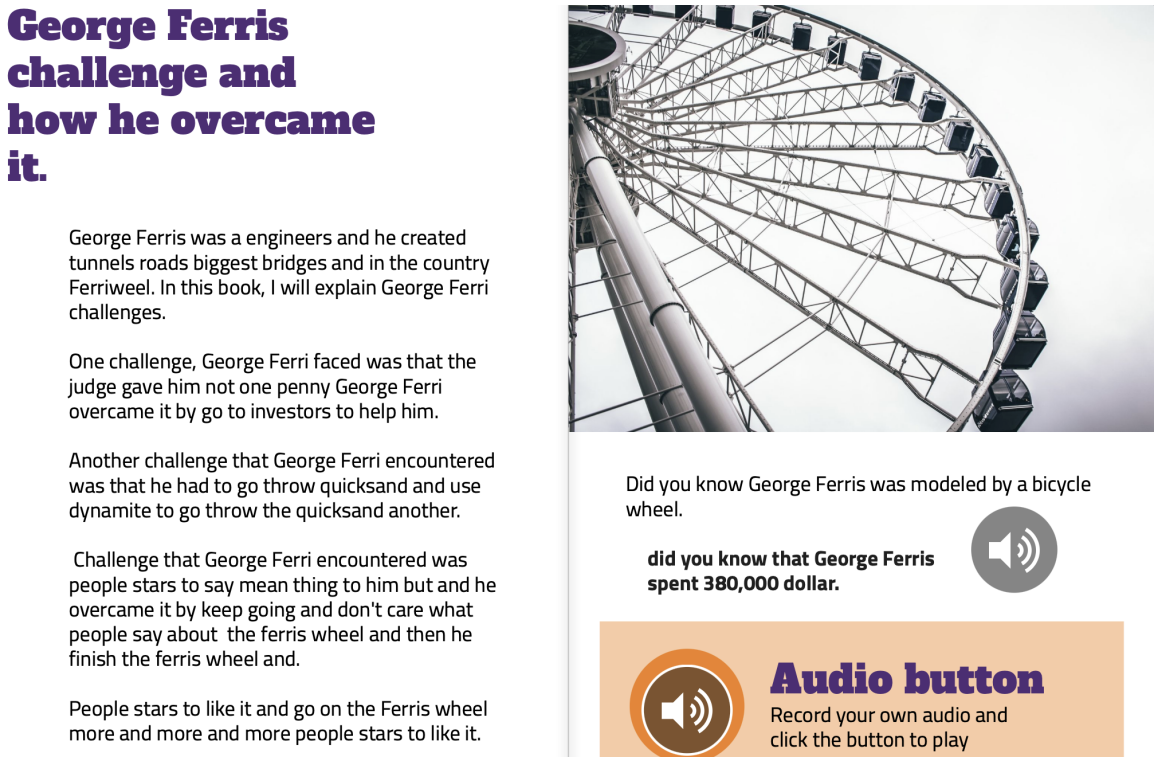
Yuna's Visual Selection in Module 2



Different from Yuna who used visuals to make personal connections and showed the popularity of Ferris wheels, Edgardo used visuals for another purpose: to present unwritten details in his writing (see Figure 6.9). When asking Edgardo's choice of this photo, he provided several reasons. Firstly, he mentioned that this photo was different from most photos that captured a whole Ferris wheel from distance. It is close enough to specifically present details of a Ferris wheel, such as the cabins and the sophisticated metal structure. Edgardo explained that "so people can easily see how it really looks like, especially the metal, the line, many cabins." Additionally, he said that the structure and shape of the Ferris wheel in the selected photo looked similar to bicycle wheels which was probably where Mr. Ferris got inspiration from. He used this comparison to refer back to an in-class conversation when students discussed and researched about the possible inspiration of this invention and connect to his own observation of different wheels in real life. Even though this composing template left limited space for more visuals, Edgardo chose one that add important details and connections to his writing. In this case, Edgardo showed his awareness of complementary relationship between visual and lanaguge (Unsworth, 2007).

Figure 6.9

Edgardo's Book Page in Module 2



Similar improving multimodal awareness was also evident in the 5th grade group. For example, Figure 6.10 is the visual choices of Nina when she wrote about Cesar Chavez. In the prior module, although she was excited to learn how to navigate multiple platforms to identify more visuals, the ending of the module left little time for her to explore further. After more explicit and deep interaction with multimodal resources for accessing and understanding the writing topic in second module, Nina demonstrated her thoughtfulness of visual use in and for her own writing. In the example, the left side is the cover page of her book where she selected three pictures. Nina said that "When I saw these photos, I knew the stories behind them." Then she pointed to the picture on the top and mentioned that this is Cesar Chavez giving a speech to encourage people to fight together. This picture was similar to the one she used on the content page of her book (right side). The difference is that the picture she used inside her book has a quote from Cesar Chavez. Nina explained that this was a powerful quote, and readers can see why he wanted to help other migrant farm workers, and the quote expressed her understanding of

the reason for not only Cesar Chavez but also everyone's awareness and fight for social justice. The other two pictures she selected for the cover page showed a portrait of Cesar Chavez and he met migrant workers. Nina said that "I found many pictures online, but I really like this one because I think farm workers like him and he looked happy. He is smiling. They also held signs and flags." These visual examples demonstrated that visuals were a valid part of Nina's meaning making and her proud way of showing her learning. Nina was able to explain her use of multimodality with detailed rationales beyond simply matching the photo with general topic. She used multimodal representations to show some important heroic actions of Cesar Chavez (e.g. visiting farm workers, giving speeches) and bringing in multimodal texts that made her feel empowered as a Mexican American.

Figure 6.10

Nina's Sample Book Pages in Module 2





I hop you enjod to learn about Cecer Chaves he fouth for soshal justis and an amazing hero to Mexican American and margin farmworkers he a brave man and very special person.

These three examples from module 2 in both grade groups demonstrate that a multimodal learning space can gradually support students to develop understanding of the communicative potential of visuals, and integrate visuals into their writing in more meaningful ways. Through

redesigned lessons, Mrs. B and I repositioned digital and multimodal tools in the class as integrated, natural, and legitimized way of meaning making. The changing relationships with tools shaped students' new understanding of using visuals to make connections between learning and personal experience, showing unwritten details to readers, as well as demonstrating learning of a new topic.

Theme 4. Multimodal Learning Space Supports and Deepens Students' Understanding of Dense Informational Texts

One of the most important questions from Mrs. B as well as many teachers when designing and implementing multimodal projects is if and how multimodal learning experience can benefit multilingual students' academic learning and writing skills. This question is important for teachers in the standardized, language-only curricular and instructional context when they have to face the immediate institutional demands to priority certain modes of expression. This study demonstrated that the multimodal learning space supported students' in-school informational writing in three ways: facilitating reading comprehension, retaining new knowledge, and deepening understanding of writing topics.

Facilitating Reading Comprehension

Informational writing requires students' reading skills to identify, comprehend, and summarize key information from a text before they start composing. However, during the module 1 project, many students experienced challenges of understanding reading text which made the writing an uneasy process. Although Mrs. B read the text two times with students and engaged them in discussion, the dense information was not fully accessible for all students. Mrs.

B also expressed her frustration that “I don’t know why they just don’t understand the text. It takes forever to finish this writing task.”

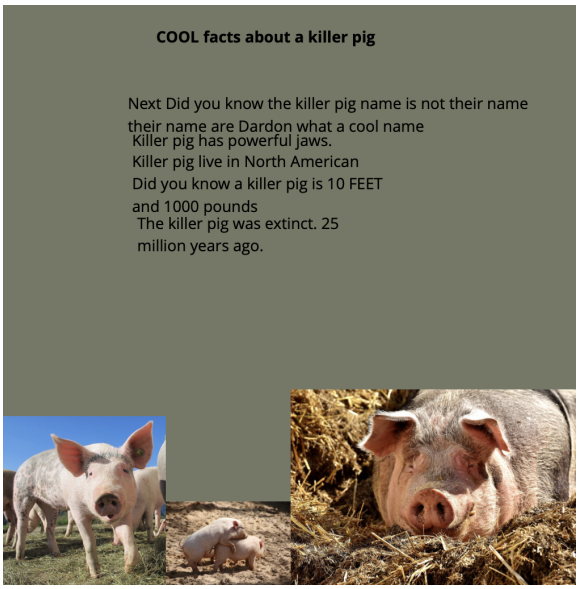
Students’ challenge of reading comprehension was reflected in their reluctance to reread the reading text for accurate information when writing. Instead, some students mainly drew upon their own personal knowledge about the writing topic to finish the task. For example, Figure 6.11 (left side) shows an excerpt from Elisa’s draft. Although she was a passionate writer and provided much information, this was mainly from her own knowledge and her friends’ ideas, as she wrote in this paragraph. When asking her to add key information and evidence from the required reading text to support her writing, Elisa said she didn’t remember other information because the text was read a few sessions ago. Besides, there were also some cases of students simply doing a quick Google search as the main source of information for their writing. The right-side excerpt of Figure 6.11 is a page from Amelia’s writing. I noticed she searched “facts of killer pigs” online and used information popped up on the top of the page instead of drawing on any information from reading the text to inform her writing. Most importantly, she searched images of pigs to present “killer pigs” which were two different species. This also indicates she didn’t fully understand the text. When I asked if she could reread the reading text to use information from the text and check the accuracy of information, she was reluctant and said she didn’t understand the book. In both examples, Elisa and Amelia tried to draw on other resources (e.g., personal knowledge and online information) to bypass the linguistic challenges and participate into the required writing task. However, this observation also revealed the fact that only teaching with linguistic mode might limit learning opportunities of some students who need multiple channels of support to understand dense reading text (Jemenez & Mayer, 2016).

Figure 6.11

Examples of Students' Writing Samples



(Elisa's example)



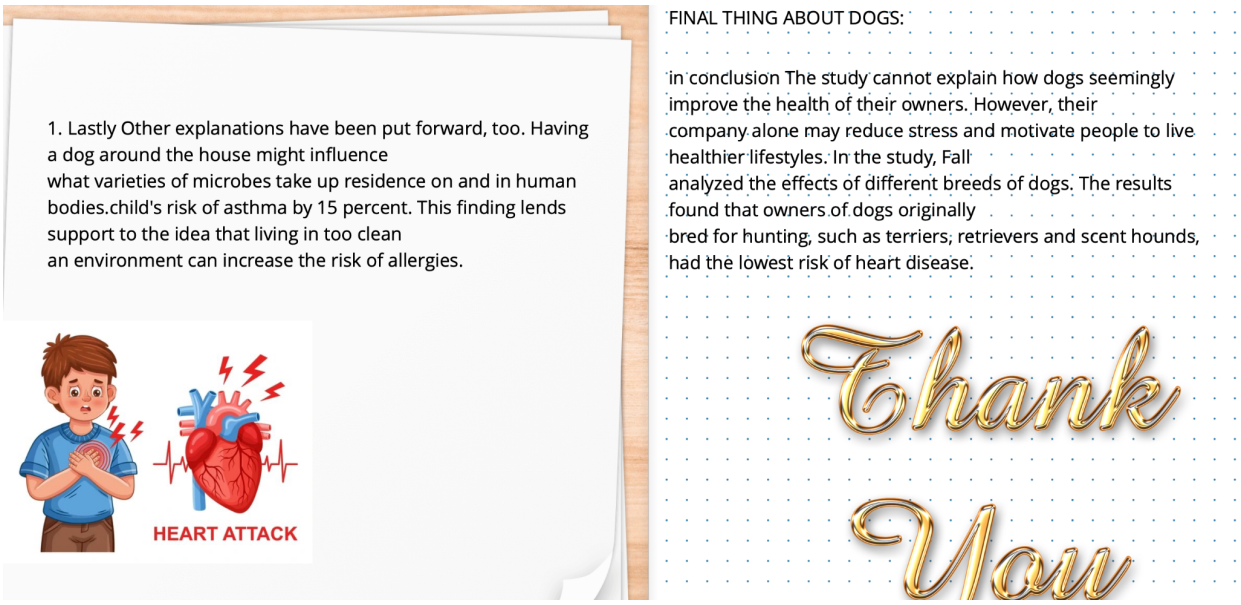
(Amelia's example)

Another writing challenge relating to reading comprehension in this research is that students didn't use their own words to summarize information from the text. It seems that some students found it difficult to translate their understanding of the text through language. For example, half of Nina's writing in module 1 was from online searching of information while the other half (see Figure 6.12) were fully copied from the reading text. Nina was an active student who always engaged in class discussion and talk with peers to share her ideas. However, what she showed in her composing draft did not match her efforts to demonstrate learning. Although Mrs. B and I asked Nina to summarize and paraphrase the information, she deleted the draft and revised, in the end, she still didn't successfully do that. Nina shared her pressure of not making progress when seeing other peers move forward in their composition and when Mrs. B had to expedite the process because of limited class time. The push to finish the task and limited scaffolding beyond linguistic support made Nina's draft not successfully show her thinking and understanding. Besides her sentences, the use of a picture of heart attack did not aligned with her

content about asthma and allergies, which reflects another needs for learning how to assemble multimodal resources coherently (Unsworth, 2008).

Figure 6.12

Nina's Writing Sample in Module 1



These observations imply that students might need more support beyond rereading the text to understand key information. Being able to understand the required text and using the information to ground content of composition are the foundational steps for the writing task. However, during composing process, students often had to rely on their prior knowledge about the writing topic and searching online resources to overcome the challenge of understand the required reading text after several attempts to reread. The gap between instruction and transferring learning into composing only through language needs to be addressed.

A multimodal learning space supports students' understanding of dense informational text because students had multiple channels to access content information (Brugar et al., 2018; Deig et al., 2025). In this process, students often engaged in interpreting, discussing intentionally selected multimodal resources. These conversations can elicit new ideas and new understanding

of the topic (Clark-Gareca & Meyer, 2022). Starting from module 2, multiple multimodal texts were carefully selected to present not only key vocabulary but also key information relating to the reading text. Through digital platform, all the discussion about these multimodal texts and reading texts were saved as various posts or as students' own comments, which served as a daily informal assessment for Mrs. B and I to continuously check students' understanding and provide targeted support. These practices led to students' growing confidence for their writing project. This confidence of knowing what to write was also demonstrated by their graphic organizers before writing: the information they included in the graphic organizers for module 2 was accurate to capture most key information, which was different from their performance in module 1. This fast understanding of information smoothed and expedited students' writing process so they finished their writing project in much shorter time than module 1.

Retaining New Knowledge

Another challenge in the project was the frequent disruption of events and testing to regular class sessions. In module 1, Mrs. B had to reteach and review every class because students forgot content. Without reviewing, students such as Elisa expressed that she didn't remember the reading text. However, Elisa was also overwhelmed by too many texts read in class. In her early drafts, I found she mixed information from the required reading text, personal experiences, and a writing sample about another topic (service dogs) that Mrs. B used to teach the structure of informational writing. That means she mixed pieces of information learned in class for her writing, despite the fact that some of the information was irrelevant to the writing topic at all. Additionally, frequent reteaching meant less time devoted to writing. In the first few weeks, there were no more than 10 minutes in each session for students to engage in writing. Mrs. B had to extend the time for the module. Several students complained that "the writing

project never ended and was forever". In the end, several students such as Amelia and Yuna expressed losing interest in continuing the writing process. Limited class time, time for reteaching, and students' decreasing engagement with the writing project were urgent challenges.

As discussed in theme 2 and theme 3 that the multimodal learning space created in this research project recorded all resources, conversations and new learning on a multimodal Padlet board so that students were able to review on their own their prior learning and peers' posts even without the immediate help from the teacher. The tool and peer support played a critical role in supplementing teacher's scaffolding in class because Mrs. B didn't have sufficient time to give detailed feedback to all students within a short class session. When having this multimodal board, I noticed students frequently skimmed the board during the writing task to agentively find out their own posts and peers' ideas. With multiple exposure to prior learning and multiple channels to quickly access information, we spent much less time on the whole class reviewing, instead we used the time for writing practices. Mrs. B recognized the change, and she talked surprisedly that "they remember all the vocabulary and what the reading is about!" This led to smoother and more consistent writing experiences. For the module 2 project, it took only 5 writing sessions for students to finalize their writing compared with 9-10 sessions in the prior module.

Deepening the Understanding of Writing Topics

One of the most notable progress in students' writing across modules is that students demonstrated deep understanding about the writing topics. This understanding goes beyond simply summarizing information from the reading texts, instead, students actively drew upon new ideas and information prompted through class discussion and from personal experiences to enrich their composing. In this section, I will show writing samples from three 5th graders

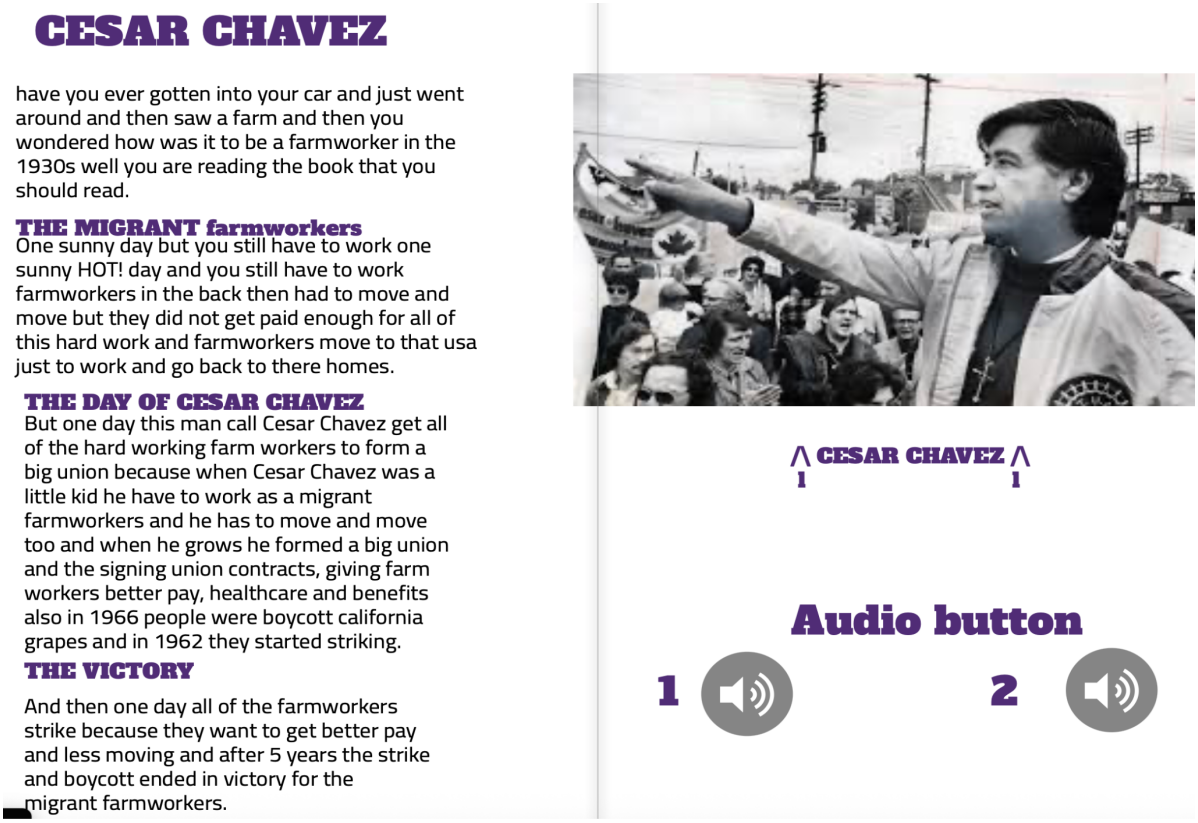
(Eddie, Elisa and Nina) and how knowledge was circulated in the digital space and how they orchestrated both linguistic and visual modes to demonstrate their understanding of Cesar Chavez and his efforts for migrant farm workers. Their work is not only about finishing a school writing task but also demonstrates their awareness of broader social issues related to the writing topic.

There are multiple pieces of evidence from Eddie's draft that can demonstrate how knowledge elicited from engagement with multimodal texts circulated into his writing (see Figure 6.13). In the first two paragraphs, he hooked readers with two real world scenarios: driving a car and passing by a farm, working on a sunny hot day. He used these two scenarios to help readers to resonate to the harsh working conditions of farm workers in the 1930s which naturally led to his point about Cesar Chavez's motivation to help farmworkers. These two scenarios were related to two photos we discussed in class when students noticed hard working conditions of farm workers in the 1930s. Also, in the required reading text, there was no information about the outcomes of Cesar Chavez's movements. However, several students (e.g. Jamie) asked this question and we explored this question together in class. Eddie used this information as the happy ending of his heroic story about Cesar Chavez. Together, Eddie combined information from and beyond the curriculum to show his understanding about Cesar Chavez's movements and its significance, demonstrating that meaningfully engaging with multimodal texts can supplement and move students' writing beyond summarizing information towards deeper explanation and interpretive meaning making. This interpretive engagement is also evident in how he structured his writing and appropriate informational writing with features of narratives. Eddie positioned and emphasized Cesar Chavez as a hero by weaving information into a heroic story, structuring his writing around elements of challenge (hard living and working

conditions of farm workers), turning point (efforts of Cesar Chavez) and outcome (the victory of the civil movements).

Figure 6.13

Eddie's Writing Sample in Module 2



Elisa demonstrated her deep understanding of the writing topic through both her writing and intentional selection of photos (see Figure 6.14). In her writing part, she provided information about Cesar Chavez's childhood experience when he didn't have opportunities to go to class and had to work on a farm. When watching a video about Caesar's childhood, Mrs. B asked students to think about their own childhood to make personal connections which helped kids understand deeper about one of his motivations. Elisa wove this information as part of her writing to establish the rationale of Chavez's later movements. Additionally, she presented accurate information about what rights farm workers were fighting for and specific actions they

took. This is a noticeable improvement in her writing because in the prior module, Elisa experienced the challenge of accurately understanding and capturing all key information in the required text in the beginning. It was through several sessions of exploration of online and visual resources that she gradually built understanding. Different from the iterative composing process, in module 2, Elisa immediately started her written draft. Both her graphic organizer and first draft reflected all key information from required text with supplementary information from in-class discussion. This indicates her confidence to transfer her learning into the composing task after redesigned instruction.

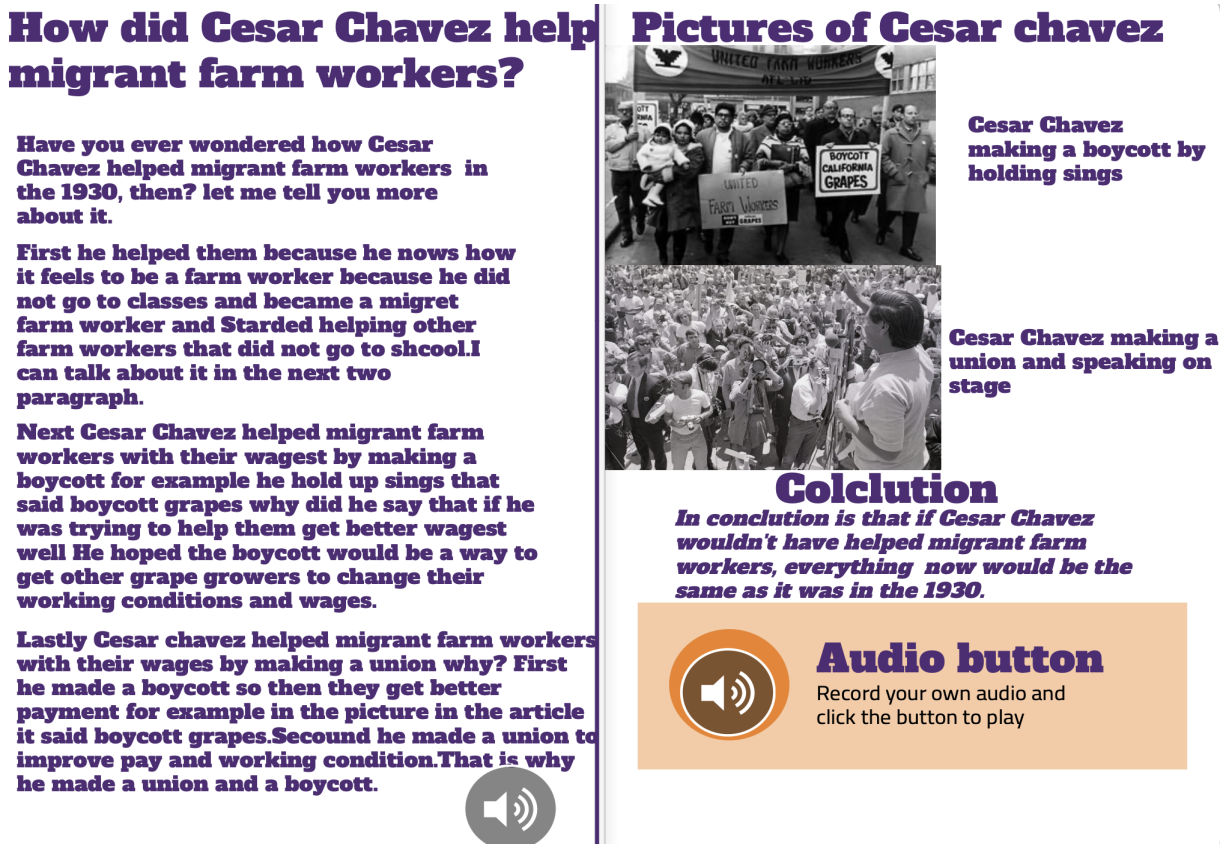
Regarding visual selection, Elisa initially used a portrait of Cesar Chavez, because she was not sure teacher's expectation for visuals, she mentioned that "I thought she [Mrs. B] wanted picture of Cesar Chavez", although this was not visual presentations that she prefer. Elisa showed photos she downloaded and saved in her computer and said "*actually I have some pictures I really like*". Confirmed that she can use visuals that can best present her expression goals, Elisa immediately replaced the initial picture and explained why the new selection is more meaningful: "*people can see how hard they fight for their rights.*". The visual intentionally highlighted Chavez's heroic actions such as protesting and delivering speech, demonstrating Elisa's knowledge about the writing topic and skills to present it in both written language and visual approach.

In class, Elisa expressed her appreciation of Cesar Chavez who brought long-lasting changes to people in today's life, as she left a comment on class Padlet board that "I am wondering how people's life will be like if we don't have Cesar Chavez." She brought this appreciation into her work by emphasizing Chavez' influence in her conclusion paragraph. In this example, Elisa connected her learning about historical events to today's life which shows her

understanding and reflection of this writing topic beyond a class assignment. After the class, Elisa excitedly shared with me that she found there was a school named after Cesar Chavez in the neighborhood and she expressed that she understood why people wanted to remember him and honor him. Together, Elisa's engagement in a redesigned multimodal class not only supported her to finish the required school writing task, but also motivated her to explore, make connection and bring in her funds of knowledge to enrich her work.

Figure 6.14

Elisa's Writing Sample in Module 2

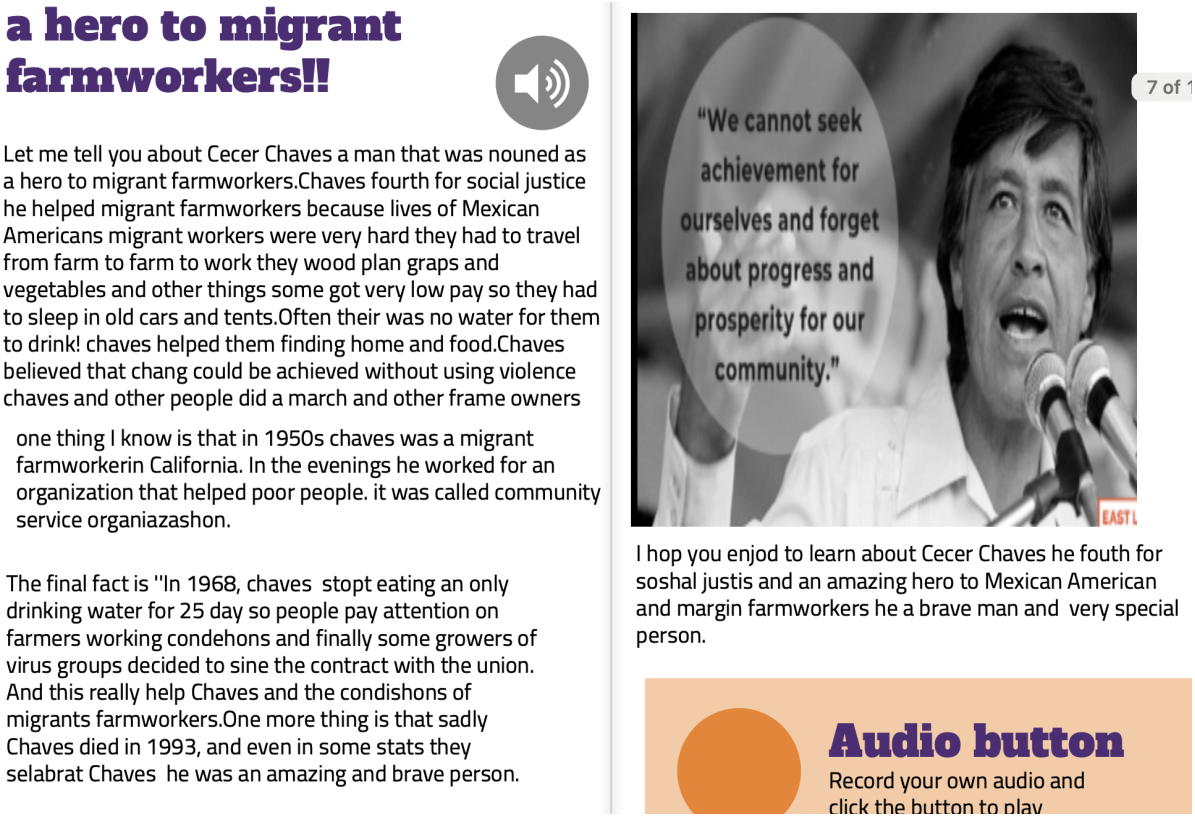


The last writing sample is from Nina whose writing expressed her appreciation of Cesar Chavez and her understanding of social justice from this writing project. Different from module 1 when she had the challenge to write on her own words, in this module, she was confident to write down many ideas to express herself. Different from Elisa and Eddie's writing, her writing

style seemed to reveal more personal feelings. For example, besides presenting several facts about Cesar, she wrote "*sadly Chavez died in 1993*" "*he was amazing and brave person*" "*an amazing hero to Mexican American*" "*he (is) a brave man and (a) very special person.*" In this writing project, Nina revealed her connection to Cesar Chavez as a Mexican American and how this identity made her feel especially related to the writing topic. Although she found many good pictures for the writing project, in the end, she decided to use the one with a quote that "*we cannot seek achievement for ourselves and forget about progress and prosperity for our community*" as the only picture on her book page, because this quote emphasized the importance of community and showed her understanding of civil right movements as fighting for social justice not only for an individual but for all the people's rights. Expressing ideas in her own words and making purposeful visual selection demonstrated Nina's understanding of the writing topic.

Figure 6.15

Nina's writing sample in module 2



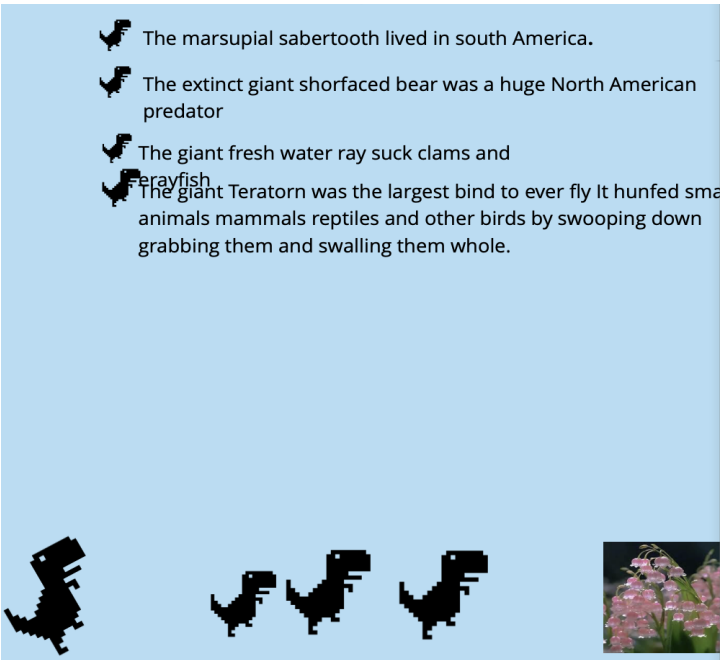
Collectively, these examples show that a carefully designed multimodal learning space might not only reduce students' cognitive workloads to understand dense informational reading texts but also support a deeper understanding of the writing topic. This deeper understanding is more than the skills to summarize the reading text. It also emerged as as students explored non-linguistic resources, which often prompted new ideas and expanded how they understood the writing topic. Students not only demonstrated their learning through written language, but also through intentional visual choices that reflecting what they considered as important and meaningful for their work. In addition, multimodality generates multiple ways for students to connect to the writing topic, including through real life scenarios, their own observation of everyday life, as well as aspects of their identities (Kendrick et al., 2022; Rowe & Miller, 2017). These connections make school-based writing task alive and the writing experience more authentic (Thibaut & Curwood, 2018).

Theme 5. Multimodal learning space supports students' affective engagement in writing tasks

Learning in the multimodal space supports students' affective engagement in writing tasks. This is especially important for students who initially seemed to be less engaged in writing tasks. For example, in the beginning of module 1 project, Amelia (4th grade) expressed disengagement of the book making project. There were several times when Amelia was observed staring at her Chromebooks and writing nothing. When asking about her ideas, she often responded with "*I don't know what to write*" or "*I don't know how.*" As discussed in the prior section, not being able to understand information from the dense informational text and transfer in-class learning to composition work only through written language might influence students' confidence and experiences of producing ideas. Figure 6.16 is a page from Amelia's book in module 1 which she worked on for several sessions. After listing facts she could understand from the reading text, she spent most of her time on adding the small dinosaur symbol all over the page and a picture of flowers. However, these visuals were not closely related to what she wrote on the page. With a lot of encouragement, Amelia started to work on other pages of writing, however, she was found to quickly search some facts online and write them down to finish the task. When the first writing project came to an end, she said "*oh, finally. It took so long*!".

Figure 6.16

Amelia's Writing Sample in Module 1



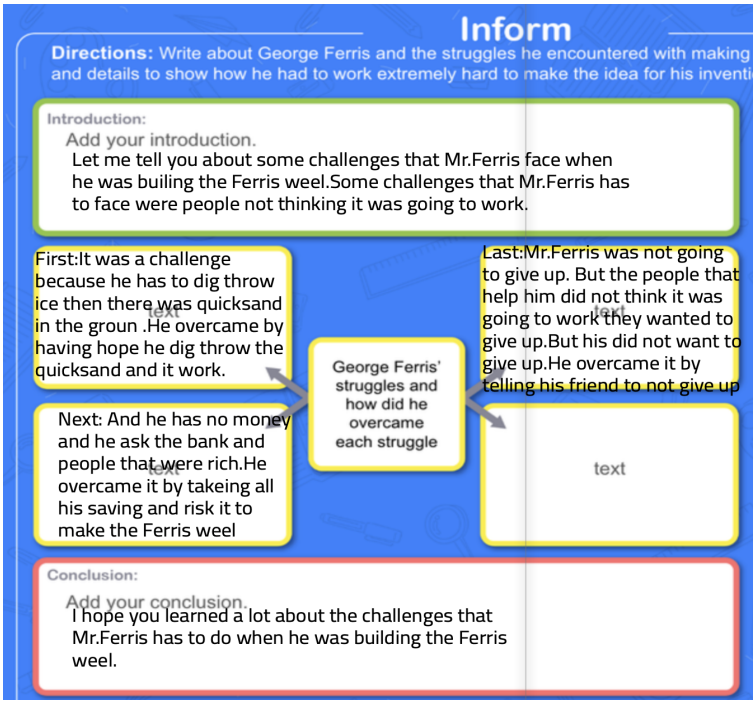
Amelia's experience shows that having access to digital and multimodal resources does not necessarily and automatically lead to students' positive attitudes towards writing, or skills to meaningfully use these tools to mediate their own learning process. Therefore, a more supportive multimodal writing experiences not only admit the existence of multimodality but also help, scaffold and guide students how to uses multimodality for meaning making. The redesigning of the DMC project in module 2 explicitly emphasized the rich meaning carried by visuals, connections students can make through multimodal texts as well as more opportunities of peer learning during class. For Amelia, being able to comprehend the reading text and reading peers' ideas greatly boosted her motivation to write. In module 2, she was one of the most active students in the 4th grade group who always read and commented on peers' posts. This participatory feature of a multimodal classroom helped Amelia to gain a stronger sense of belonging because students' ideas mattered and were included as an indispensable part of learning. She also turned out to be the first student who finished her writing draft accurately. Mrs. B used her graphic organizer (see Figure 6.17) as a good example to show in class and

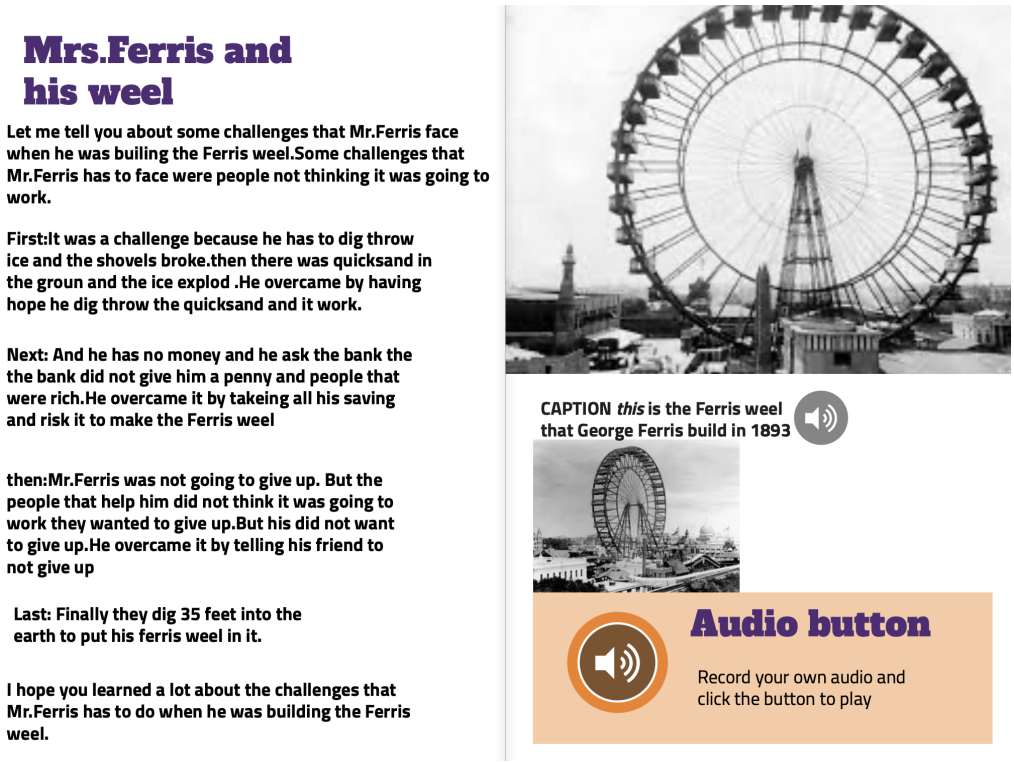
Amelia was excited and proud of this recognition. It is important to note that multiple digital and semiotic tools were available in both modules, so Amelia's changing attitudes towards school writing project was less dependent on the use of new digital tool (Padlet), instead, the change was more related to how teacher and researcher helped students reposition the relationships with tech tools and multimodal resources, and how these resources supported Amelia to access to new knowledge and see herself as a part of the learning community.

At the end of the research, she said that "*I feel proud of myself on book creator and because I am creative and I am proud of what I do. I also record on Padlet to talk about what I learned*" and she especially emphasized the collaborative and participatory features of multimodal projects motived her. Being able to understand new knowledge through multiple representational channels and peers' ideas and demonstrate learning led to a more positive and motivated writing experience for Amelia.

Figure 6.17

Amelia's Module 2 Writing Sample





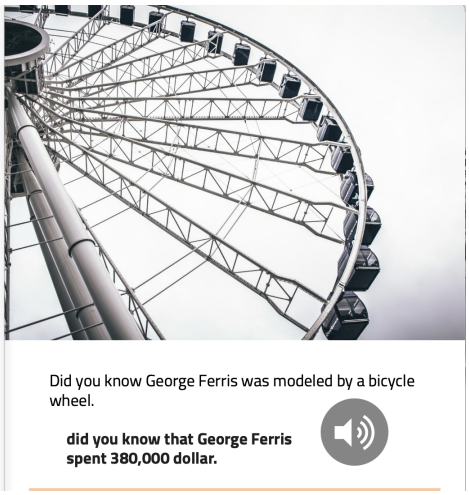
For many other students, writing in the multimodal learning space motivated them to think of the writing project as more than an assignment for summarizing a required reading text; instead, they started to consider it as a proud space to show their knowledge and extend their learning beyond the reading text. For example, students such as Eddie (5th grade) and Edgardo (4th grade) finished their writing projects earlier than other students, however, both of them agentively chose to expand their projects (see Figure 6.18) beyond finishing the required essay writing task. Eddie decided to make one more page to write about facts of Cesar Chavez and his own definitions of new vocabulary learned in this module. Eddie eagerly wanted to present information that was not captured in the main body of his essay, so "*people can know more about Cesar Chavez*", as he said. For Eddie, his learning in the writing module is more than understanding the specific text, but a whole set of language and information about Cesar Chavez as an important historical figure. In the case of Edgardo, he had a new question when he wrote his essay about Ferris wheels. He wondered how much money was spent on the first Ferris

wheels in the world. He actively conducted some online research to explore his question and proudly added this information to his book "*did you know that George Ferris spent 380,000 dollar*". When reflecting about this writing experience, Edgardo specifically highlighted the good question he had and the answer he found as the best part of his writing. Edgardo said that he was proud of following his own curiosity and bringing in new information to his book. Edgardo's case shows that a well-supported multimodal classroom can provide a space where students go beyond reproducing required information, led by their own curiosity about the writing topic, and take ownership of composing as active meaning making. Together, Eddie's and Edgardo's examples show that their positive knowledge holder identities gradually emerged in the multimodal composing process.

Figure 6.18

Students' Writing Samples





(Eddie's book page) (Edgardo's book page)

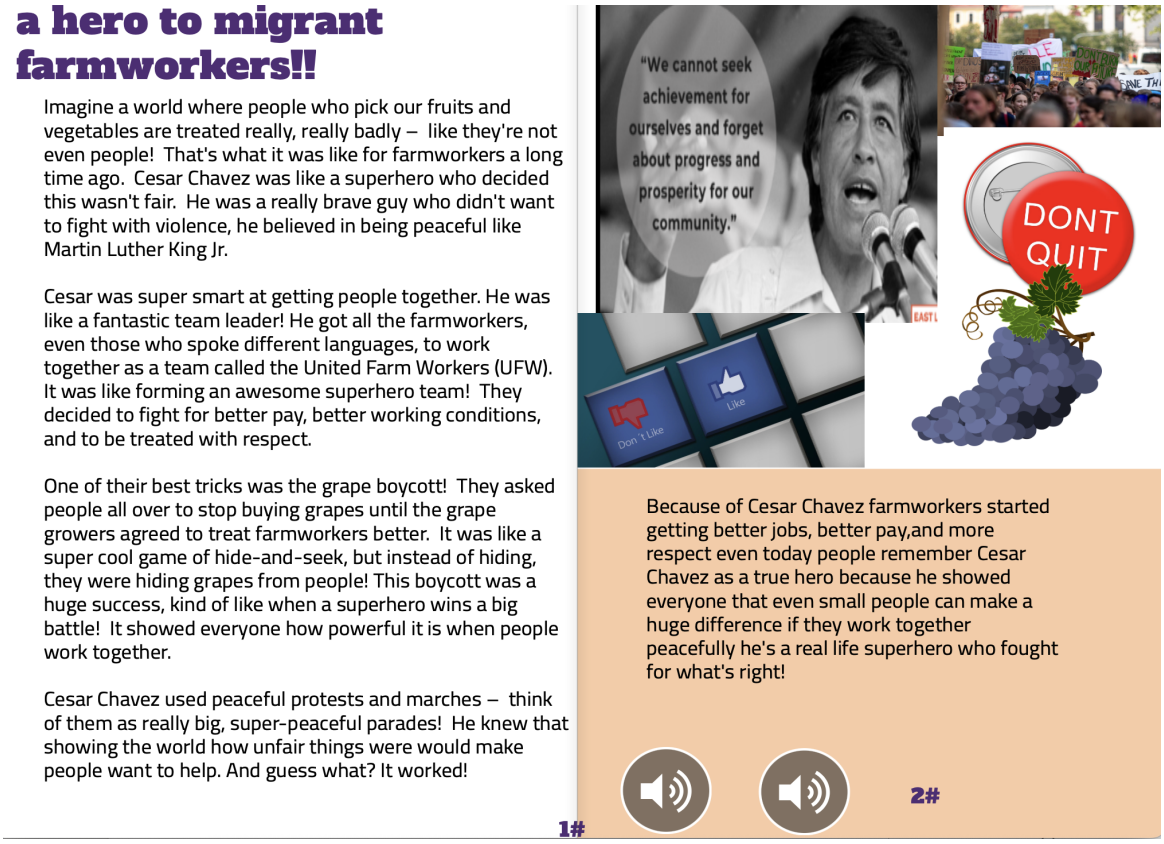
Moreover, a multimodal learning space is a co-constructed and student-led learning space, where students' ideas and progress are always recognized and responded to. Being recognized and heard by peers and teachers lead to students' strong ownership of their work and

agency to do good work (Hughes & Morrison, 2014; Vasudevan et al., 2010). Students such as Nina (5th grade) and Elisa (5th grade) rewrote their writing drafts two times in module 2 to best present their ideas as they learned more about the writing topic. Although they already finished good drafts, they were agentive and patient writers who requested to spend more time on the project and showed strong responsibilities of showing their best work.

For instance, Elisa often asked if she could stay for a while after class to continue to work on her drafts. She said that "*I really need to finish this because it is important!*" She realized that her ideas matter in the class and to many other readers, which motivated her to devote extra time to negotiate what information to add in her work and demonstrate her thinking through writing. When she recorded her own writing, she was serious about the process and practiced several times before she started recording. As many other students, she read her own work and reflected on what doesn't make sense to herself for more final editing. She showed her authorial identity who was responsible for details and best conveying information. Another example is from Nina. After the module 2 writing project was wrapped up, Nina made another draft (see Figure 6.19) at home with the help of siblings and she left a comment on the Book Creator platform, asking how she was doing. Nina brought the proudness of her work done in class and carried the passion for good writing back to home to rewrite with her siblings. In both examples, students' engagement in writing stemmed from their own desire to better express themselves and demonstrate their knowledge, rather than from the requirements of the teacher.

Figure 6. 19

A New Draft Composed by Nina after the End of Module 2



In summary, this chapter shows seven focal students' unique writing experiences in the multimodal learning space where they engaged in exploring, interpreting and using rich multimodal texts for their writing and in their writing. Their experiences demonstrate that a carefully designed multimodal classroom can support students' academic learning/ writing experiences that goes beyond engagement (Choi & Yi, 2016) and reproducing required information. This positive multimodal composition experience relied on the careful design of the learning space and process which is more than simply giving students access to multimodal texts. Instead, teachers need to scaffold students' knowledge of multimodality (Pacheco et al., 2021) such as intermodal relationships (Unsworth, 2008), as well as practicing how to interpret visuals for them to better articulate and strategically apply it for their own compositions (Serafini, 2010; Shanahan, 2013). Therefore, moving from conventional composing to multimodal composing is not merely about adding new tools and modes to a writing classroom, but about how teachers can

design classroom conditions that support students' meaningful relationships with these tools and resources.

With intentional multimodal scaffolding and support, these students showed a spectrum of composing processes. Students may engage with multimodality to facilitate the composing process and explore questions driven by their curiosity, while demonstrating this knowledge in a more conventional essay; other students may choose to compose with rich visual representations. Either way, we see students' agentive decisions to deploy modes for their specific learning goals. In this process, they enjoyed more peer learning opportunities (Harman and Shin, 2018; Rowe & Pennington, 2025) and developed stronger multimodal awareness to use multimodality meaningfully to enrich their writing projects (Kendrick et al., 2022; Marshall & Toohey, 2020). Collectively, these experiences created more literacy learning opportunities for students so that they can have a deeper understanding of the writing topic (with and beyond curriculum provided information) and establish a more agentive and positive writer identity.

Chapter 7 Discussions, Implications, and Conclusion

In this chapter, there are four main sections. I will start by revisiting how the two research questions were answered and how this research addressed prior research gaps. Then I will discuss the theoretical contribution of this research to the understanding and application of multiple theories that inform this dissertation project, including multiliteracies theory, third space theory and culturally relevant pedagogy. Following this section, implications for practitioners, researchers, as well as school leaders and teacher educators will be discussed. This chapter will conclude with limitations and future research directions.

7.1 Revisiting Research Questions

This dissertation project explores two research questions: 1) how to foster an authentic multimodal learning space and 2) how does this multimodal learning space offer multilingual students more learning opportunities. Taking the designed-based research approach to case study, I observed, co-designed and co-facilitated three modules with Mrs. B to gain authentic insights about (emerging) challenges and opportunities to effectively integrate multimodality into mandated language education curriculum to support multilingual students' writing experiences. In this process, five themes (chapter 5) regarding how we promoted a multimodal learning space were identified. The findings show that designing a multimodal learning space is a negotiation between teachers' agency, systemic context and researcher's expectations (design insight 1). Therefore, it is important to recognize this complexity, listen to teachers' concerns and provide feasible solutions such as recycling and redesigning available resources already in the class (design insight 2). In addition, when reframing multimodality not merely as a visual aid for language, but as powerful anchors for various connections students can make, it plays a critical

role in generating rich conversations and deepening students' understanding of the writing topic as more than a course assignment (design insight 3). These findings also provide an example of how digital and multimodal resources can be used to change the teacher-directed learning process to a co-constructed learning environment full of opportunities for peer learning (design insight 4). Lastly, the exploration of the first research question reveals the need for more support from the school, professional community and district to make teacher's efforts sustainable (design insight 5) as we continue our multimodal practices.

The second research question zooms into seven focal students' (4th and 5th grade) writing experiences to reveal how shifting multimodal design might limit/ open more learning opportunities for students, as Mrs. B and I gradually unfolded and refined the multimodal learning space across modules. The findings demonstrate that despite relatively structured instruction, students still showed a spectrum of digital multimodal composing processes for their specific learning styles and goals (theme 1). Additionally, being able to engage in more peer learning opportunities (theme 2) and students' gradually developing multimodal awareness (theme 3) contribute to students' understanding of dense informational texts (theme 4) which in the end supported their positive authorial identity (theme 5).

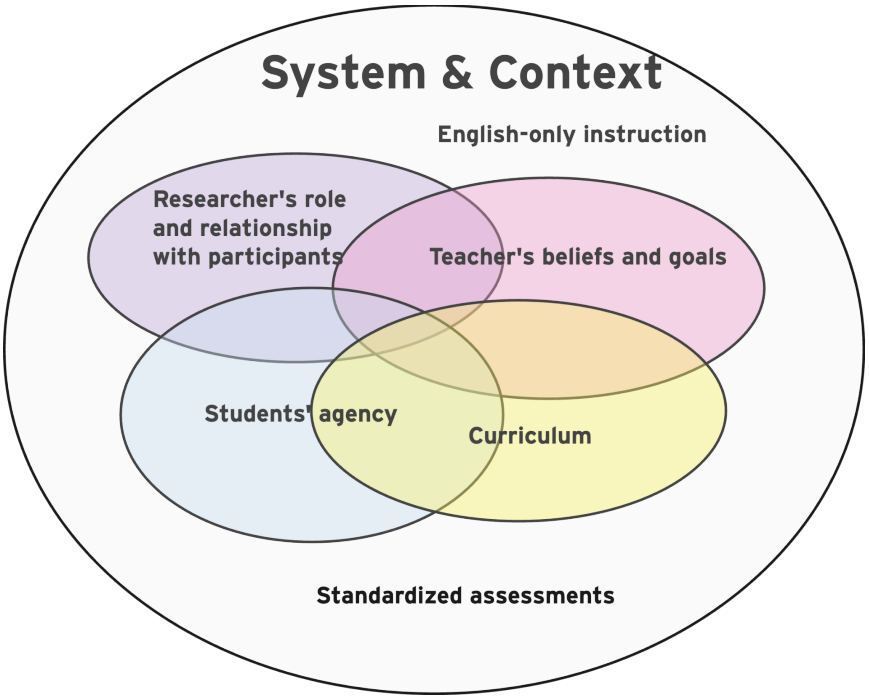
Overall, these findings aligned with what prior research found about the multiple benefits of integrating multimodality to support multilingual students' writing learning (e.g. Li, 2016; Pacheco et al., 2021) and revealed some concerns and challenges of effectively implementing multimodal projects such as digital book making in various educational settings (e.g. Dagenais et al., 2017; Humairoh et al., 2024). However, as discussed in Chapter 2 literature review, there are many research gaps that need to be further addressed, including the need for more multimodal research conducted in K-12 formal education settings where teachers may face multiple

institutional and systemic challenges to meaningfully integrate multimodal practices (Grapin & Llosa, 2020). We also need to continue to explore actionable and flexible frameworks and strategies to guide teachers' multiliteracies practices across different educational settings (Dalton et al., 2015), as well as clearly addressing the skepticism of academic benefits of integrating multimodality in writing instruction for diverse learners (Tan et al., 2020).

This dissertation research contributes to prior research in several ways. Firstly, the exploration of the first research question provides an entry point for teachers to design and implement multimodal learning experiences in a more feasible, flexible and sustainable way. This dissertation not only explicitly recognizes the influence of systemic and contextual factors that can shape teacher's practices and the scope of the research project, but also unfolds the complex and dynamic nature of the learning ecology where teacher, researcher, students and curriculum continuously interact with each other (see Figure 7.1). Therefore, the research framed the educational intervention to be an organic process growing from the site to find the most appropriate way to weave multimodality into writing, instead of a fixed procedure to be brought into classrooms. Lim and Unsworth (2023) argued that an effective multimodal pedagogy framework needs to be both structured to anchor teachers' design and flexible for "varying emphases and expressions." (p. 115). The findings of the first research question provide such a framework for teachers to reflect how to analyze available resources, redesign and reframe the use of multimodality in their specific contexts, how to use digital and multimodal resources to highlight students' knowledge, as well as recognizing the needs for continuous professional support.

Figure 7.1

Dynamic Classroom Ecology



Secondly, this dissertation, specifically the research question 1, highlights the focal teacher Mrs. B's practices and changing perceptions of DMC over time, positioning Mrs. B as a positive learner of implementing multimodality and an agentive source of change. Researchers such as Grapin (2019) brought up the idea of the strong version and weak version of multimodality and pointed out that most language teachers tended to enact the weak version in their classrooms. Strong version refers to teachers recognizing and utilizing multimodality as meaningful meaning-making approaches on their own, whereas the weak version relates to a more reductive perspective of multimodality as simply language aids (Grapin & Llosa, 2020), as shown in Mrs. B's initial practices. However, to my knowledge, few studies explored how to support in-service teachers to gradually move from the weak version to a strong version in a collaborative and context-sensitive way. Therefore, the three modules (iterations) of this research offered an example of how teacher's agency and understanding of multimodality-mediated writing experiences can be improved through continuous reflection and redesigning with a researcher. In this sense, this research project also turned out to be a growing space for Mrs. B as

well as for me to practice and navigate how to “remix” our professional knowledge of conventional language skills and new understanding of multimodality in an authentic way.

Moreover, this research presents the researcher's voice and negotiations of insider-outsider roles in the classroom-based research, which is in need and should be revealed in more qualitative research involving research-practice partnership (Jarl et al., 2024; Yip, 2022). These negotiations of roles revealed both intricacy and possible considerations of researcher-practitioner collaboration to integrate multimodal practices into the classroom in an appropriate way and to support the teacher’s agency to go beyond implementing interventions designed by researchers, but transforming the learning environment with researchers (Fowler-Amato & Warrington, 2017). For example, practices in this research such as understanding teacher’s beliefs and practices for contextualizing research design, daily discussion and reflection with teacher about my noticing, exploring possible design strategies together with the teacher to broaden both of our imagination of multimodal composing, and prioritizing teacher and students’ ideas who are the actual owners of the space. The decision and commitment to find a possible middle ground to reach both researcher’s and teacher’s goals and to divert the classrooms to a co-constructed learning space made the project possible under the standardized and language-focused context.

The exploration of the second research question adds on to prior research by authentically showing multilingual students’ composing process, ideas and artifacts to provide more details of why a carefully designed digital multimodal composition experience can support, strengthen and enrich academic learning and more. The academic value of DMC projects has been a concern documented in several research (e.g., Li & Li, 2022; Yu et al., 2024). This research addressed this concern by demonstrating that it can be beneficial to students’ academic learning such as

informational writing because it facilitated students' reading comprehension and fostered their deeper understanding of the writing topics. Focal students used multimodal resources to access information, generate rich conversations, and bring in more connections about the writing topic, which turned out to be valuable sources of information for their own writing projects. This understanding of rich information led to students' strong agency and motivation to write in academic space and established their knowledge holder identities in the composing process.

Additionally, by presenting several examples from students, this research shows diverse approaches that students respond to DMC and interact with multimodality even within a relatively limited and structured learning environment. This diversity highlights the importance of providing students with choices of composing and scaffolding students how to make such choices to serve their different learning styles and goals. These findings show that when having such choices, all students can be experts on various literacies skills and learn from each other, which leads to a more student-centered and student-directed learning experience.

Lastly, findings in the second research question further reveal the importance of the lesson design and teacher's multimodal pedagogical skills to make DMC effective and fruitful for language and literacy learning. Students' changing experiences and practices from module 1 to module 2 illustrate that without explicit guidance, students (despite being "digital native") might not automatically pick up multimodal awareness and use digital tools effectively and critically to mediate learning (Hellmich et al., 2021).

7.2 Theoretical Contributions

This dissertation is informed by multiple theories and frameworks for its initial design, implementation, and several decisions of redesigning, as discussed in chapter 3. This research might provide a newer and expanded understanding of these theories when applied in elementary

language and literacy education context. Specifically, this section focuses on this dissertation's theoretical contributions to the multiliteracies theory, third space theory and culturally relevant pedagogy.

Reimagining "Design" in Multiliteracies Theory

"Design" and "agency" are two essential concepts in the multiliteracies theory. The term "design" is also one of the keywords frequently used throughout the whole dissertation. In the multiliteracies theory (The New London group, 1996) and multiliteracies pedagogy (Cope & Kalantzis 2009), researchers pointed out that students are designers of their work drawing upon all available semiotic resources for "new design". In this dissertation, the practices of "design" and "agency" are not merely from students, but also come from the researcher and the teacher to make the multimodal learning possible and fruitful. In this regard, an effective design is a collaborative endeavor from multiple educational stakeholders.

In this dissertation research, researcher and practitioner co-designed the learning space, and invited students to design their own writing artifacts. Students' design and agency in the process again informed teacher and researcher's redesign of the learning space to further support students' design. Thus, "design" in the multiliteracies theory should be a collective and continuous evolving process. This research informs future researchers who are interested in multiliteracies pedagogies to consider the critical roles of researcher's design and teacher's co-design to create effective and supportive multiliteracies learning spaces for students.

This dissertation also highlights the flexibility and creativity of "design", which means there is no one approach and fixed procedure to follow and enact multiliteracies pedagogy. As students in this research who were creative in applying their rich semiotic resources to make meaning and express ideas, this research also shows that teachers and researchers can also think

out of box and play with contextual constraints (using available resources) to design projects and instruction that facilitate multiliteracies learning. At the same time, for students, design means having choices. Choosing to focus more on linguistic components for specific learning goals is different from only being allowed to use linguistic mode as the only expected and appropriate mode to express ideas or mediate expressing ideas.

Herein, the intricacies of "design" in multiliteracies theory should have at least three aspects: firstly, researchers need to consider a more contextualized research design recognizing the interplay of available resources, restrictions, and teacher and students' agency; secondly, teachers need to recognize their critical role to redesign curriculum and provide explicit scaffolding for multiple literacies skills; thirdly, students need to cultivate the agency and confidence of choosing multiple modes to design their own compositions and best express their ideas.

Multimodal Learning Space as a Negotiated Third Space

This dissertation demonstrates that multimodal learning space can be a negotiated third space, a space of hybridity which rejects the conventional literacy/ multiliteracies and school/other knowledge binaries, to foster a new learning experience that couldn't be achieved without the hybridity (Pahl & Rowsell, 2011; Vasudevan et al., 2010). The third space theory (Gutierrez et al. 1999) highlights students' agency in navigating and drawing upon knowledge and skills learned from multiple spaces (e.g. home, school, community) to inform new learning. Adding to this point, this current dissertation also reveals that the teacher and the researcher are also contributing to the formation of a third space by using their rich professional knowledge and lived experiences. Therefore, a third space is co-constructed. This research provides an example for future researchers to see what different knowledge and skills are drawn upon, and how these

various knowledge were elicited and gathered to foster a unique learning experience for teacher, students and researcher.

Additionally, this research reveals that one of the biggest challenges of forming a third space in a formal educational context is figuring out how to strategically navigate systemic challenges and assumptions of what knowledge/ skills are valid in academic contexts. This makes a third space negotiated and dynamic (Michalovich, 2025; Moses & Reid, 2021). This research particularly shows that a third space is influenced and shaped by outside pressure (e.g. language-focused assessment, perception of technology-integrated teaching) and available resources (e.g. mandated curriculum, choices of digital platforms, limited time). As such, researchers need to have multiple conversations throughout the whole research process with teachers to decide what knowledge and practices might be welcomed in the class, and what might not yet. Also, researchers need to have the eyes to capture new opportunities to pivot the learning space gradually towards the third space to transform learning experience.

Lastly, this research shows that a third space is a space of "becoming" (Gutierrize, 2008) so that there will be no ending of the process moving towards a third space. In this research, there are a myriad of emerging challenges, opportunities and new ideas of how to bring in more resources beyond the curriculum as we move from one module to another. Even when the research project was wrapped up, there were multiple lingering questions and possible ideas for the future, making the dissertation research an open-ended story.

Culturally Relevant Pedagogy in the Digital Era

When designing this research project, I draw on tenets of culturally relevant pedagogy (Ladson-Billings, 1995) to guide my practices in the classrooms I worked with. Situating the classic framework in a digital and multimodal context, this research might add on to the envision

of a more culturally relevant/ responsive/ sustainable classroom in the digital age. New culture and knowledge afforded by digital technologies, and multimodality as a natural and justified part of expression are two examples of "culture" this research specifically attends to. The definition of culture continuously expands with social development, therefore, pedagogies should respond to this trend to embrace emerging new cultures and new ways of expression. This dissertation offers an example of how students can engage with various new cultural tools to support their in school learning while also building up skills (e.g. digital literacy, visual literacy) they can also apply in daily life.

Culturally relevant pedagogy also attends to student's academic learning, which is one of the goals of this current research. This research uses multiple cultural tools to mediate students' academic learning (e.g. informational writing skills, reading comprehension). The research also interprets and understands students' learning progress in a more holistic way, recognizing multiple aspects of writing development including writing agency, use of multimodality and richness of the writing content, through tracking students' writing over multiple drafts and multiple modules. Thus, students' unique learning progress and trajectories are recognized, instead of measuring students' progress against fixed and reductive language standards.

This research also shows the potential of facilitating and augmenting students' critical consciousness on social events through authentic discussions of multimodal texts and making connections between these texts with life experiences. For example, this research shows students' awareness of civilian participation for social justice and obtaining rights, and their eagerness to use their literacy skills to present their opinions regarding environmental issues to broader audiences beyond this specific classroom. The rich discussion and expression generated by interpreting multimodal texts, and opportunities to practice literacies skills that are critical in

contemporary life for social participation are examples of how a multimodal learning space might authentically support students' critical awareness in the new digital era in a safe and guided way.

7.3 Implications

Implications to Practitioners

This research shed light on a deeper understanding on how teacher's practices might shape the effective integration of digital and multimodal resources for learning. This study specifically shows the complex negotiations between the teacher's agency to implement new approaches of writing instruction and the outside pressure including curriculum requirements and standardized assessments. Therefore, the design strategies identified in this dissertation might offer in-service teachers in similar situations some ideas and examples regarding how to create a more feasible, flexible and sustainable multimodal learning experience for multilingual learners. Additionally, this research presents examples of how digital tools and multimodal resources can lead to a more student-centred classroom which goes beyond using these tools for presenting information but promoting richer opportunities for agentive and deeper learning.

Implications to Researchers

This dissertation also provides implications for researchers on how to build up partnerships with teachers in a classroom-based research. This research reveals the intricacy of researcher-practitioner collaboration in a classroom when the relationships between researcher, teacher and students are continuously changing, which keep shaping and reshaping the direction and expectations of research. As such, researchers need to be transparent about expectations with teachers, and be flexible to modify research projects (e.g. specific projects, tools, procedure) to best serve the needs of teachers and students. In addition, this research reveals the dynamic and

potentially messy nature of design-based research in the authentic learning environment. Instead of considering educational intervention as a one-directional and linear process, researchers need to recognize the agency of various educational stakeholders in the research site and ground research in the specific context. Lastly, this dissertation calls for more future research investigating multimodal teaching and learning in formal K-12 school settings to further update current language and literacy education, responding to the ever-changing social and technological development.

Implications to Teacher Educators, School Leaders and Administrators

This research also provides implications for educational leaders, teacher educators and administrators to play more active roles in collaborating and preparing teachers with multimodal pedagogical skills, which requires not only knowledge about the affordances of multimodality but also skills of using multimodality for effective teaching. Professional training and researcher-practitioner partnerships should be contextualized to local teachers' needs and follow up teachers' practices continuously and constructively to sustain these practices. Teachers need to authentically experience multimodal teaching with support from institutions and professional communities before they may feel comfortable and ready.

7.4 Limitations and Future Directions

There are some limitations of this dissertation research project. Firstly, this research process was still English-only and didn't explicitly support students' multilingual assets. Despite my belief in multilingualism and my own identity as a multilingual learner, I made the hard decision not to challenge too hard the English-only norm of this space. This is because I understand Mrs. B's legitimate priority and responsibility to support students' English language learning in this specific class. My positionality as an outsider of this learning community before

entering the site, and my identity as a doctoral student who could not afford to lose this valuable experience in the classroom in the end led to my choice of not to address the issue in a deeper manner. My approach to this issue is to emphasize multilingual resources as only one of the multimodal modes (linguistic mode) to mediate learning and express thinking. However, in the future, more researchers should continue the effort to recognize, utilize and celebrate multilingual and multimodal practices in language and literacy classrooms, as researchers such as Arshavskaya (2022), Curiel & Ponzio (2021) and Smith et al. (2017) did in their studies to integrate translanguaging opportunities in various DMC projects.

Secondly, due to the relatively short time frame, the results are open-ended and exploratory in nature. Although initially I planned to continue the research as a year-long project, the unexpected personnel transition and reluctance of the new teacher to continue this effort terminated this project in one academic semester. Design-based research and formative intervention aim for long-term and systemic change of a learning space (Penuel et al., 2011); future similar research might be more rigorous and effective when implemented in a longer term. A one-semester research project could not address many issues that emerged in the process, leaving space for future researchers to further investigate. For example, future research can explore if in a long run, the multimodal learning space will affect students' performance in standardized language assessments, how well does the teacher continue to grow the multimodal pedagogical skills until being able to independently create such a space on their own, and how to sustain and expand the practices in the classroom to more classrooms in the school.

Lastly, the types of multimodal projects are limited in this research, only focusing on digital book making and multimodal Padlet posts. These projects might be good starting points for teachers who have less autonomy under constraints of context and teachers who feel less

confident to transition from conventional approaches to teach writing to newer ideas of exploring new writing genres. However, there should be more diverse types of multimodal projects, responding to many emerging new genres (e.g. social media, websites, infographic, vlog, TikTok) in this digital age to support students to develop more critical and creative composing skills. Future researchers can also collaborate with teachers in different disciplines to make it possible. For example, the collaboration between language teachers, mathematical teachers, science teachers and media specialists might lead to fruitful projects of learning through composing infographics, which could have been a final project idea for this dissertation project if time allowed and more plans were made.

7.5 Conclusion

The purpose of this dissertation is to explore the possibility of integrating digital and multimodal resources to language classrooms under the context of language-focused curriculum and standardized assessments, as well as exploring multilingual students' writing experiences in this multimodal space. This research demonstrates that the integration of multimodality can be flexible and creative, despite some challenges and constraints, to achieve both teacher's academic teaching goals and researcher's expectations to move beyond discrete linguistic skills to support multilingual students' meaning making holistically. This research also reveals the critical role of teachers to carefully design this multimodal learning space and explicitly cultivate students' multimodal awareness to make projects such as digital multimodal compositions, making this instruction approach more effective for both content, language and multiliteracies learning. Moreover, when having the space to deploy rich semiotic resources, students in this research demonstrated strong motivation, engagement and progress in understanding multimodal texts and applying new learning to their own writing projects.

This research reframes language education for multilingual learners as more than teaching English. As argued by Lim (2024) that language education should be redefined as communication education in the 21st century when language is ONLY one of the approaches to communicate and express ideas. This research also calls for collaborative efforts from more researchers, teachers, curriculum designers, school leaders and policy makers to move towards our shared goal to prepare our multilingual students not only language skills but also multiple literacies skills, for today, as well as for the future.

In the end, when wrapping up this dissertation project and concluding the writing journey, I realize there are still many lingering moments of regrets, leaving this story open-ended with no answers to many of my own inquiries about multimodal pedagogies and practitioner-researcher collaboration yet. However, these regrets also lead to my endless reimagination of "next time I will…". This dissertation will continuously remind me and probably novice researchers like me who want to devote to classroom-based research to remain humble, creative, brave and reflexive on the thorny adventure to make language and literacies education better.

Appendices

Appendix A

Pre-research Interview with Teacher

- Have you heard of the ideas of "multiliteracies" and "multimodalities"?
- What is your opinion about integrating multimodal resources, such as visuals, audios, into writing instruction?
- Have you ever tried activities such as making digital books, creating podcasts, designing posters when you teach writing?
    - How was it?
    - How do you feel about the experience?
        - What are some challenges or concerns you encountered in the process?
        - What are some things you paid specific attention to for digital book projects? How do you assess or evaluate the quality of their digital books?
        - How do you give feedback to them? What kind of feedback do you provide?
        - From the lesson plan, I saw there are activities such as independent writing, conferencing, peer feedback. Can I participate more in these parts?
        - Can I see the prior samples from the book creator?
- What are your expectations and potential concerns about this research project?
- What do you think these multilingual students do well in your writing class (strength)?
- What are some needs you notice about your students in writing development?
    - Can you tell me more about (specific student)'s writing level and behaviors (e.g. motivation in writing, writing sample)?
- Can you give me some suggestions about how my writing project can better align with the school curriculum and your instruction?

Post-research Interview with Teacher

- What are some things you noticed about students' writing progress?
- What do you think in what ways book creator and Padlet helped our students make progress?
- What is something you feel we should do but we didn't, or anything you think can make digital and multimodal learning experiences more beneficial for multilingual students?

Appendix B

Interview/ Conversation Prompts with Students about DMC

- What did you think about your multimodal writing pieces? Can you explain more to me about what you write?
    - Why did you choose this picture? (use students' writing artifacts for discussion)
    - What do you want to express here? How is the use of this picture related to your ideas?
- What do you enjoy most about using Book Creator and Padlet to learn and write?
- What do you learn and improve from this writing experience?
- What do you feel very proud of your own writing on Book Creator and Padlet?
- Do you think using pictures, videos and your own voices are important parts of your writing? Why or why not?
- What are some things you don't like or feel very hard about in this process?

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