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M.Sc. Dissertation

Write or Wrong; An Analysis of Thai Children's Writing Samples

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Abstract

Thai is an alphasyllabic orthography and a tonal language with a non-linear arrangement of written vowels. The current study aimed to explore children's Thai writing development through an error analysis of existing writing samples. An additional aim investigated the associations between the children's Home Language and Literacy Environment (HLLE) and errors from the writing samples. The sample consisted of 31 Thai-English bilingual and multilingual children between 8-11 years of age from international schools across Thailand. The children's writing samples were examined on factors that make up the translation processes of writing (transcription and text generation) including measures of word count, number of ideas and spelling errors. A spelling coding scheme was created to capture the different error types. Thai is a scriptio continua, which means that it has no spaces between words, so space knowledge is also important in Thai knowledge development.

All writing samples were examined for word count and spelling errors and a subset of the writing samples were analysed for idea units and space knowledge. Results showed a significant difference between more-skilled and less-skilled spellers for both word count and spelling errors. On average, more-skilled spellers wrote twice as many words than the less-skilled spellers and less-skilled spellers made more errors on all segments in a word (consonants, vowels, tones) compared to more-skilled spellers. In line with previous literature on Thai spelling development, more spelling errors were made for consonants followed by vowel and tone errors. Results indicate a positive relationship between idea production and word count, suggesting that children who have higher orthographic knowledge can divert their resources to the text-generation processes of writing. Further inspection is needed to understand the writing processes of a scriptio continua language.

As for the association between the HLLE and the child's writing samples, correlation analysis showed a significant moderate correlation between the child activities in Thai and average word count, suggesting that the child independent activities in the home are associated with the productivity of writing. Results from the parents' report on their child's knowledge of Thai aksharas suggested that children have more difficulty writing, recognizing and spelling low-frequency aksharas than high-frequency aksharas. Finally, the current research highlights the insights of the home environment in association with Thai writing development but acknowledges the limitations and the need for future research.

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CHAPTER 1: INTRODUCTION

1.1 Bilingualism, Writing and Home Environment

When the term bilingual comes to mind, the thought of an individual who can function in two or more languages appears. Bilingualism is acquired through the living environment. Bilingual children speak two languages and the proficiency of each language is strongly related to the exposure and input of each language. Home literacy activities such as shared book reading, storytelling and watching television programs impact bilingual children's language comprehension, especially in the language used during interactions between the parent and child (Jiménez, 2018; Nag et al., 2018). Thus, children's language skills are strongly related to the experiences with the language input in their home (Scheele et al., 2010). The phenomenon where the home language may begin to reduce in prominence because the school language increases in use and value is known as subtractive bilingualism (Cummins, 2005). The current research is interested in one such context of Thai learning in the context of Thai-English bilinguals.

Writing is a complex process that requires translating speech into written symbols. It is a process used for communication and learning. When writing, children need to understand print concepts of a particular writing system and they need to know the sounds of letters. Writing ability requires more support and guidance compared to reading ability, as such, it is imperative that researchers understand how writing development is supported by the home environment. A way writing development is assessed is through conducting an error analysis (Hali˙Toglu, 2020). An error analysis provides researchers and teachers with information on what students know. This research aims to discover the frequent errors made by Thai children in international schools in Thailand.

Thai is a tonal language and an alphasyllabic orthography with a non-linear arrangement of written vowels. The orthographic unit in this writing system is called akshara (or /akson/, a syllable block with phonemic markers), and written Thai uses spaces between clauses and phrases rather than between words. The complexity of the orthography is demonstrated in primary school children's written work. So far, studies on Thai spelling, tone and reading have been heavily published in English language academic outlets (e.g., Ratitamkul, 2010; Winskel, 2010; Winskel & Iemwanthong, 2010). This dissertation will look to replicate some of these analyses of Thai spelling and tone learning and go further to also examine the understudied areas of space knowledge and idea production in children's Thai writing. The dissertation also intends to understand writing development through the

links between the child's writing samples and their home language environment through a parent survey.

1.2 Structure of the Dissertation

First, the empirical research on writing development, the alphasyllabic writing system and the language and literacy environment will be reviewed, followed by a description of the gaps in the literature. Second, the methodology will be presented comprising a description of the participants, recruitment process, assessment tools, the procedure for data collection and finally, the inter-rater reliability and external validity of this study. Third, the results section will be presented, starting with a description and statistical analysis to address the research questions on spelling errors, and the word count, idea units and space knowledge in children's writing. Next, the description and statistical analysis will examine data from the parent home language and literacy environment (HLLE) survey. The last chapter is a discussion and includes an interpretation of the findings, limitations of the error analysis study, implications of the findings, future directions for research on Thai children's writing development and HLLE, followed by a general conclusion to end.

CHAPTER 2: LITERATURE REVIEW

2.1 Writing in Primary School

Writing is an essential technique used for communicating with others. It can be defined as using symbols to convey thoughts or ideas (McNamara & Allen, 2019). Writing skills are important for a child's participation in literacy processes both in and out of school. Every day we translate our thoughts and ideas to a physical trace through pen, pencil or computer. We write to learn, remember, express ourselves and communicate with individuals of different communities. Learning to write is an issue that worries researchers, teachers and parents because writing is a skill that is affected by oral language and reading skills (Jiménez, 2018). Oral language skills, especially vocabulary, play a role in young children writing skills as they need to generate words to transfer their thoughts onto writing. Children with a smaller vocabulary bank tend to write fewer words, resulting in less/simple ideas or producing a shorter written text (Puranik & AlOtaiba, 2012). The child's surrounding environment promotes language and literacy learning, such as their classroom or home environment.

Writing is a complex and nonlinear process requiring planning, translating and reviewing or editing the written product (Flower & Hayes, 1980, 1987). The process of planning involves generating and organizing ideas and setting goals for writing. The process of reviewing requires reading and editing what has been written. Translation involves putting ideas into meaningful words, sentences and phrases (Puranik et al., 2008) and it is considered a challenge for beginning writers. For children to translate their writing, they need to tackle the demands of "producing letters, spelling words and combining [them] into syntactically appropriate sentences" (Adams et al., 2021, p.2). Thus, for primary school children, the process of translating is separated into two sub-components: transcription and text generation (Berninger et al., 1992; Nag, 2017a). The processes of planning, translating and reviewing enable the child to express their knowledge and thoughts, and use these to participate in academic activities. The writing-related processes are assessed through their impacts on the writing product, and may be measured at the microstructural (words and sentences) and macrostructural (global context) levels (Adams et al., 2021).

2.1.1 Transcription

Transcription skills are the foundation for writing as it involves translating language units from memory into written form (Puranik & AlOtaiba, 2012). It incorporates activities such as handwriting, typing and spelling (Berninger et al., 2009; Jiménez, 2018). Transcription is especially important in the beginning years of writing as children have to pay

attention to letter formation and combination to spell words. Handwriting is a skill that is achieved in early primary levels and it is a skill that entails orthographic coding, visual-motor integration and motor planning (Lam & McBride, 2018). Handwriting fluency is critical for higher-order processing in writing such as text generation. Lam and McBride (2018), for example, found that Chinese handwriting measures significantly explained children's spelling because children paid attention to the stroke order, which enhanced their visual and motor learning of writing. Thus, the integration of orthographic knowledge is required for handwriting. Having poor orthographic knowledge would make higher-order processes of writing difficult (Puranik & AlOtaiba, 2012).

In addition, to spell a word effectively, a child must have well-developed orthographic knowledge. For example, a written dictation involves retrieving, assembling and selecting orthographic representation. So, when there is a spelling error, it provides evidence of orthographic knowledge (Jiménez, 2018). Also, children need to have the knowledge of letters and letter-sound correspondences to translate them in writing (Puranik & AlOtaiba, 2012). The framework of triple-word-form proposed by Berninger et al., (2009) suggested that to spell a word correctly children need to acquire three types of linguistic knowledge: phonological knowledge (i.e. perceive and analyse the spoken word); orthographic knowledge (i.e. represent how a spoken word is perceived in written form) and morphological knowledge (i.e. recognize subunits within a spoken or written form). When a child makes a phonological error, there is an incorrect representation of the sound. These spelling errors include the omission of phonological elements such as tone and stress. An orthographic error in an alphabetic language is an error with incorrect and ambiguous letters, such as the vowels, consonants and diagraphs for English. Graphemic errors are considered orthographic errors and these are defined as symbol reversals or misspelling a character with a visually similar character (O'Brien et al., 2020). For languages such as Thai, spelling difficulties can be seen as a "sensitive marker for poor akshara knowledge and phonological decoding difficulties" (Nag, 2013, p. 214). With increasing age, the transcription skills become more automatic, but young writers must have sufficient transcription skills before evolving to text generation.

2.1.2 Text-generation

Text generation skills require the ability to turn ideas into "words, sentences and larger units of discourse" (Jiménez, 2018). At this stage, young writers shift from forming word-level indices, such as individual letters and spelling words, to sentence-level indices,

such as constructing sentences and paragraphs. The shift from word level to sentence level reveals the measures of productivity and complexity in a text. To capture the variation in children's writing performance, the indices used for writing productivity are the total number of words and the total number of ideas, while the index to measure writing accuracy is the number of spelling errors (Adams et al., 2021; Puranik et al., 2008). In primary school classrooms, writing stories is common. The narrative writing texts include features such as focusing on characters, the unfolding of events and actions and the time and place of events. The narrative communication can either be personal or fictional (Berninger et al., 2009). Using children's narrative writing and other pieces of writing (e.g. copywriting, sentence writing, dictation) leads to inferences about their attainments in language and literacy components (Nag, 2013). The lack of text generation and transcription skills restrict planning and revision processes (Puranik et al., 2008; Puranik & AlOtaiba, 2012).

2.2 Orthography

2.2.1 Orthographic Knowledge

Writing is not simple. Children must transform the ideas into orthographic representations, which involves conceptual, linguistic and motor processes (Jiménez, 2018). Orthographic knowledge is the ability to represent spoken language in written form (Katz & Frost, 1992). For Thai, studies have identified orthographic knowledge as a predictor of spelling proficiency as greater awareness of orthographic units are required (Winskel, 2010; Winskel & Iemwanthong, 2010). Orthographic rules are language-specific, which means that a bilingual individual learns to read in more than one orthography or if the orthographies are based on different scripts, the bilingual individual must learn to read multiple scripts.

The orthographies of South and Southeast Asia are categorized as Indic alphasyllabaries (Nag, 2014). To develop orthographic knowledge for Brahmi-derived scripts, including Thai, children must represent the spoken word in the orthographic units of akshara (Nag, 2017b). Orthographic knowledge for Indic alphasyllabaries develops slower than other alphabetic scripts because there are factors that are easy to see and other characteristics that are at a deeper linguistic level (Nag, 2017b). Considering both orthographic depth and breadth is useful (Nag, 2007). The orthographic depth provides information on the continuum on which languages can be arrayed depending on the letter-sound correspondence. If the one-to-one letter phoneme correspondence is different, the writing system is considered to have a deep orthography (Katz & Frost, 1992; Share & Daniels, 2016). Orthographic breadth goes beyond the transparency of the writing system and

considers the symbol size in the writing system. The pace of learning will be quicker for a contained orthography with few symbols, such as English, but longer for extensive orthographies like the alphasyllabary Kannada (Nag, 2007).

2.2.2 Thai Orthography

Thai is an alphasyllabary. Thai represents print in units called akson. The Thai syllable structures are V, VC, CV, CCV, CVC, CCVC (V= vowels; C=consonant; Winskel, 2010, 2013). Thai is written from left to right horizontally. Thai has predominantly monosyllabic words. Some words have similar spellings that may vary in just one akshara or tone (Winskel & Ratitamkul, 2019).

Consonants. All consonants are written on the main line. There are 44 basic consonants and four archaic consonants for 21 initial consonant sounds and nine final consonant sounds (Winskel, 2009, 2010). The 15 initial consonant clusters are orthographically and phonologically realized, and they all start with stop consonants and are followed by laterals, trills or bilabials. The orthographic class-change cluster is when the initial consonant of the cluster is silent (ห, high class or อ, middle class). The silent consonants change the consonant class from low to a high or middle class expression, thus corresponding to a change in tone (Kasisopa, 2011; Winskel, 2013; Winskel & Ratitamkul, 2019).

Consonants are more inconsistent in their phoneme to grapheme mapping compared to vowels. High feedforward consistency is when one grapheme (symbol) represents one phoneme (sound). While high feedback consistency is when one phoneme represents one grapheme. When considering the Thai consonant symbols, the feedforward consistency is low because some consonants have a change in sound when they are in the final position (Kasisopa, 2011). All consonants can occur in the initial position, but only 33 symbols can occur in the final position. From the 33 final-position symbols, there are only nine sounds. Thai only has initial consonant clusters. Final consonant clusters are not phonologically allowed, so they are pronounced as a single word. Most consonant symbols have a single sound associated with them, but many sounds have several orthographic representations. Thus, the grapheme to phoneme correspondences of akshara in either the initial or final position are mostly feedforward consistent, but many are feedback inconsistent (Kasisopa, 2011). The inconsistencies in phoneme to grapheme mapping of consonants indicates the complexities of Thai orthography.

Vowels. Thai vowels are placed either vertically above, below or to either side of the consonant. There are differences in vowel length, and the short and long vowels can combine to produce diphthongs. The five vowels that precede the consonant in writing produce a mismatch in speech (เ-, แ- ไ- ใ- โ-). For example, the word เล่น is spoken as /l (ล) ê (เ) n (น)/ 'to play'. Other vowels are written and spoken in order, similar to English (e.g., มาก /m (ม) âa (า) k (ก) / 'a lot'). Additionally, vowels are not always explicitly stated, as inherent vowels are not orthographically represented, instead they can occur with a consonant. The consonant with the inherent vowel /a/ is usually found in words of Sanskrit or Khmer origin or /o/, which is found in native Thai words (Winskel, 2013). Despite being complex in their grapheme expression, Thai vowels have a high degree of consistency in their phoneme to grapheme mapping. There are 18 monophthongs (one vowel sound in the syllable; nine short and nine long) and six diphthongs. Kasisopa (2011), placed the vowels into ten groups based on the positioning of the akshara and their components (Appendix A).

Tone. Thai is a tonal language with five-tone sounds (high, mid, falling, rising and low), and four tone markers (◌่ /mai ek), ◌้ /mai tho/, ◌๊ /mai tri/, ◌๋ /mai chattawa/). The tone markers are always placed above the consonant and above any upper vowels. Tone determination is influenced by the class of the initial consonant, type of syllable and tone marker (Winskel, 2013; Winskel & Iemwanthong, 2010) and the vowel length.

Scriptio Continua. Thai is a scriptio continua language, which means that it is written without spaces between words. Instead, spaces are used to indicate the end of a phrase, clause or sentence (Kasisopa, 2011). Since Thai akshara strings can be read to break at different points in the unspaced written language, it creates ambiguity and a word definition issue. So, individual words are recognized by scanning for word boundaries, which depends very strongly on the sentential context (Kasisopa et al., 2016). Previous research on eye tracking movements indicates that when reading Thai, children's preferred viewing location (PVL) was closer to the word centre (Kasisopa, 2011; Kasisopa et al., 2013, 2016). Kasisopa (2011) found that when Thai readers were reading unspaced text and the unusual spaced text, the eye patterns were the same, but the speed of reading was faster for the spaced text, especially for children who were poor readers. When reading, the eye movements are fast and coordinated and are punctuated by fixations. Fixations allow for the identification of word segmentation when reading Thai by using the frequency information to identify position-specific word-initial and word-final consonants (Kasisopa et al., 2013a). The high-frequency word-start aksharas helped reduce reading time. As for word-end akshara, the

frequency had a lesser effect on the landing site. Having high frequency akshara serves as a push to the landing site, and tends to shorten viewing time. While eye-tracking research when reading Thai has shown that readers rely less on visible cues such as spaces between words, having spaces does result improves reading time and helps with word recognition. Younger children, for example, relied on the visual cues of spaces between words, but when there were no spaces between words, the akshara frequency was used to distinguish the words (Kasisopa, 2011).

2.3 Error Analysis

An error can be defined as the use of an incorrect form and the inability to correct it (Özkayran & Yılmaz, 2020). Analysing the types of writing errors made by primary school children would help researchers, teachers and parents determine areas of difficulty. An error is made by a learner who has not yet achieved the rules of the target language, so the analysis for errors could allow researchers to better understand the process of a child's language acquisition. Errors are indicators to facilitate the process of language learning because errors serve as feedback for learners, which is key to successful learning (Corder & Allen, 1974). One approach to conducting an error analysis involves five steps. The first step is to collect a portfolio of samples in the learners' language, then identify, describe, explain, and finally evaluate the errors (Vásquez & Alberto, 2008). The purpose of conducting an error analysis is to find out what learners know and do not know, to provide teachers with a supply of information to help learners progress in the target language.

2.3.1 Previous Literature on Spelling Errors in the Alphasyllabary Writing System

When learning to write alphasyllabaries, children are either taught to spell the word one akshara at a time or build up the "graphic complexes from their phonemic components" (Nag et al., 2010, p. 2). A study conducted by Nag and colleagues (2010) analysed spelling produced by 60 Kannada speaking children in grades four and five who were either bilingual or multilingual. Children were asked to spell 30 words of different types. The spelling analysis was differentiated on a continuum of spelling skills, ranging from skilled to less skilled spellers. The researchers examined spelling correctness using mean proportions on three levels: word, akshara and intra-akshara. In relation to the present study, the focus will only be on the intra-akshara analysis. The intra-akshara analyses examined the performance of the individual akshara: consonant and vowel. The researchers found that both groups of children spelt consonants better than vowels. The consonant errors were further divided into two features: visual and phonetic. Children tended to make more phonological errors

compared to visual errors. Short and long vowels were examined, and the omission for short vowels was more common than the omission for long vowels. These errors arise because of the phonological similarity of the short and long vowels. The analyses of errors on the intra-akshara level showed that children use phonemic information to spell words. In summary, the findings from this study suggest that spelling errors can be due to phonological and visual factors. Since Kannada is an alphasyllabary, children need to learn to write symbols either above, below or on the line, which may provide visual complexities leading to the need for children to segment the symbols when writing. The ability to segment symbols is a stumbling block in reading and writing (Nag et al., 2010).

In more recent research, O'Brien (2020) examined phonological, orthographic and morphological spelling errors for grade 1 children learning different writing systems. The writing systems include an alphabetic, Latin script (Malay); alphasyllabic script (Tamil); and non-alphabetic, morphosyllabic script (Chinese). These three Asian writing systems were chosen due to the multicultural environment in Singapore. Children were asked to spell ten words through a dictation task. The spelling was first analysed as either phonological, orthographic, morphological or other errors. Then the errors were further categorized depending on the language for language-specific errors. Along with children's spelling errors, parents were sent questionnaires to collect data on the demographic (e.g. gender, ethnicity) and home environment (parent education level, income, time spent with members in the household). The results suggested that children in the Tamil spelling group made more errors compared to the other group. On average, the Tamil language group showed higher phonological errors than the Chinese language group. There were no significant differences across Asian language groups for orthographic errors, but for morphological errors the Tamil language group showed a lower proportion of errors compared to the Chinese and Malay language group. The Tamil akshara are both visually and phonetically confusable and the graphemic complexity could explain why there were more Tamil errors compared to Chinese and Malay spelling errors. Tamil has a large orthographic inventory as children must learn 247 graphemic representations. The extensive and complex orthography takes children longer to learn, thus causing more errors.

Analysing spelling errors reveals information about a child's phonological knowledge. To spell proficiently, children need to retrieve well-developed orthographic representations. Thai is an alphasyllabary with high consistency in mapping phoneme and grapheme for vowels, but not consonants. Winskel (2010) looked at the spelling development

of Thai children between 7-9 years of age. She provided children with dictation of 57 words and analysed them for consonant, vowel and tone errors. The scoring rubric had nine consonant errors, four vowel errors and two tone errors. The words tested children's knowledge of different vowel combinations and tone rules. The children were analysed based on year-level differences (Grade 1 vs Grade 2 vs Grade 3). There was a general trend that children in the 1st grade made the most errors, especially consonant errors. For vowel errors, younger children found vowel length and similar vowels to be problematic. While children in all year levels made tone errors, older children made relatively few errors (i.e. omissions and substitutions) compared to younger children. Additionally, errors were found based on spoken language effects as children confused the letters /r/ and /l/ when spelling. The segmentation of spoken language translates to the writing system leading to persistent errors of homophonous consonants, omission of class-change clusters and the incorrect expression of a tone. The complexity of the Thai orthography is due to the factors of consistency of phoneme-grapheme mapping, spoken language effects, segmentation problems, visually similar letters.

The three studies analyse spelling errors of language from the alphasyllabary writing system. While the studies captured the accuracy and richness of the writing, they do not capture the productivity of writing. The present study aims to address this gap when analysing children's writing samples.

2.4 Language and Literacy Learning Environments

2.4.1 Bilingual Language Development

2.4.1.1 Mother Tongue. A child's mother tongue is indicative of their belonging, which is essential to building their culture and personality. Mother tongue can be defined in several ways—child's native language, "first language learned without conscious effort" (Hali˙Toglu, 2020), or the dominant language of the home. Children who have a good grasp of their mother tongue have better literacy skills in the school language because it increases their self-confidence and cognitive skills (Ozfidan, 2017). The development of the mother tongue not only improves the mother tongue, but aids in the language of the school. Thus, the mother tongue may directly or indirectly affect the acquisition and learning of the second language. When the mother tongue is developed and used together with another language or languages, then bilingualism or multilingualism is acquired (Hali˙Toglu, 2020). Hence, it is not possible to consider bilingualism independently from the mother tongue.

2.4.1.2 Bilingualism. When a child grows up in an environment where two languages are used daily, there is a strong possibility that the child becomes bilingual. The child's bilingualism will progress more in households where either one or both parents speak the native language along with another language. In the home, the child is in constant contact with the language through daily interactions with parents or other household members who speak the language or a bilingual nanny/caretaker (Jalilian et al., 2016). Bilingualism in the home is deliberately created by the parents' decision to speak to the child in a different language. However, all bilingual children grow up in different linguistic situations as bilingualism can also be picked up through extra language classes.

Bilingual individuals are considered open-minded, flexible and creative and tend to have high language skills (Bialystok, 2001; Kavak & Gül, 2020; Unsworth, 2016). The development of bilingual skills depends on the availability and use of languages in various contexts and the situations that encourage the child to express themselves (Jalilian et al., 2016). As bilingual children age, switching from one language to another becomes frequent, exposing the child to extensive vocabulary. The vocabulary is distributed across two languages allowing the child to use their languages in different contexts. The switching of words from one language to another is known as code-switching. Code-switching is common for bilingual individuals who grow up in environments where both languages are spoken.

The bilingual definition does not always consider how each language may differ in abilities of reading, writing, speaking and listening. Bilingual children do not need to be fluent in both languages. The individual differences of bilingualism can be seen on a continuum, and it describes the child's level of proficiency in the two languages. There are differences in the performance of tasks, context and conditions across languages (Tsybina & Eriks-Brophy, 2010) as the child may be dominant in one of the two languages. Distinctions can be made about how a child acquires the knowledge of an additional language, with simultaneous bilingualism, which refers to the child learning the two languages concurrently or sequential bilingualism, which refers to the child learning the second language after the first.

In Southeast Asia there are several multilingual education programs, which increase opportunities for individuals to become biliterate. In Thailand, the primary language of instruction in international schools is English, but to help children feel culturally and linguistically at home, children are required to learn an additional language that match their home language. Thus, children enrolled with a Thai passport must take Thai as a home

language in line with the Thai Ministry of Education requirements. This study will examine children placed in such classrooms.

2.4.2 Thai Classroom Instruction

According to the Thai Basic Education Curriculum, Thai children officially enter the education system in Grade 1 (Kasisopa et al., 2016). Thai reading instruction begins by teaching children how to map the aksharas to sounds using the whole-word approach with additional phonic strategies. Thai children start reading spaced text (text with inter-word spaces) in Grade 1 and slowly transition towards unspaced texts towards the end of the academic year. This is done to prepare the children for the unspaced Thai texts. The writing development follows a similar pattern to reading. Classroom writing activities in primary school vary across grade levels, but it begins with chorus and copy work, then moves towards creating original texts and spontaneous writing.

Due to the COVID-19 pandemic, schools in Thailand suspended face-to-face education and adopted the distance education model for the majority of the 2020-2021 academic school year. Distance learning allows learners to access the learning process from any location. Distance education was conducted synchronously with the teacher and the learner in the learning environment at the same time (Aydin & Erol, 2021). Advantages to distance learning include an increase in attendance, engagement, and motivation of students. However, with distance learning, teachers and learners' motivation and self-discipline may cause concern, especially for primary school children (Aydin & Erol, 2021; Sariani et al., 2021). Aydin and colleagues (2021) conducted a qualitative study to describe the views of Turkish language teachers on distance learning during the COVID-19 pandemic. Turkish teachers expressed that teaching basic language skills like speaking and listening skills were more productive as students listened and paid attention. However, writing skills were the least developed skill because it was difficult to get students to write a text through distance learning. This may be due to the differences in the classroom environment and the home environment. In classrooms, children are exposed to the visual aid, such as pictures, words and sentence structures, to assist them with their language skills, which may provide assistance to their writing (Sariani et al., 2021). On the other hand, while children may not have visual aid at home, they have language inputs from their parents and other household members.

2.4.3 Home Language and Literacy Environment

In low- and middle-income countries, such as Thailand, children tend to grow up in linguistically diverse environments. For many children the home language is different from

the school language. Children who speak the same language at home and school are likely to have a home language advantage compared to children whose home and school language differs, although the trends are mixed and more linked to the quality of instruction rather than home language status (Nag et al., 2018). During preschool years, the majority of the children are exposed to their school language (L2) for the first time. This may cause a shift from the use of home language (L1) to school language (L2) to increase amongst children in preschool due to instruction of the L2 (Ijalba, 2015). The phenomenon of shifting to reduced use of the home language has been called subtractive bilingualism (Benmamoun et al., 2013; Cummins, 2005).

When parents are not proficient in the L2 and cannot communicate with their L1 to their children, they cannot convey their values and beliefs. Parent involvement promotes literacy practices by increasing knowledge, promoting storybook reading and conducting hands-on activities (Vagh & Pan, 2009). Parents engaged in their children's learning are motived to support them through a variety of enriching literacy materials and experiences that promote children's literacy acquisition (Vagh & Pan, 2009). Increasing the frequency of parent-teacher contact through conferences is not enough to improve children's educational attainment, there needs to be an investment in home literacy interventions. Home language and literacy environment (HLLE) interventions are targeted through supply or skill training, such as shared book reading, parent-child interaction in language-based activities and adult literacy practice (Nag et al., 2018; Vagh & Pan, 2009).

The Nag et al. (2018) systematic review established three dimensions for the HLLE—i. Books-at-home, ii. Home tutoring, iii. Adult literacy practices. These three HLLE dimensions can provide details on whether there is a disconnection in the home and school languages. Books-at-home refers to any print material found at home, whether owned or borrowed and it refers to the engagement and use of the print. Some examples of prints at home include storybooks, textbooks, holy books and workbooks. Home tutoring refers to either paid tutoring or parental instructional strategy. The frequency, duration and methods of home tutoring vary. Paid tutors may help children with their homework or develop their general language skills. In comparison, parents may provide support by simply telling their children to complete their school homework and explaining how to do it. Mothers, compared to fathers, are more involved in their child's education and when the mother cannot help, they will turn to other family members or a caretaker (Nag et al., 2018). Adult literacy practices include parents' skills and attitudes toward children's learning, but it has been

operationalized differently by researchers. It can refer to activities such as reading and writing bills, reading prayers with children, exposure to oral language through television and other learning material at home (internet connection, pencils, erasers, calculators). Finally, there is a variation in the dimensions across homes due to limitations in financial resources (Nag et al., 2018).

2.4.3.1 HLLE and Vocabulary Instruction

Previous intervention studies have shown that parent involvement through developing their knowledge of the language and engaging in activities with their child has increased vocabulary and comprehension skills. A quasi-experimental study by Lau and colleagues (2020) involved South Asian mothers living in Hong Kong to participate in a Chinese vocabulary intervention and found that both the mother and child had an increase in their language skills. The mothers attended one-hour sessions per week for eight weeks. The first four sessions highlighted the orthographic structure of the Chinese character, covering activities such as copying the characters, the meaning of vocabulary words and discussions surrounding the words. The last four sessions focused on the meaning and structure of characters through nursery rhymes, objects and pictures (Lau et al., 2020). It was found that mothers vocabulary knowledge and word reading increased four times from the baseline measurement. Increasing parents' knowledge led to created active communication with the child at home, resulting in language gains by children.

Furthermore, using the home language for interventions can benefit the school language (Armon-Lotem et al., 2020). In 2015, Ijalba found that providing knowledge and resources for parents in their home language facilitated a gain in expressive vocabulary in Spanish and English for children. Parents were instructed to read for 15 minutes and conduct activities based on reading every day. After the parent intervention of shared reading and communicating in Spanish, children displayed language gains in both Spanish and English.

2.4.3.2 HLLE and Writing Ability

Much research has focused on shared reading and its association with a child's oral language and reading development. Little is known about the relationship between home language and literacy environment and a child's writing ability (Puranik et al., 2018). Ngorosho (2011) examined the home environment in relation to the reading and writing ability of grade three children in Tanzania. A questionnaire was sent out to parents regarding the living and literacy environment. The living environment included aspects of the family socioeconomic status, and the literacy environment looked at the availability of books at

home, parental involvement and writing items. It was found that only seven percent of the variance explained the home literacy variables (books, notebooks, parent involvement). The study suggested that parental involvement is a significant predictor for the child's ability to write and that it may have a greater impact on advanced writing skills once the child reaches the upper primary school years (Ngorosho, 2011).

Puranik and colleagues (2018) examined the home environment and children's writing skills by analysing various writing samples. Preschool children in Florida and western Pennsylvania, were tested individually on four types of writing activities—i) letter writing: writing the English alphabet, ii) spelling, iii) picture description, iv) two spontaneous writing samples. Information regarding the home literacy environment was captured through a parent questionnaire. The questionnaire involved questions regarding parental teaching practices. Questions required parents to select activities that they work jointly with their child and to list the child's independent activities through questions of how frequently the parent helps the child write letters of their name. It was found that majority of the parents frequently engaged in writing activities with their children. The questionnaire answers were significantly related to letter writing, spelling and spontaneous writing (Puranik et al., 2018). When mothers helped their children with grapho-phonemic processes and the precision of writing, it resulted in children receiving a higher writing score. Despite finding significant results, Puranik and colleagues (2018) suggested that asking parents open-ended questions about the writing activities and the parent-child interactions could help further deepen the understanding of the nature of parent involvement. The current study will address the gap of parent involvement in a child's writing through a home language and literacy environment survey containing both closed-ended and open-ended question.

2.5 The Current Study

This chapter has reviewed the research literature on writing, Thai orthography, studies on spelling errors in the alphasyllabary writing system and the home language and literacy environment. The literature review identified that writing development is a complex process that depends on the writer's ability to utilise other language areas. Previous research studies on languages in the alphasyllabary writing system, especially Thai, have only assessed the contribution of spelling errors in writing. The current study addresses this gap by replicating the spelling analysis and going further to analyse understudied areas such as word count, idea units, and space knowledge. In addition, the current study also examines the home language environment through asking parents a series of open-ended questions.

The study examines the following three research questions:

1. Referring to the Thai children's writing samples:
    a. What are the word counts, spelling errors, idea units, and space knowledge of children who are in year 3, year 4, year 5 and year 6?
    b. What is similar and different in word count, spelling errors, idea units, and space knowledge for children who are in year 3 versus year 4 versus year 5 versus year 6?
2. What are the associations between reported home language and literacy environment and children's word count, spelling errors, idea units, and space knowledge?

CHAPTER 3: METHODOLOGY

3.1 Aims

The primary aim of this study was to explore children's Thai language development through an error analysis of writing samples. A secondary aim of the study was to analyse the children's Home Language and Literacy Environment (HLLE) through a parent survey, with special focus on three attributes: the home environment, parents report on child's Thai knowledge and ways parents could help their child with Thai learning.

3.2 Research Design

The study employed a mixed-methods design aiming to investigate various aspects of Thai writing of primary school children in Thailand, and the association between these and the home environment. A mixed method design allows for the intentional combining and integration of qualitative and quantitative approaches with triangulation. The purpose of triangulation is to understand the research question by gaining different, but complementary data on the same matter (Creswell & Plano Clark, 2006). The triangulation design used is the convergence model, which suggests that the qualitative and quantitative data are collected and analysed separately, and then during interpretation, the results are converged (Creswell & Plano Clark, 2006). In this study, the data was predominantly quantitative with the addition of qualitative open-ended questions in the parent survey to expand and interpret on the quantitative findings of the study. The quantitative and qualitative data were collected simultaneously.

3.3 Research Questions

1. Referring to the Thai children's writing samples:
    a. What are the word counts, spelling errors, idea units, and space knowledge of children who are more-skilled and less-skilled spellers?
    b. What is similar and different in word count, spelling errors, idea units, and space knowledge for children who are more-skilled spellers versus less-skilled spellers?
2. What are the associations between reported home language and literacy environments and children's word count, spelling errors, idea units, and space knowledge?

Due to the nature and missing data collected, the analysis for the first research question needed to be changed from differentiating children between year level (year 3 versus year 4 versus year 5 versus year 6) to differentiating children on a continuum of spelling skill (more-skilled versus less-skilled).

3.4 Recruitment

Recruitment efforts were initially organized around directly contacting the Head of Elementary of international schools in Bangkok, Thailand. However, due to the indefinite closure of schools, snowball sampling with the researchers' personal contacts was used to recruit parents and children between the ages of eight and eleven. This group of children was selected because they are developing their knowledge from reading and writing Thai from spaced to unspaced texts. Six participants were recruited directly from the researcher's pre-existing contacts. The remaining participants were recruited through Whatsapp and LINE messages, which are applications for instant communication. The researcher sent a short description of the study (Appendix B) along with an information sheet that entailed a detailed description of the study and the consent form (Appendix C) to parents. The information sheet consisted of information about the child's writing samples and the parent HLLE survey. The consent form allowed parents to select which aspect of the research they would like to participate in. The researcher also developed a supplemental parent information sheet (Appendix D) and a child assent form (Appendix E) that was sent to parents who provided consent to participate in the research.

3.5 Participants

The study focused on year 3 to year 6 Thai nationality children enrolled in international schools in Thailand. In Thailand, it is mandatory for all children registered as Thai nationals to take Thai as a language in international schools. To be included in the sample for the research, the participating child fulfilled the criterion of taking Thai as a native language and not as a second language.

A total of 30 parents (32 children) gave consent to provide their child's writing samples and out of the 30 parents, 26 provided consent to take the HLLE survey. Writing samples were received from 32 children across seven international schools in Thailand, six of which were in Bangkok. One child was removed from the analysis as they did not meet the requirement for the minimum word count in available writing samples. The final sample consisted of 22 girls and nine boys, ranging from 8 to 11 years (M= 9 years, 3 months).

Twenty-six parents provided consent to fill out the HLLE survey, but only 20 responses (74%) were received. Two responses were from one parent as they had two children participating in this research. Of the 19 parents, 16 (84%) were mothers and 3 (16%) were fathers. From parent reports, all speak Thai, 18 read Thai and 15 write Thai. However, the level of proficiency of each language aspect was not reported. According to parent

reports, on average, children started speaking Thai at 2.3 years, reading Thai at 5.5 years and writing Thai at 5.9 years. The languages spoken at home vary at an individual level. In some households, only one language is spoken, while in other households, up to four languages are spoken. Three households did not speak Thai at home, instead, the spoken language was either only English or English and Hindi.

Table 1

Demographic Information from the HLLE survey (N=19)

Languages Spoken at Home	Frequency	Percentage
Thai	16	38.10
English	14	33.33
Hindi	6	14.29
Punjabi	5	11.90
Mandarin	1	2.38
Cantonese	0	-
Other	0	-

Note: Parent of the two participating children has been counted as one because they live in the same household.

3.6 Assessment Tools

Child performance data came from a portfolio of written samples from participating children. The writing samples included spontaneous samples from routine school activities. School activities ranged from copywriting to dictations, book reports and sentence writing to open-ended story writing. To be eligible for the study, each participating child needed a minimum of 60 words. The research also intended to include researcher-guided activities that teachers would have included in their routine classes. However, due to disruptions from the COVID-19 pandemic, this was not possible.

The barriers that online learning created were reflected in the portfolio of the writing samples. There was a total of 78 writing samples that were of copywriting. These samples were removed from the analysis as the purpose of copying is to see whether the child has developed the motor patterns for writing letters (Jiménez, 2018) and does not test the knowledge of the child. A total of 164 writing samples were analysed on two dimensions: word count and spelling errors. A subset of the writing samples (20 samples) was analysed for properties of narrative writing, including idea units and space knowledge.

To further check the impact of online learning on children written production, a thematic analysis was conducted on parents' opinions on how online learning has affected their children. Three themes emerged: Academic (teacher support, subject difficulty, method of delivery); Attitudes (motivation, interest); Home Environment (prompting factors, help from household members). While a few parents stated that online learning had not impacted their child's performance, the majority of the parents expressed that online learning has impacted the availability of teacher support and has slowed down the development of reading, vocabulary acquisition and writing in Thai. Parents also voiced that their child has shown a decline in their interest and motivation towards learning Thai. In some households, besides parents, other members in the house (caretaker/nanny, grandparents) assisted the child with Thai work.

3.6.1 Word Count

In Thai, there is an absence of explicit markers for sentence and word boundaries (Aroonmanakun, 2007), which makes it tricky to define what a *word* is. There are three types of Thai words: single words; compound words; complex words. For the purpose of this research, the segmentation of words was either as single words or compound words, depending on the context of the sentence. Simple words consist of one morpheme. Compound words are words with two or more morphemes and the definition of a compound word is "different from the sum of the meaning from its parts" (Aroonmanakun, 2007, p. 2). This is because a compound word impacts the meaning and context of a sentence, for example:

> ถุงเท้า / tŭng táo/ (socks) can refer to either a single word, or two separate words ถุง / tŭng/ (bag) and เท้า /táo (foot).

The combined word is different in meaning to the meanings of its individual counterparts and reading the compound word as two single words affects the meaning of a sentence. Hence, single words and compound words will be counted based on the sentential context (Winskel et al., 2017).

3.6.2 Spelling Errors

For spelling, well developed orthographic knowledge is required (Winskel & Iemwanthong, 2010). A coding scheme for spelling errors can help capture the sophistication

in children spelling attempts (Tangel & Blachman, 1992). Following Winskel (2010), the features associated with spelling development in Thai are summarised as follows:

Phoneme-Grapheme Mapping. Thai vowels have consistent phoneme-grapheme mapping despite complexity in their visual expression (Winskel, 2013; Winskel & Ratitamkul, 2019). On the other hand, Thai consonants are not as consistent because of the presence of homophonous consonants. Homophonous consonants "provide alternative spellings for the same phoneme, and hence constitute a potential source for spelling errors in Thai children" (Winskel, 2010, p. 9). Other potential spelling errors are when consonants occur in the final position as there is a change in the phoneme-grapheme mapping and when there is a silent final consonant. The silent final consonant does not produce a sound in speech but is represented in writing.

Spoken Language Effects. Phonological knowledge is related to spelling success (Tangel & Blachman, 1992). In everyday Thai spoken language, the sounds of /r/ and /l/ often get swapped, for example ลม /lom/ (wind) becomes รม /rom/. This phonological confusion may be reflected in the child's spelling errors.

Visually Similar Letters. Visually similar letters are confusing to young children (Winskel, 2010; Winskel & Iemwanthong, 2010). There are many Thai consonants and vowels that look visually similar, including some homophonous consonants. This may be problematic as the selection of incorrect homophonous consonant due to visual confusion changes the meaning of the word.

Suprasegmental Features. Suprasegmental features such as stress, tone and vowel length are psycholinguistically special (Treiman & Kessler, 2005; Winskel, 2010a) and are underrepresented in the Thai alphasyllabary writing system. To spell, a child must break the words into speech sounds and then select the orthographic unit that corresponds to that segment of sounds (Tangel & Blachman, 1992). The suprasegmental features tend to get lost in writing because children tend to spell words based on their pronunciation. When writing Thai, suprasegmental features can lead to class-change consonant errors, vowel length errors and tone mark errors.

These four features of Thai spelling development were used to create a coding scheme for spelling errors for this study. The coding scheme consisted of 31 subcategories of spelling errors which were divided into four general categories: consonant errors, vowel errors, tone errors and other errors.

3.6.2.1 Consonant Errors. There were 17 types of consonant errors which were divided into three categories: initial position consonant, final position consonant, and other consonant errors (Appendix I2).

1. Initial position consonant errors
    a. Initial Consonant Only
    b. Unrelated Initial Consonant
    c. Visually similar consonant
    d. Homophonous Consonant: The researcher adopted Heather Winskel's appendix of articulation to determine a homophonous consonant (Appendix H). A homophonous consonant can easily get mistaken for a visually similar consonant, but for this research, if the consonants errors were homophonous and similar, it was only coded as a homophonous consonant.
    e. Consonant Cluster
    f. Class-change cluster
    g. Omission of the Initial Consonant
2. Final Position Consonant Errors
    a. Substituted a final consonant
    b. Added a final consonant
    c. Omitted a final consonant
    d. Final-change consonant
    e. Final Silent consonant
3. Other Consonant Errors
    a. RL Confusion Error
    b. Added a consonant in the middle position
    c. Substituted the middle consonant
    d. Omitted a consonant in a middle position
    e. Wrote vowel instead of consonant

3.6.2.2 Vowel Errors. There were seven types of vowel errors (Appendix I3).

1. Vowel Omission
2. Vowel Substitutions
3. Vowel Length Errors
4. Visually Similar Vowels
5. Adding vowels:

6. Vowel above/below the wrong consonant
7. Reversed Vowel

3.6.2.3 Tone Marker Errors. There were five types of tone marker errors (Appendix I4).

1. Omission
2. Substitution
3. Added Tone
4. Tone above the incorrect Akson
5. Wrote vowel instead of tone

3.6.2.4 Other Errors. There were two types of 'other' errors. These were errors that did not fit into a segment type category (Appendix I5).

1. Unrelated words
2. English Words

3.6.3 Idea Units

Idea units were calculated to examine the unique propositions expressed in the writing samples identified as narrative writing (Puranik & AlOtaiba, 2012b). All these narrative writing samples were stories. Ideas were calculated as number of things/concepts that were presented in the stories. Ideas that were joined by conjunction were counted as separate ideas. The repetition of an idea was not counted.

3.6.4 Space Knowledge

Thai is a scriptio continua language and initial instruction of Thai is conducted with spaced text and then children move to unspaced text towards the end of Year 2 (Kasisopa et al., 2016). When a child puts a space between words in their Thai writing, it suggests that they acknowledge the linguistic unit is a word, but they have not yet begun to follow the writing systems specific convention of scriptio continua. For this research, space knowledge was calculated by counting the spaces between words. Those with more spaces between words would be considered as less developed in Thai space knowledge.

3.6.5 Home Language and Literacy Environment Survey

The survey had 23 questions in total, so to prevent parents from feeling overwhelmed, the survey was divided into four sections. The first section collected information from the parents on their kinship relation to the child, knowledge of Thai, child's gender, child's age, languages spoken at home and child's age when they started acquiring Thai. The second section collected information regarding adult literacy practices, books-at-home and home tutoring, designed based on HLLE dimensions identified in the Nag et al. (2018) systematic

review. The third section of the survey required parents to report their child's knowledge of the akshara. This required parents to report whether their child finds it difficult to recognize, write or spelling individual aksharas. Sixteen high frequency akshara and sixteen low frequency akshara were chosen from a frequency list reported in Aroonmanakun (2006). The last section of the survey was open-ended asking parents the ways they can help their children with Thai spelling errors, idea production for Thai narrative writing and Thai vocabulary development. There was also an open-ended question about how online learning has impacted the child's learning and understanding of Thai.

The Home Language and Literacy Environment (HLLE) parent survey was developed on the Qualtrics' online survey software and was designed to be both computer-friendly and mobile-friendly. While Qualtrics is General Data Protection Regulation (GDPR) compliant, parents were sent personal links to the survey via the secure university email. Instead of using names, each personal link corresponded to the unique alphanumeric code that matched the parent to the child.

3.7 Measures and Data Analytic Plan

3.7.1 Spelling Error and Word Count

Initially, the analysis was to be conducted by year group, but due to the small and unequal sample size per year group, the analysis was differentiated by spelling skills. Since there is an inconsistent phoneme-grapheme mapping of Thai consonants and consonant learning has been shown to be the most demanding for young learners (Kasisopa, 2011; Winskel, 2010b; Winskel & Iemwanthong, 2010c), spelling skill was established by conducting a split on the mean proportion of consonant errors to determine the highest and lowest quartile. Consonant errors included all consonant errors made by each participant (n=31,164 writing samples). The quartile was determined by a median value of 0.115. The differentiation of the sample on spelling skill compared one group of children who had 0.115 or fewer errors to a second group with 0.121 or more errors. The former group, called the more-skilled spellers, included three year 3, two year 4, five year 5 and six year 6. The less-skilled spellers group included six year 3's, three year 4's, three year 5's, three year 6's. Table 2 provides additional information about the more-skilled and less-skilled speller groups. The two groups did not differ significantly in age, $t(29)=1.39$, p=n.s.

Table 2

Mean Age and Proportion of Spelling Errors and Word Count (standard deviation) for More-Skilled and Less-Skilled Spellers

	More-Skilled Spellers	Less-Skilled Spellers
Age in years	9.73 (.98)	9.20 (1.13)
Proportion of spelling errors	.10 (.12)	1.32 (1.03)
Average Word Count	81.34 (68.08)	32.38 (14.49)

The assumptions of normality and homogeneity of variation were violated in this dataset. Because of this, multiple Mann-Whitney U tests were conducted to analyse the differences between the more-skilled and less-skilled spellers on segment type errors and other errors. A Mann-Whitney U test was also conducted to test the differences of more-skilled and less-skilled spellers on word count on the 164 writing samples.

3.7.2 Idea Units and Space Knowledge

The planned by-group analysis with the more-skilled and less-skilled groups was not possible for the idea units and space knowledge variables because of the small number of participants (N=13) with relevant writing samples. Instead, the researcher chose to look at associations between idea units and word count and space knowledge and word count.

Analyses of number of idea units and errors with space knowledge were conducted for a subset of the writing samples. Some children were dropped from the analysis because only a subset of the writing samples were a written story or narrative. The analyses were examined by the relationship with word count. Two separate Pearson product-moment correlation coefficients were conducted. The first between idea units and word count and the second between space knowledge and word count. Further analyses of the relationships between idea units and word count and between space knowledge and word count were conducted by using the Spearman partial correlation as it controls for the possible confound of year level.

3.7.3 HLLE Survey

The survey responses were analysed both quantitatively and qualitatively. Descriptive statistics were provided for the closed-ended questions and thematic analyses for the open-ended questions. A Spearman's Rho correlation and a point-biserial correlation were carried

out to see the association between aspects of the HLLE survey and spelling errors and word count.

3.8 Data Screening and Cleaning

The data screening and cleaning process involved two steps (Pallant, 2020). The first step required scanning the data to check for errors and the second step rectified the errors in the data file. Data screening and cleaning was conducted for every writing measure.

For the measure of spelling errors, the errors were coded against the spelling coding scheme (Appendix I). The researcher re-coded the spelling errors and compared them to the first round of coding to look for discrepancies. Most of the codes were identical. At this stage, the researcher decided to collapse two separate codes for consonant errors into one because both were coding for errors on visually similar consonants.

The measures of word count, idea units and space knowledge were examined in parallel. The researcher recounted the words in each writing sample and found a miscalculation for compound words. As described, 'words' were counted as either simple words or compound words, depending on the sentential context. Compared to the original data file, the total number of words for the first eight participants were slightly lesser in the second data file. There was a recurring mis-count of compound words as two separate words in the original data file. These coding lapses were resolved and corrected in the original data file. The number of ideas and number of spaces between words were recalculated and compared to the original coding. No discrepancies were found for the number of spaces between the original and second coding. However, for the number of ideas, there was a discrepancy in three writing samples, so the ideas were recounted and corrected in the original data file.

3.9 Inter-rater Reliability

The writing samples involved coding spelling errors and counting the words, idea units and spaces between words. The data involved a great deal of subjective judgement, so there needed to be another rater to check for the consistencies in the decisions (Bryman, 2016). The additional rater was a first-language Thai user with a master's degree in Thai Language and Literature and is currently a Thai language teacher at an international school in Bangkok, Thailand. They were asked to code for spelling errors, word count, idea units and space knowledge for 30% of the participants (n=10). The participants were chosen at random using Microsoft Excel's functions of RAND and INDEX. Prior to the coding process, the

rater was trained on the coding scheme. To check for inter-rater reliability, the rater was asked to place the code that corresponded to the type of error.

3.9.1 Spelling

The coding scheme for Thai spellings was constructed using Winskel's (2010) pre-existing codes and by identifying errors during a pilot survey. The coding scheme had 31 codes which allowed for a greater complexity to be captured (Syed Nelson, 2015). The researcher first provided the second-rater with a coding scheme that included the spelling error codes, the type of error and an example of an error that matched the code. The training session first involved the familiarization of the coding scheme through a detailed discussion of each code. During this time, questions regarding the coding scheme were answered. Next, the researcher and rater conducted an example coding from data that was not part of the randomly drawn 30%. A follow-up discussion was led to answer further questions. The rater found it difficult to differentiate between visually similar consonants and homophonous consonants because some homophonous consonants look similar, thus making the rater give two codes to one error. The researcher explained homophonous errors were only counted as homophonous consonants and not visually similar consonants. To help the rater distinguish what a homophonous consonant is, the researcher provided the rater with the appendix adapted from Winskel's (2010), which shows the articulation of the consonants. Once trained, the rater was to code independently.

Inter-rater agreement of categorical variables, such as coding the type of spelling errors in the present study, can be measured through Cohen's Kappa coefficient. The kappa coefficient indicates the degree of agreement between two raters (Cramer, 1998; Syed & Nelson, 2015). A kappa value of .81-1.0 is considered almost perfect (Landis & Koch, 1977). The kappa coefficient for codes for Thai spellings was .90, suggesting a strong to a near-perfect inter-rater agreement between raters. A discussion between the researcher and the rater was carried after the coding process for instances of no agreement. The second rater expressed confusion about determining the code for some spelling errors that could be considered consonant or vowel diphthong errors. The consonants of -อ, -ย, -ว paired with a vowel can function as a diphthong. The researcher and rater came to the consensus that the code will correspond to the correct spelling. For example, for the word เรา the child wrote เรว, thus replacing the final vowel า with the consonant ว. This error was coded as a vowel error, more specifically, a vowel substitution. The second rater also suggested collapsing two vowel codes (*'wrote vowel in reverse'* and *'wrote the head of ไก out")* into one code as the codes were coding for

the same error. The suggestion was accepted. After these discrepancies were resolved there was a perfect agreement between the researcher and the rater.

3.9.2 Word Count

The same rater provided the word count for each writing sample produced by the ten randomly chosen participants. Before the independent coding, the researcher first explained the definition of a *word* as operationalised in this research. Since the second-rater is a Thai language teacher, there was mutual understanding about identifying a simple word and a compound word based on the context of the sentence. Next, the researcher and rater practiced counting the number of words from a writing sample that was not part of the ten randomly chosen participants. Once trained, the rater was to code independently.

Inter-rater agreement for interval data, such as the word count, can be measured by the intra-class correlation (ICC). The ICC allows for a between-rater variance and an "estimation of the precision of the reliability coefficient" (Tinsley & Weiss, 1975). The ICC index for word count suggests excellent inter-rater agreement (ICC=.99)

3.9.3 Idea Units and Space Knowledge

Idea units and space knowledge were looked at for a subset of the writing samples. Four of the ten randomly selected participants provided samples that were considered as narrative writing. Across the four participants, there were six narrative writing samples. The rater was asked to count the ideas and space between words for the six writing samples. Before the coding process, the rater was trained. The rater expressed concerns about subjectivity when identifying ideas in a text. So, the researcher provided an idea inclusion and exclusion list to the rater. A discussion about the list was carried out and all queries were answered. The training for space knowledge was not extensive but involved the researcher and rater discussing the operationalization of space knowledge. The researcher reiterated that only spaces between words are counted, not spaces between sentences and phrases. The ICC index for idea units and space knowledge are .92 and .98, respectively, suggesting excellent inter-rater agreement.

3.10 External Validity

In addition to inter-rater reliability, the generalizability of word count needed to be considered, especially in relation to the cultural and socio-linguistic setting. In Thai, a *word* is difficult to define. For this research, words were counted as either a simple word or compound word depending on the sentential context. To support the way in which words are counted, words were checked using an online dictionary (thai-language.com/dict, Slayden,

1997). The researcher checked the word count for the same 30% randomly sampled participants. The word count produced by the second rater and the researcher reflected the words received from the dictionary.

3.11 Procedure

3.11.1 Pilot

As the writing measures and parent survey were developed specifically for this study, a pilot was conducted to assess the clarity of the coding scheme for each measure and whether the questions in the parent survey were understandable. The pilot was conducted with a child in year 7, which is secondary school. Even though the child did not reach the eligibility criteria for the research, the child had several narrative writing pieces, which allowed the researcher to assess the different measures in depth. Conducting the pilot allowed the researcher to identify spelling errors and create spelling codes that were not included in Winskel (2010). The child's mother was proficient in English and Thai, so she was asked to complete the survey. While there were no misspelt words in the survey, the format of the survey needed editing. The format was corrected before collecting data from participants. The pilot also enabled the researcher to establish how long the coding process takes for each writing sample.

3.11.2 Data Collection Procedure

The academic school year for international schools in Thailand begins in August. The researcher started collecting data in late May until the end of the academic school year (end June). Participants were first contacted via instant communication applications (Whatsapp and LINE), whereby they received information regarding the research and a consent form to be submitted to the researcher's email. An email with instructions on how to send the writing samples was sent to parents once completed consent forms were received (Appendix F). Since many parents did not have access to a scanning device, they could take images of their child's writing samples via their camera phone. Due to the closure of schools, many children did not have access to their writing journals, so the email stated that parents could send screenshots of writing samples submitted to the schoolteachers and photographic images of the hardcopy work. The email instructed parents to submit writing samples by replying to the email (N=32). After two weeks, a follow-up email was sent to only those parents who provided consent for the writing samples to be sent.

Regarding the parent survey, an email was sent to the parents who provided consent to complete the parent survey (Appendix G). After ten days, parents were sent another follow-up email reminding them to complete the survey (N=20).

3.12 Ethical Considerations

The present study adhered to the ethics guidelines outlined by the British Educational Research Association (2011), British Psychological Society's Code of Ethics and Conduct (2018) and British Psychological Society: Conducting Research on the Internet (2017). The research received ethics clearance through the University of Oxford's Central University Research Ethics Committee (Appendix J).

In addition, since participants were recruited via instant communication applications, such as Whatsapp and LINE, the research received approval and clearance to use the communication applications through the Data Protection Assessment (DPA) from the University of Oxford's data privacy committee (Appendix V and Appendix W). The DPA was completed to remain GDPR compliant as the University of Oxford has not conducted a formal assessment on the Third Party Security for Whatsapp. However, for LINE, personal data is stored on secure servers in Japan, which is deemed sufficient protection by the European Commission.

The use of snowball sampling and recruiting through personal contacts may add pressure on participants and their participation status, but all participants were informed of their voluntary consent and their ability to withdraw from the research at any time. Some parents expressed concerns about the anonymity of their child's identity as their child's level of proficiency in Thai was not good. The researcher reiterated to parents that all data will be confidential and names and personal information of the child are redacted from the sample. A general information sheet, approved by CUREC, was sent to parents, which provided an overview of the confidentiality of the research and ability to withdraw from the research at any point. Parents were also provided with a supplementary information sheet and children were required to fill-out an assent form.

3.12.1 Safeguarding and Confidentiality

Participants in the research were 8–11-year-old children. The researcher did not meet the children at any point of the research but has access to their writing samples. Their writing contained information that could identify who they were, including their name, their family members name and their photo, putting them in a vulnerable position. In these circumstances, the child's personal information was redacted prior to start of data analysis. All children were

given a unique alphanumeric code. Parents provided images of their child's written work via email. The email attachments were downloaded and secured on a password protected computer and on the secure university storage system (Nexus365 OneDrive).

Due to COVID-19 and the lockdown in Thailand, parents may have found it a burden to fill out a research survey. To reduce pressure to comply, after two reminders, the researcher considered the parent as not opting for the research. For confidentiality, each parent had a unique identifier that corresponded to their child's unique identifier (e.g., if the child's unique identifier was CD1, the parents' unique identifier would be P1). All survey answers were recorded digitally (via Qualtrics) and stored using encrypted files in the departmental-provided storage system (e.g. Nexus365 OneDrive) and on a password protected computer.

CHAPTER 4: RESULTS

The following chapter answers the research questions by presenting and analysing each writing construct in separate sections. The last section presents and analyses additional information about the home. The Statistical Package for Social Science (SPSS 27) was used for all data analysis of the study.

Section 4.1 reports the productivity in writing through word count between more-skilled spellers and less-skilled spellers. Section 4.2 reports the accuracy in writing through spelling errors between more-skilled spellers to less-skilled spellers. A similar analysis was not possible for idea units and space knowledge because of the reduced numbers of narrative writing samples across participants (N=13), instead, the researchers chose to look at the associations, which are reported in sections 4.3 and 4.4. The associations between the HLLE parent survey and the writing constructs were discussed within each section.

4.1 Word Count

The number of writing samples varied for each participant (Appendix K). To determine the total words written for each participant, the number of words per writing sample was counted and summed. To be eligible for the study, all participants had a minimum of 60 total words written. A total of 164 writing samples and 6,326 words were produced by 31 children. The writing samples ranged from a dictation list to book reviews to sentence writing to story writing, creating variability in word count across writing samples. To account for the variability in word count across writing samples, the average words written was calculated for each participant. For example, if a participant had nine writing samples and wrote a total of 148 words, the average words written would be 16.4. The mean, standard deviation and range are provided in Table 3. Less-skilled spellers produced more than twice the number of writing samples compared to more-skilled spellers, but the average words produced were higher for more-skilled spellers. The word count of more-skilled spellers (Mdn=58.3, n=16) were higher than those of less-skilled spellers (Mdn=28, n=15). A Mann-Whitney test indicated that the difference was statistically significant, U=61, z=-2.33, $p<0.05$, r=.42.

Table 3

Descriptive Statistics by Level of Spelling Skill and Total Words Written

Spelling Skill	n	Number of Writing Samples	Number of Words	M	SD	Range	
						Min	Max
Skilled Spellers	16	53	3055	81.34	68.08	13	251
Less-skilled Spellers	15	111	3271	32.38	14.49	14	64.70
Total	31	164	6326				

4.1.1 Associations between HLLE and Word Count

A Spearman's Rho correlation was used to analyse the associations between the Thai HLLE, including books-at-home, child activities and parent-child activities factors and the non-normally distributed average word count. The Thai HLLE factors were calculated as proportions from the total numbers for each participant. Non-significant low correlations were found between the average word count and the Thai HLLE variables of books-at-home and parent-child activities. A moderate significant correlation was found between average word count and child activities in Thai, suggesting that child-led activities in the home, such as watching tv/series, reading books and watching online videos, influence word count in school assignments.

Table 4

Spearman's Rho correlation of Average Word Count and Thai HLLE

	Average Word Count
Average Word Count	--
Thai Books at Home	.331
Child Activities in Thai	.560*
Parent- Child Activities in Thai	.403

Note. n=20. *p<.05.

Further analysis of a point-biserial correlation was used to analyse the association between the nominal HLLE variables and the interval variable of average word count (Appendix L). Parents were asked to report how they would assist their child in Thai writing. The five options were spelling, idea production, spacing, suggesting alternate words and

structuring the writing. If an option was selected by a parent, it was coded as a YES (1), if it was not selected, then it was coded as a NO (0). Non-significant and low correlations were found between average word count and techniques parents use to assist their child in writing Thai, suggesting that word count can be less or more no matter how much parents provide help.

4.2 Spelling Errors

Across 31 participants a total of 6,326 words were written and 688 spelling errors were identified. The errors were divided into four categories to represent the segment type errors (consonant, vowel, and tone) and other errors. Amongst the four categories, there were 31 subcategories of errors. The most frequent error type was tone errors (34.74%), followed by consonant errors (33.14%), vowel errors (24.27%) and other errors (7.85%). The mean proportions, standard deviations (SD) proportions, and range for total spelling error and each error type are provided in Table 5. The mean proportion of spelling errors was .69.

Table 5

Descriptive Statistics of Proportion of Errors by Error Rates for Consonant, Vowel, Tone and Other Errors

				Range	
	N	Mean	SD	Min	Max
Total Spelling Errors	31	.69	.94	0	119
Consonant Errors	31	.23	.33	0	35
Vowel Errors	31	.20	.31	0	36
Tone Errors	31	.20	.31	0	49
Other Errors	31	.07	.13	0	13

Table 6 provides descriptive statistics of the mean proportion and standard deviation proportion between spelling skill groups (more-skilled spellers and less-skilled spellers) for each error type. The statistics were calculated after accounting for the proportion of number and types of errors in each writing sample. The majority of the errors were made by less-skilled spellers (88.66%) and only a relatively small number were made by the more-skilled spellers (11.34%). The spelling performance of less-skilled spellers (*Mdn*=33, *n*=15) was higher than those of more-skilled spellers (*Mdn*=3.5, *n*=16). A Mann-Whitney test indicated that the difference was statistically significant, U=236.5, z=4.61, $p<0.05$, r=.83.

Table 6

Descriptive Statistics of Proportion of Errors by Error type and Level of Spelling Skill

Spelling Skill	Error Type	Mean	SD
Skilled Spellers	Consonant	.026	.032
(n=16)	Vowel	.028	.055
	Tone	.034	.042
	Other	.014	.046
	Total	**.099**	**.117**
Less-skilled Spellers	Consonant	.439	.372
(n=15)	Vowel	.375	.360
	Tone	.369	.375
	Other	.137	.162
	Total	**1.32**	**1.03**

Consonant Errors. The percentage of consonant errors for less-skilled spellers was 28.92% compared with 4.22% for more-skilled spellers. In relation to the substitution of initial position consonant errors, less-skilled spellers (13.23%) made more errors than more-skilled spellers (1.16%). Errors on the omission of initial consonants were slightly higher for less-skilled spellers (0.44%) compared to more-skilled spellers (0.15%). For final position consonants, the percentage of spelling errors on the substitution of an incorrect consonant, addition and omission of a final consonant were 2.33%, 1.02% and 0.44%, respectively, for less-skilled spellers and 1.16%, 0% and 0%, respectively for more-skilled spellers. Since there were words with more than three consonants, middle consonant errors were analysed between spelling skill groups. For middle position consonants, the percentage of spelling errors on the substitution of an incorrect consonant, addition, and omission of a middle consonant were 0.73%, 0.58% and 0.73%, respectively, for the less-skilled spellers and 0%, 0.15% and 0.15% for the more-skilled spellers.

Consonant Cluster Errors. For participants who were less-skilled spellers, consonant clusters (2.33%) and class-change clusters (2.76%) were more problematic than participants who were more-skilled spellers (0.29% and 0.15%, respectively).

Final-change Consonants and Final Silent Letter Consonant Error. Final-change consonants and final silent letter consonant errors were problematic for less-skilled spellers

(1.16% and 1.16%, respectively) compared to more-skilled spellers (0.44% and 0.58%, respectively).

Phoneme Related RL Error. When spelling, less-skilled spellers (1.31%) tended to confuse *r* and *l* letters more than more-skilled spellers (0%).

All the consonant errors were added, and a Mann-Whitney U test demonstrated a significant difference in consonant errors between less-skilled spellers and more-skilled spellers, $U=239$, $z=4.73$, $p<0.05$, $r=0.85$.

Vowel Errors. Similar to consonant errors, vowel errors were more frequent in less-skilled spellers (21.37%) than more-skilled spellers (2.91%). The percentages for vowel omission, substitutions and additions were higher for less-skilled spellers (3.92%, 5.23%, and 2.62, respectively) than more-skilled spellers (0.73%, 0.29%, and 0.58%, respectively). Vowel length errors and visually similar vowels also posed as problematic for participants who were less-skilled spellers (5.09% and 1.45%, respectively) compared to more-skilled spellers (0.44% and 0.73%, respectively). Less-skilled spellers wrote vowels in the reverse form more frequently than more-skilled spellers, 1.45% and 0.15%, respectively. Less-skilled spellers also tended to write vowels above the incorrect consonant (1.60%). A Mann-Whitney U test demonstrates a significant difference in vowel errors between less-skilled spellers and more-skilled spellers, $U=231$, $z=4.42$, $p<0.05$, $r=0.79$.

Tone Marker Errors. Tone marker errors were the most frequent errors for less-skilled spellers (31.10%) and more-skilled spellers (3.63%). Participants who were less-skilled spellers tended to omit (17.59%), substitute (4.80%) or add a tone marker (4.65%). In comparison, skilled spellers tended to omit (1.60%), substitute (1.16%) or add a tone marker (0.58%). Out of the 31 error types, tone marker omissions were the most frequent errors made by less-skilled and more-skilled spellers. Other tone marker errors made by more-skilled and less-skilled spellers were placing the tone marker above the incorrect akson (0.15% and 2.91%, respectively) and writing a vowel instead of tone (0.15% and 1.16%, respectively). A Mann-Whitney U test demonstrated a significant difference in tone marker errors between less-skilled spellers and more-skilled spellers, $U=219.5$, $z=3.95$, $p<0.05$, $r=0.71$.

Other Errors. Other errors were errors that did not fit into the segment type errors. These errors included unrelated words and English words. Less-skilled spellers (7.27%) tended to make more other errors than more-skilled spellers (0.58%). Unrelated word errors were considered as whole word substitution. The percentage of errors on unrelated words and English words were 5.38% as compared with 1.89%, respectively, for less-skilled

spellers and 0.29% as compared with 0.29% for more-skilled spellers. A Mann-Whitney test demonstrated a significant difference in other errors between less-skilled spellers and more-skilled spellers, U=187, z=3.02, p<0.05, r=0.54.

4.2.1 Association between HLLE and Spelling Error

Parent Reports. A component of the HLLE survey asked parents to report their child's knowledge of the Thai aksharas (consonant, vowel and diphthong, tone marker). Parents reported whether their children had difficulty in either recognizing, writing or spelling the aksharas. According to parents, children have more difficulty in spelling (50.93%) than recognizing (35.69%) and writing (13.38%) aksharas.

Table 7

Percentage of Parents Reporting the Difficulty in Recognizing, Writing and Spelling High and Low Frequency aksharas

	High Frequency	**Low Frequency**
Recognise	4.09%	31.60%
Write	3.35%	10.04%
Spell	15.24%	35.69%

Note: Differences between high and low frequency aksharas were evident as parents reported that children had more trouble recognizing, writing and spelling low frequency aksharas (77.32%) than high frequency aksharas (22.68%), suggesting that the akshara frequency list by Aroonmanakun (2006) still presents high/low frequency aksharas accurately.

For spelling, 19 of the 22 consonants, all seven vowels and diphthong and three tone markers were reported to be difficult for children. As reported by either seven or eight parents, the consonants that appeared to be problematic for children were ฐ /th/, ฎ /d/, ฏ /t/, ฟ /f/, ฝ /f/, ฮ /h/ and ญ /j/, which are consonants from the low frequency list. From the high frequency consonant aksharas, three parents reported ร /r/ and น /n/ and two parents reported ย /j/ and ว /w/ to be difficult for their child when spelling. The vowels and diphthongs that were problematic for children were ฤ and –ั. The diphthong ฤ is a low frequency akshara, while the vowel –ั is a high frequency akshara. The vowel –ั /a/ is usually paired with a consonant, such as -ัว /w/ or -ัย /j/, to form a diphthong. From the four high frequency vowels, two are long vowels _า /a:/ and –ี/i:/ and according to four and three parents,

respectively children tend to make mistakes when using these vowels. Three of the four tone markers were presented on the list of aksharas (-่, –้ and –๊) and all three tone markers were reported as difficult to spell for children.

For recognizing, according to parent reports, all the low frequency aksharas were difficult to recognize, specifically the consonants, ฐ /th/ and ฒ /th/, ฎ /d/, and ฏ /t/, diphthong ฤ and tone marker –๊. For the high frequency aksharas, the tone marker –้ seemed to be the most problematic for children to recognise.

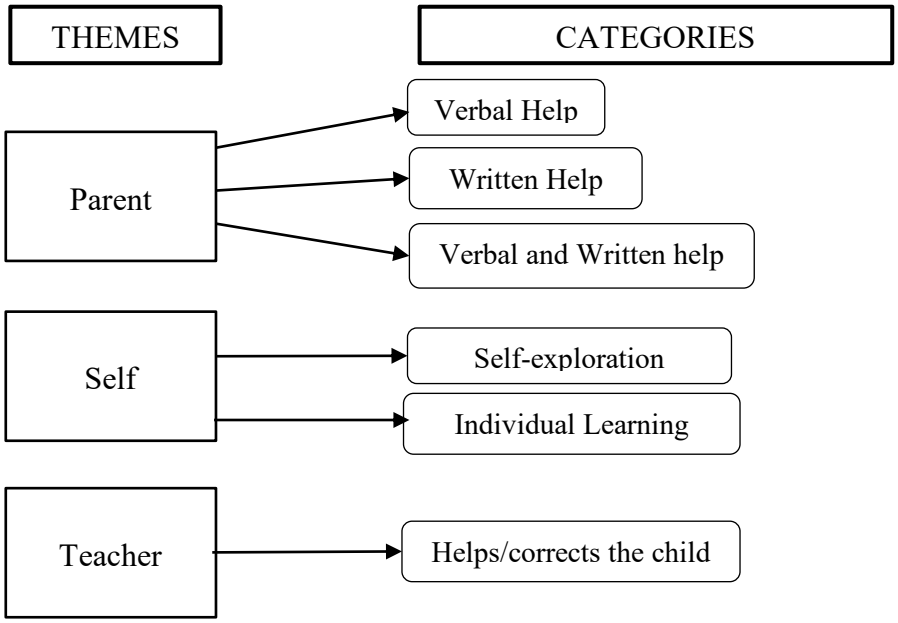
For writing, parents reported that children have difficulty writing all the low frequency aksharas except for the consonant ช /s/. As for the high frequency aksharas, vowels were reported as difficult to write, specifically –ั and –ี.

Parental Assistance. Along with reporting the child's knowledge of the aksharas, parents also reported how they would assist their child in Thai writing skills. Eleven parents reported that they would check their child's spelling. From the 11 parents, seven were parents of children who were less-skilled spellers.

Another component of the survey asked parents how they would help their child correct a spelling mistake if their child wrote ดึม instead of ดื่ม (the child substituted an incorrect vowel and omitted the tone marker). Three themes emerged from the thematic analysis: parental assistance, self-guidance, and teacher assistance (Figure 1). Parental assistance involved either verbal help, written help or both verbal and written help. Self-guidance referred to the child learning and exploring mistakes on their own without any help from their parents. A few parents expressed that it is the teacher's role to help their child in identifying and correcting the spelling mistakes.

Figure 1

Thematic Analysis Themes and Categories for Assistance on Spelling Error



Note. Thematic analyses throughout have figures. This is the first figure, the rest are in appendix O.

From the 20 responses, four were either left blank or the answer was not related to question (i.e., parents wrote "yes", "sometimes"). Seven parents would offer their child verbal help, such as pronouncing the word by breaking it up into subunits: *"I would pronounce for her* ด *อือ* มอ *ดึม ไม้เอก ดื่ม" (A mother of a Year 3 student)*. Two parents would offer their child written help: *"I will show them how to write it" (A mother of a Year 4 student)*. Three parents would offer both verbal and written "*I will write the collect word , explain the meaning of ดื่ม then tell her to read and write it out." (A mother of a Year 4 student)*. Two parents reported that they will let their child fix the spelling error on their own. One parent expressed that it is the teacher's role to help their child with spelling errors.

Correlation Analyses. Spearman's Rho was used to analyse the relationships between non-normally distributed mean proportion of total spelling error and Thai HLLE factors, including books-at-home, child activities and parent-child activities (Appendix M1). Non-significant low correlations were found between the total spelling error rate and the Thai HLLE variables. However, between the home environment factors there was high significant correlations were found between the types of Thai books-at-home and child activities in Thai and between the types of Thai books-at-home and parent-child activities in Thai. A high significant correlation was also found between child activities in Thai and parent-child

activities in Thai. The findings suggest that the types of Thai books-at-home influences the activities conducted in Thai. Also, child-led activities and parent-child activities in Thai influence one another.

A point-biserial correlation was used to analyse the association between the nominal HLLE variables, including spelling, idea production, spacing, suggesting alternate words and structuring the writing and the interval variable of total spelling error rate (Appendix M2). Non-significant low and negative correlations were found between the total spelling error rate and techniques parents use to assist their child in Writing Thai. Moderate significant correlations were found between parents assisting with spelling and spacing and parents assisting with spelling and structuring the writing. Moderate significant correlations were also found between parents helping with the structure and spacing and parents helping with structure and suggesting alternative words. A high significant correlation was found between parents helping with idea production and suggesting alternate words. The findings suggest that parents assisting children in one aspect of writing influences the assistance of another aspect of writing. However, the parent assistance in writing does not influence the spelling errors.

4.3 Idea Units

The planned research question of analysing the data between spelling skills was not possible using a parametric test for the idea unit variable because of the small number of participants (N=13) and writing samples. Instead, the researcher chose to look at associations between idea units and word count. Across 20 writing samples, there were 204 idea units. The number of idea units ranged from five to 21 ideas. The relationship between idea units and word count was investigated using Pearson product-moment correlation coefficient for the 20 writing samples. There was a strong, positive correlation between word count and idea units, $r=.835$, $n= 20$, $p<.001$, which was statistically significant.

Table 8

Descriptive Statistics for Idea Units and Word Count (N=13)

			Range	
	M	SD	Min	Max
Idea Units	10.20	4.41	5	21
Word Count	108.10	60.97	33	255

Spearman's Partial Correlation. There was strong, positive, partial correlation between word count and idea units, after controlling for year level, r=.72, df=17, p< .05, which was statistically significant.

4.3.1 Association between HLLE and Idea Units

Parents were asked about how they would assist their child in their Thai writing skills. From the twenty parents, ten reported that they would assist their child by providing ideas. Furthermore, an open-ended question asked parents how they would help their child come up with ideas for story writing based on a picture. Three themes emerged from the thematic analysis: parental help, teacher help and self-help (Appendix O1). Parental help involved brainstorming and scaffolding with the child. From the 20 responses, one response was blank. One parent reported that it is the teacher's responsibility to help the child with such activities. Five parents identified that their children do not require help and prefer igniting ideas on their own from their surroundings. Thirteen responses were related to parents helping their child:

> *"First, I would ask them to identify what they see in the details of the image. Going on further, I would ask them about their thoughts regarding the picture and provide them basic prompts/questions to help them uncover these thoughts. The last step would be to give them perhaps a basic structure of how they can articulate their thoughts and ideas into a story that flows well."*
>
> *(A mother of Year 5 student)*

4.4 Space Knowledge

The planned research question of analysing space knowledge between spelling skills was not possible because of the small number of participants and writing samples. Instead, the researcher chose to look at associations between space knowledge and word count. Space knowledge was operationalized by the number of spaces between words. Across 20 writing samples, there were 96 spaces between words. The number of spaces ranged zero to 12. The relationship between space knowledge and word count was investigated using Pearson product-moment correlation coefficient for the 20 writing samples. There was a weak, positive correlation between word count and idea units, r=.098, n= 20, p=n.s., which was not statistically significant.

Table 9

Descriptive Statistics for Space Knowledge and Word Count (N=13)

			Range	
	M	SD	Min	Max
Space knowledge	4.80	3.79	0	12
Word Count	108.10	60.97	33	255

Spearman's Partial Correlation. There was weak, negative, partial correlation between word count and space knowledge, after controlling for year level, r=-.17, df=17, p=n.s.

4.4.1 Association between the HLLE and Space Knowledge

Parents were asked about how they would assist their child in their Thai writing skills and four reported that they would assist their child with the spacing of sentence and phrases.

4.5 Addition Information about the Home

The section analyses additional results from the HLLE parent survey (N=20), with a focus on the Thai HLLE. The results are separated in four sections- i) home-school connections, ii) books-at-home, iii) home tutoring, iv) adult literacy practices.

4.5.1 Home-School Connections

Parent Involvement. On a four-point Likert Scale, parents reported how involved they are in helping their child with their Thai homework. Most parents reported that they are *moderately* (35%) involved in helping their child followed by *very* involved (25%), *slightly* involved (25%), then *not at all* involved (15%). Parents were also asked to report whether they attend parent-teacher conferences with their child's Thai school teacher. From the 20 parents, only three said that they do not attend the conferences. Two of the three parents that do not attend parent-teacher conferences are *slightly* involved in helping their child with Thai homework, while the third parent is *not at all* involved in helping their child with their Thai homework.

Code Switching. On a five-point Likert Scale, parents reported how often they switch their language between Thai and English, when conversing with their child. There was variability in the responses. Most parents reported that they *rarely* (35%) switch between languages, followed by *often* (30%) and *sometimes* (25%). One parent said that they always switch between languages and one parent said that they never switch between languages.

Child Activities. The activities listed were everyday activities that children might partake in, including reading books, watching tv, listening to music and watching online videos (Appendix P). According to parents' report, children are equally inclined to read books (26.44%) and watch tv (26.44%). The most frequent activity conducted in Thai was watching TV followed by reading books, watching online videos and listening to music. However, majority of the activities were conducted in English (64.37%) followed by Thai (29.89%). Ten of the twenty children did not conduct any activities in Thai.

4.5.2 Books-at-Home

Parents reported the type of prints at home based on the languages that were spoken at home (Appendix Q). Overall, English prints (53.55%) had the highest frequency, followed by Thai prints (41.23), Punjabi prints (2.37%), Mandarin prints (1.90%) and Hindi prints (0.95%). From the ten print types, the most frequent print at home was books from school (15.17%).Thai books from school had the highest frequency from all types of prints. The print with the second highest frequency were books owned (13.27%), with English books having the highest frequency. The prints with the lowest frequency were Holy Books (6.16%) and Newspapers (6.64%). Additionally, the parent with two participating children reported having English *Letters* in their household (0.95%).

In households the prevalent Thai prints were books owned, books from school, information pamphlets, magazines, calendars and workbooks. However, there was variability in the individual households as the range of Thai books-at-home was from zero to ten. The three households with zero types of Thai books at home, did not speak Thai at home. The household with ten types of Thai books-at-home spoke three languages in their household (English, Thai and Mandarin). From the 17 households that have Thai books at home, four did not own Thai books and one did not have any Thai books from school.

4.5.3 Home Tutoring

Paid Home Tutoring. Parents reported whether their child received paid Thai home tutoring (Appendix S). Eleven parents reported that their child does not receive paid home tutoring, while nine parents reported that their child does receive paid home tutoring. The duration and frequency for the home tutoring varied. Five of the nine parents reported that their child receives one hour of tutoring per week, three parents reported that their child receives between one to two hours of tutoring per week and one parent reported that their child receives three hours of tutoring per week.

Household Members. Other than parents, grandparents (27.50%) and caretakers/nanny (27.50%) provide the highest exposure of the Thai language to the participants. These results were supported through the open-ended question about how online learning has affected the child's learning and understanding of Thai. The common theme of receiving help from household members was identified and two parents explicitly stated their Thai speaking nanny helps the child when any issues in schoolwork: *"Her speaking has actually improved a lot as she has more time with the nanny (thai speaking)" (A mother of a Year 3 student)*. Siblings (20%) and household employees (12.50%) also provide exposure to the Thai language. Additional responses of household members that provide exposure to the Thai language include a driver (10%) and friends and neighbours (2.50%).

Parental Assistance for Vocabulary Development. Along with asking parents how they would help their child with correcting spelling errors and producing ideas for a story, parents were also asked how they would help their child learn new words, especially if they use words such as, ที่ /têe/ (to), การ /gaan/ (action), ใน /nai/ (in), และ /láe/ (and), มี /mee/ ([to] have) frequently in their writing. A thematic analysis revealed three overarching themes (parental help, self-help, teacher help) with further categories in each theme (Appendix O2). Twelve parents reported that they would help their child through suggesting alternate words, speaking to them more and reading books. Some parents also reported that speaking to their child will allow their child to visualize different words in a broader context, thus remembering the words for future use. Four parents reported that they do not help their child as it might make them feel incapable and instead the child will learn from their own mistakes. However, from the four parents who reported that they would not help their child, two parents selected the option of assisting their child in Thai writing by suggesting alternative words (Section 4.5.4). These finding contradicts one another, suggesting that additional analysis is required. The remaining parents reported that it is the school's responsibility to help their child with vocabulary development.

4.5.4 Adult Literacy Practices

Parent-Child Activities. Parents were given the option to select the type of activity they conduct with their child and the language they conduct them in (Appendix R). From the five activity options, most parents reported to provide their child help with school homework (29.11%) followed by telling stories (24.05%), then reading books child (22.78). The activities parents would least partake in was singing religious songs (12.66%) and reciting

rhymes. Parent and child activities were conducted mostly in English (54.43%) followed by Thai (34.18%). From the 20 parents, eight do not conduct any activities in Thai.

Parent Assist in Thai Writing. Parents were provided with five options on how they would assist their child with Thai writing. Most parents reported that they would help their child by *checking spelling* (28.95%) and *providing ideas* (26.32%). Followed by, *suggesting alternative words* (21.05%), *assisting in the structure of writing* (13.16%), and *assisting in the spacing of sentences* (10.53%). Parents provided other options on how they assist their child including helping with pronunciation, reading the homework instructions, and explaining the child what they need to do. From 20 parents, five parents said that they wouldn't be assisting their child. Instead, two of the five parents said they would hire a qualified tutor and another two said that the other parent would assist their child with their writing. One parent left all the options blank.

CHAPTER 5: DISCUSSION

The study aimed to explore Thai writing development of Thai-English bilingual children in international schools through an error analysis of factors that make up the translation phase of writing. Main statistical analysis focused on whether there was a difference between spelling skills and the type of spelling errors (segment type and other errors) and between spelling skills and word count. Additional analysis on the writing samples focused on the relationship between word count and narrative writing factors, such as idea units and space knowledge. The supplementary aim of the study was to explore the association between home language and literacy environment (HLLE) and child's writing development through the errors made. The HLLE survey included dimensions of the books-at-home, paid home tutoring and adult literacy practices. The survey also included the unique aspect of parents report of child's knowledge on the Thai aksharas and open-ended questions on how parents would assist their child in writing properties, such as spelling, idea production, vocabulary development.

The following research questions will be addressed in the discussion:

1. Referring to the Thai children's writing samples:
    a. What are the word counts, spelling errors, idea units, and space knowledge of children who are more-skilled and less-skilled spellers?
    b. What is similar and different in word count, spelling errors, idea units, and space knowledge for children who are more-skilled spellers versus less-skilled spellers?
2. What are the associations between reported home language and literacy environments and children's word count, spelling errors, idea units, and space knowledge?

5.1 Interpretation of the Findings

5.1.1 Word Count

Word count is a measure of productivity and fluency in writing (Lam & McBride, 2018; Puranik et al., 2008). In the study, the average word count was higher for more-skilled spellers compared to less-skilled spellers. The significant difference between spelling skills and average word counts suggests that the length and quality of the child's written composition are related to their spelling ability (Berninger et al., 1992; Puranik & AlOtaiba, 2012). Children who are less-skilled spellers have poor orthographic knowledge making them

use more mental resources when shifting from transcription to text-generation processes, affecting the quality of their writing. Children fluent in writing have a precise representation of the word and can retrieve orthographic units from memory activity. This could free up resources needed for processes such as planning and composing, which are necessary for children in primary school as they are moving from word to sentence level of writing at a rapid rate (Jiménez, 2018; Lam & McBride, 2018).

5.1.1.1 Associations between HLLE and Word Count. Correlation analysis showed a significant moderate correlation between the child activities in Thai and average word count, suggesting that the child independent activities in the home are associated with the productivity of writing.

Additionally, children with an extensive vocabulary bank could write more words, resulting in greater writing production and longer written texts (Puranik et al., 2008). The current study did not analyse vocabulary in children's writing, but through parent reports, the majority of the parents stated that they would assist their child with vocabulary development by providing new/alternative words, letting their child read more and engaging in more conversations with their child. Promoting shared book reading increases dialogue between parent and child, leading to improved vocabulary (Ijalba, 2015; Puranik et al., 2018). The dialogue is communicated in the writing system. So, further research can explore the type/token ratio in the child's writing to measure the lexical diversity and help understand the richness of vocabulary in writing.

5.1.2 Spelling Errors

A significant difference was found between more-skilled and less-skilled spellers for the total spelling error rate. After accounting for the type and number of errors against the word count for each writing sample, the results showed that consonant errors had the highest mean proportion error rate followed by vowel errors, tone marker errors and other errors. The finding is consistent with previous literature stating that more Thai consonant errors will arise because of their phoneme to grapheme mapping inconsistencies.

Consonants. Consonant errors were significantly different between the more-skilled and less-skilled spellers. The substitution of the initial consonant made up the most errors for both spelling skill groups, especially for the less-skilled speller group. These errors included unrelated initial errors, visually similar consonants and homophonous consonants. The errors rates for visually similar consonants and homophonous consonants were similar for less-skilled spellers. Homophonous consonants have an inconsistent phoneme-grapheme mapping.

They provide alternative spellings for the same sound and have multiple consonants that look visually similar, which may confuse a child with poor spelling development (Winskel, 2010; Winskel & Iemwanthong, 2010). Additionally, less-skilled spellers also made more substitutions of a final change consonant and omissions of a final silent consonant. Since there are only nine final consonant phonemes, the inconsistencies in phoneme to grapheme mapping for final consonant aksharas are feedback inconsistent, causing an alternative spelling for the same phoneme.

Spoken language effects are translated into writing. Compared to the more-skilled spellers, the less-skilled spellers tended to omit a consonant cluster and a class-change cluster. These errors arise due to the lack of knowledge in representing the segmentation of spoken language in a written form. The spoken language effects of the confusion of /r/ and /l/ consonants in everyday Thai dialect were more frequent in less-skilled spellers, but the phoneme RL related errors were made less than the other consonant errors.

In addition, the omission, substitution and addition of middle consonant aksharas were the least frequent consonant errors made by both more-skilled and less-skilled spellers, suggesting that the child was able to retrieve these orthographic representations effectively. The error of writing a vowel instead of consonant was only seen in less-skilled spellers and they may arise due to a misunderstanding as there are vowels that pair up with consonants to form a diphthong.

Unlike Winskel's (2010) study, the current study does not provide children with writing prompts or a dictation list, instead, the researcher collected and analysed pre-existing writing samples. However, the results of higher consonant errors than vowel errors parallel the findings from Winskel's (2010) research.

Vowels. There was a significant difference between more-skilled and less-skilled spellers on vowel errors. The vowel error rates for vowel substitutions and visually similar vowels were four times higher for less-skilled than more-skilled spellers. These errors are expected because of the complex graphemic representation of Thai vowels. Visually similar vowels are problematic for learners who have not grasped well-honed visual skills (Winskel, 2010). To spell words correctly, children must memorize the complex patterns of vowels, and children who are less-skilled in spelling have not developed the knowledge of graphemic representation, thus causing difficulty in retrieving and writing the vowels (Winskel & Iemwanthong, 2010).

Additionally, vowel length errors were the second most problematic vowel errors for less-skilled spellers. Literature suggests that this error is categorized as a suprasegmental feature because it conveys information about linguistic structures as children need to be aware of vowel accents. These phonological errors arise because beginning writers tend to pronounce words slowly while writing, causing the suprasegmental features to be lost (O'Brien et al., 2020; Winskel, 2010; Winskel et al., 2017). Finally, the results of the study suggested that the proportion of vowel error rates were lower than consonant errors rates, which is in line with previous literature stating that vowels are more consistent in their phoneme to grapheme mapping than consonants.

Tone marker. Tone marker errors were significantly different between more-skilled and less-skilled spellers. Tone marker omissions were the most frequent spelling error for both spelling skills. Tone marker substitutions and additions were more frequent in less-skilled than more-skilled spellers. Tone marker errors are phonological errors, and they are due to the suprasegmental features of tone. In Thai, tone determination is influenced by the class of initial consonants and vowel length. The different tone markers interact with consonant-class to produce particular tones realizations (Kasisopa et al., 2013; Winskel & Iemwanthong, 2010). The results for tone marker errors are expected as the substitution of the initial consonant and vowel length errors were amongst the most frequent errors children made, especially the less-skilled spellers.

The errors of writing the tone marker above the wrong akshara or writing a vowel instead of a tone marker demonstrates that children either still need to develop their knowledge of tone marker rules or the error may be a momentary slip as there was only a total of 30 errors.

Other. Other errors were significantly different between more-skilled and less-skilled spellers. The less-skilled spellers tended to write more unrelated words and English words. Writing an unrelated word may be due to a misunderstanding of the target word. Additionally, participants in the sample were either bilingual or multilingual so the replacement of a Thai word with an English word was not surprising, especially in less-skilled spellers.

Berninger's (2009) triple-word-form theory stated that all three linguistic types (phonological, orthographic and morphological) are necessary to spell correctly. In the current study, most of the errors were the substitution of consonants and vowels,

homophonous consonants, omission of a tone marker and vowel length. These errors constitute as phonological errors and concur with Winskel's and Iemwanthong's (2010) findings as they found that children from grade 1-3 were more likely to make phonological spelling errors most of which was due to homophonous consonants. The current study's findings also relate to O'Brien's (2020) research as most spelling errors for Tamil were phonological errors and Nag et al.'s (2010) research who found that at the intra-akshara level, spelling errors were attributed to phonological processing. The high error rate of phonological errors suggests that children "use phonemic information to build up akshara" (Nag et al., 2010, p.9). Similar to Nag et al. (2010), the current research observed that phonological errors were also due to visual factors, hence the orthographic errors of visually similar consonants and vowels were problematic for children of both spelling skills, especially for less-skilled spellers. In the current study, morphological errors were not as common as phonological errors. The main morphological error was the substitution of a homophonous consonant because while the akshara symbol was incorrect, the correct representation sound was preserved, but the meaning of the word was different.

5.1.2.1 Association between HLLE and Spelling Errors. Parent reports of their child's knowledge of Thai Aksharas showed that children have the most issues in spelling, followed by recognizing and writing the aksharas. For spelling, all segment types (consonants, vowel and tone) were difficult to spell, but children tend to make more mistakes when spelling low frequency compared to high frequency aksharas. Children's level of difficulty in recognizing and writing aksharas was lower than spelling, which means that parents acknowledge that their child has developed some level of skill in handwriting and recognizing individual aksharas. The recognition of Thai aksharas is important for reading and spelling words because Thai is a scriptio continua and individual words are recognized by analysing text boundaries. Children with low levels of akshara recognition will not only have difficulties reading but also writing because they will not be able to retrieve the akshara from memory effectively.

Moving from the letter production stage to the word production stage requires the development of transcription skills. To spell, children need to retrieve orthographic representation from memory and when this is underdeveloped, children are unable to represent spoken words into written symbols, leading to difficulties in spelling. The fact that all akshara symbols were reported as difficult to spell, suggests that spelling skill varies across children. Consonants that were reported as difficult to spell were homophonous: ข and

ษ /s/, ญ and ย /j/, ฒ and ฐ /th/, and ฟ and ฝ /f/. The aksharas of ฟ and ฝ /f/ are both homophonous and visually similar. Reporting difficulty in homophonous and visually similar aksharas align with errors found in the child's writing samples.

From parent reports, long vowels were the most difficult vowels to spell, which relates to the errors in the children's writing samples as vowel length errors were the second most problematic error for less-skilled spellers. Parents reported that children often make mistakes when spelling, recognizing and writing with all three tone markers. From the child's writing samples, tone marker omission was the highest for both more-skilled and less-skilled spellers. Parent reports of their child's knowledge of Thai akshara relate to the errors found in the writing samples, suggesting that parents have a grasp on their child's areas of difficulty.

Along with parent reports, parents expressed how they would help their child correct a spelling mistake that involved an omission of a tone marker and a vowel substitution. The majority of the parents suggested that they would help their child with this error by pronouncing the word for their child. Some parents wrote that they would break up the word into phonological subunits. Phoneme awareness is needed to perceive the word. A phonological error is due to incorrect representation of sounds, which include tones. In accordance with the writing samples, phonological errors were the most frequent type of errors made, so by parents helping with breaking up the word assists the child in selecting the symbol that corresponds to the segment of the sound (Tangel & Blachman, 1992)

Other parents said they would show their child how to spell the word and describe its meaning. The parent instructional strategy of look-listen-say-and-copy follows an approach that classrooms in low- and middle-income countries conduct (Nag et al., 2014, 2016). In addition, specific to writing in Thai, ten parents reported that they would assist their child with spelling. However, there was no significant correlation between spelling assistance and total spelling error rate, suggesting that no matter how much parents helped, it had little to no influence on spelling errors. Thus, when considering the association between the home environment and spelling, additional areas, such as the activities parents conducted to help their child with initial Thai handwriting and writing skill must be considered.

5.1.3 Idea Units

The relationship between word count and idea units was positive and strong, suggesting that children can translate their writing from word to sentence level. When writing, children must convert ideas into written form and the ability for children to move

from word to sentence level shows that once the foundational skills have been developed, children can divert their resources to text-generation and story writing processes (Puranik et al., 2008). Also, idea production is a measure of productivity in writing and involves linguistic and motor skills (Jiménez, 2018), so the fact that there is a positive correlation between idea units and word count suggests that children have developed their ability in writing. Translation skills are improved with age and the current study found that after controlling for year level, the strong and positive correlation between idea units and word count maintained. While the correlation was slightly lower, the significance suggests children in older year levels produce more words and ideas.

5.1.3.1 Association between HLLE and Idea Units. Most parents reported that they would help their child by brainstorming or creating a mindmap. A few parents mentioned that they would help their child by asking questions based on the picture. Conducting hands-on parent-child activities enriches the child's learning environment, allowing them to reach their full potential and develop texts with richer ideas (Fani & Ghaemi, 2011). While parents provided techniques to assist their child with idea production, only eight parents reported that they would help their child with idea production when writing Thai. The non-significant correlation between parents assisting their child with idea production and total spelling error rate and idea production and average word count, suggests parent assistance in idea production has little to no influence on the child's spelling errors and text length.

5.1.4 Space Knowledge

The relationship between word count and space knowledge was weak and non-significant. The finding remains after controlling for year level, except that the correlation is negative. Previous literature found that when children read Thai with inter-word spaces, the accuracy and speed of reading increased. Since space knowledge was only measured for a subset of the writing samples, it may not provide sufficient information to reflect the findings of space knowledge from children in year 3 to year 6. Further research is needed to see how the child develops their Thai writing knowledge from spaced to unspaced texts.

Findings from the parent survey found that only four of the 20 parents would assist their child in writing Thai by helping with the spacing of sentences, suggesting that additional information is needed on why some parents help their child with the spacing of sentences and why other parents do not.

5.1.5 Additional Information about the Home

Nag's (2010) three dimensions of the HLLE are books at home, home tutoring and adult literacy practices. The high significant and positive correlations between the aspects of Thai books-at-home and child activities in Thai, Thai books-at-home and parent-child activities in Thai, and child activities in Thai and parent-child activities in Thai, suggests that in households, having/doing one language or literacy aspect is associated with having/doing another language or literacy aspect. Whether a child attended paid home tutoring lessons varied, but there was no association between attending paid home tutoring and spelling error rate and average word count (Appendix S2).

Parents assisting their child with Thai writing factors such as spacing, suggesting alternate words and structuring was not significantly correlated with the child's total spelling error rate and average word count. This suggests that knowing whether the parents conduct activities with their child is not enough, additional information regarding the exposure and frequencies of the activities might be beneficial to discern an association.

5.2 Limitations

The current study has several limitations which must be addressed. First, due to COVID-19, the indefinite closure of schools in Thailand limited the number of participants recruited. Only 32 children were recruited in this study, some were through the researcher's personal contacts. The children attended different schools across Thailand, but all schools were private international schools. However, each international school had different curriculums (IB, AP, IGCSE), which might lead to differences in the Thai language curriculum, resulting in different teaching methods and pace of learning. The small sample size and widespread of international schools make the sample less representative, so caution must be applied when considering the transferability of the findings to a larger population.

In the present study, the association between the errors in the child's writing samples and HLLE survey was not fully captured. The correlation analyses for spelling errors and word count did not show meaning relationships and the analyses couldn't be done for idea units and space knowledge. Previous research showed that parental involvement such as shared book reading and joint writing activities increases communication between parents and children and improves children's writing skills (Ijalba, 2015; Puranik et al., 2018). The current study found that most homes owned Thai books and had Thai books from school, but there was no report of the frequencies and duration of parent-child activities. The lack of quantitative information does not truly grasp the home learning environment, limiting the connections between errors in the writing samples and HLLE.

The construction of the spelling error coding scheme was a mix of existing codes and new codes from piloted data. Once the coding scheme was generated, it was not extensively piloted prior to collecting data. While interrater reliability was high, only thirty percent of the spelling errors were coded. Another limitation was that errors could not be coded automatically, it required the researcher to go through the each spelling error and record the codes manually.

Another limitation of the research was the absence of uniform performance across participants. Given the current global pandemic, the researcher was unable to obtain a consistent writing sample from participants. Having one consistent writing sample across participants may have provided the researcher with a deeper understanding of the writing measures.

One final limitation to consider is the format of the survey. Parents response for languages spoken at home was carried to questions asking for the types of books-at-home, child activities, and parent-child activities. If parents did not speak Thai at home, but still had resources in Thai, the survey was not sufficient in capturing that.

5.3 Implication

The current error analysis provides researchers, parents, and teachers with information of Thai writing skills children between 8-11 years of age have difficulty in. The methodology of mixed methods allowed for a greater understanding of the evidence that links the errors in children's writing samples and home environment together. Significant results were found for spelling errors, word count and idea units and while there were slight associations between the writing constructs and the home environment, the results from this mixed methods study established a premise that writing development and home language and literacy environment should be further investigated with a larger sample.

In relation to educational research, home literacy environment and parent involvement have positively impacted the child's writing abilities. In the current study, child independent activities and parent-child activities were positively correlated, but the HLLE activities were not correlated to spelling error rate and word count. This may have been caused by the insufficient questions to capture Thai writing development in the survey. Previous research on the HLLE and its associations with writing development have focused on preschool children's writing skills and have looked at more specific activities that parents conduct to help their child with initial handwriting and writing skills (e.g., copy work, mother dictates, writing a grocery list, writing a letter; Puranik, 2018). While the current study did not discuss

these factors, parent reports on their child's knowledge of Thai aksharas provided information that parents are aware of their child's Thai difficulties and know ways to help them. However, Puranik and colleagues (2018) suggested that as children show more independence in language abilities, parents are more willing to let go of control of assisting with writing tasks. So, regarding the current research findings, while parents have provided ways to help, it is difficult to discern if they do help. In addition, since much of the school year was conducted at home through online learning, children may have received more help and assistance from household members and paid home tutors, which may have caused an inaccurate representation of the child's writing abilities.

5.4 Future Directions

To further develop the understanding between individual differences in writing development and HLLE, the researcher can conduct a semi-structured interview with parents. The interview will allow the researcher to ask parents about the survey responses to get a deeper understanding of the bilingual home environment and parent instructional strategy. Questions on the exposure, duration and frequencies of the HLLE attributes identified in Nag et al.'s systematic review (2018) are potential areas to examine. Additionally, parent involvement in school learning is impacted by parents' beliefs and expectations. The interview can target these themes through open-ended questions, so the researcher can ask follow-up questions based on parents' responses. Further themes that can be addressed during the interview are parents' relationships with teachers, resources at home and paid home tutoring techniques (Nag et al., 2018). In the current study, almost half the parents reported that their child receives paid home tutoring, so it would be interesting to know what the tutor teaches the child and the consistency the classes. For example, are the classes focused on helping the child with homework or building the child's skill in specific language areas and does the child learn every week or only when needed for school help. The transcription from the interview will allow the researcher to corroborate the findings with the survey responses.

Along with the home environment, it would be interesting to investigate the classroom environment through teacher interviews. The interview themes can revolve around classroom instructional practices, specifically focused on writing development. Since Thai does not have inter-word spaces, it would be interesting to see how teachers approach space knowledge. Additionally, questions regarding the homework will help differentiate what activities are done in class and at home and whether they relate to one another. Furthermore, after English and Thai, the most spoken languages at home were Hindi and Punjabi, so it can be assumed that children were from diverse backgrounds. Questions can revolve around the

student's environment, differences in Thai language development and how it impacts the teachers' beliefs and values of learning and teaching Thai.

Finally, using the findings from the home environment, classroom environment and child's writing samples, an intervention can be designed targeting both parents and teachers so that children can benefit in their writing development both at home and at school.

5.5 Conclusion

The current research investigated writing development of Thai -English bilinguals in internationals schools across Thailand and their home language and literacy environment. The research focused on factors that make up the translation processes of writing and results indicated that, on average, children who are less-skilled spellers acquire and retrieve orthographic units more poorly than more-skilled spellers, resulting in a higher spelling error rate and a lower average word count. As for the construct of idea production, results indicated that, text length and idea units influence one another, suggesting that once children have a solid foundation of transcription skills, they divert their resources to text-generation processes of writing. The construct of scriptio continua in writing development requires further inspection. The current research highlights the insights of the home environment in association with Thai writing development but acknowledges the limitations and the need for future research.

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Appendix A: Vowel Groups adopted from Kasisopa (2011)

Kasisopa (2011) placed vowel in ten groups based on the positioning of their components.

1) Preceding vowels:	เ_, แ_, โ_, ไ_, ใ_ (e.g. เข)
2) Following vowels:	_ะ, _า, _อ (e.g. ขา)
3) Upper vowels:	ิ, ี, ึ, ื (e.g. สี)
4) Lower vowels:	ุ, ู (e.g. หู)
5) Preceding plus following vowels:	เ_ะ, แ_ะ, เ_อ, โ_ะ, เ_า (e.g. เตะ)
6) Preceding plus two following vowels:	เ_อะ, เ_าะ (e.g. เลอะ)
7) Preceding, upper plus following vowels:	เ◌ีย, เ◌ือ (e.g. เรือ)
8) Preceding, upper plus two following vowels:	เ◌ียะ, เ◌ือะ (e.g. เกี๊ยะ)
9) Upper plus following vowels:	◌ัว, ◌ำ (e.g. คำ)
10) Upper plus two following vowel:	◌ัวะ (e.g. ลัวะ)

Reference: Kasisopa, B. (2011). *Reading Without Spaces Between Words: Eye Movements in Reading Thai*. P27

Appendix B: Initial Message Sent to Parent via Whatsapp and LINE communication applications

Dear Parent/Guardian,

My name is_____, I am a research student at the Department of Education, University of Oxford. I am writing to invite you and your child to take part in my research study about the quality and quantity of writing in Thai.

In summary, I will be compiling a portfolio of writing samples from children in Year 3/Grade 2 to Year 6/Grade 5 who are taking Thai as their first language. Attached is a document explaining the research project. If you would like to ask any questions about the project, please contact me.

I am also writing to ask whether you would be willing to pass along the enclosed information to friends and/or family members who may also be interested in participating in this research study. You are under no obligation to share this information and whether or not you share this information will not affect your relationship with me.

I hope you agree to participate in the study.

Thank you.

Email: [Researcher's email]

Appendix C: Parent/Guardian Information Sheet and Consent Form

Dear Parent/Guardian,

My name is ____, I am a research student at the Department of Education, University of Oxford. I have a Bachelor of Science Degree in Psychology from the University of Washington and am currently studying Child Development and Education for my MSc course. A more experience researcher,_____, who is an Associate Professor of Education and the Developing Child, is the main investigator of this project and she supervises my research. I am writing to invite you and your child to take part in my research study about the quality and quantity of writing in Thai. My research project's title is *Write or Wrong; An Analysis of Thai Children's Writing Samples.*

With your help, I will be compiling a portfolio of your child's writing samples. I have chosen year 3/grade 2 to year 6/grade 5 children because they are developing their knowledge of the Thai texts from reading and writing as spaced texts to unspaced texts. Due to the rise in COVID cases, I understand that schools are operating remotely, so the portfolio will consist of existing written work that children have at hand and will combine as many written samples as possible from the beginning of the academic year.

This research will require parents to take photographs and/or screenshots of the writing samples in order for me to conduct the analysis. I will analyse the writing on different factors like ideas produced, spelling, vocabulary and word count. The findings from the analysis will not affect your child's grades or performance in their Thai class and the rest of their school subjects. Also, there will be no physical contact between me and your child.

I wish to have your permission to access your child's writing samples. All the information will be anonymized and will only be seen by myself and my research supervisor.

The research will also require you to fill out a questionnaire regarding the home learning environment pertaining to Thai. The questionnaire will include questions about, for example, how often your child read books in Thai, whether your child watches Thai TV and whether they have a Thai home tutor. All the information will be anonymized and will only be seen by myself and my research supervisor. At the end of the study, a lay summary will be provided to you and your child.

If you would like to ask any questions about the project before or during the study, please contact me. I will be happy to talk with you in more detail. I hope you agree to participate in the study. If you do, please fill in the form below and return it to me via email.

Thank you!

Project: Write or Wrong; An Analysis of Thai Children's Writing Samples

Parent/guardian consent form

Please tick as appropriate

- ☐ I have read the information contained in the letter
- ☐ My child can participate in this research
- ☐ I do not want my child to take part in this research
- ☐ I will complete the home learning environment questionnaire
- ☐ I understand I can change my mind at any time and withdraw my child from the study
- ☐ I understand I can change my mind at any time and withdraw myself from the study
- ☐ I would like more information about the research, please contact me

Child's name (block capitals)……..……..

Parent/guardian name (block capitals)…….……

Parent/guardian signature……Date:……..

Parent/guardian email……..

Appendix D: Parent Information Sheet 2

Masters Research Project

Department of Education

University of Oxford



"Write or Wrong"



For any questions about the study, please do not hesitate to contact me

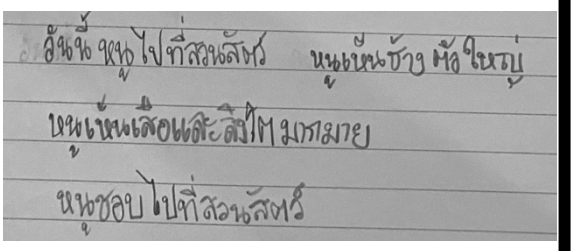
[researchers' email]

or Senior Researcher,

[senior researchers email]

Analyzing writing to identify emerging strengths and frequent errors

Writing is a skill that results from the integration of listening, speaking and reading skills. Thai is a complex language with several rules that may cause difficulty for children learning to express themselves well through writing. This study involves analyzing writing samples from children in year 3 to year 6 to look for strengths and weaknesses. The aim of the study is to understand Thai writing development. A potential use of the study is to design an intervention for teachers to help children with different areas of Thai writing, such as vocabulary, spelling and space knowledge. Once the research is completed, I will be providing a summary of the findings, which will be beneficial as it will help identify areas of improvements for the child.



The study

- A portfolio of your child's Thai written work in school will be compiled with the help of parents
- The writing samples will be collected from multiple activities
- Due to COVID, the samples collected will be samples that you already have available
- The writing samples will be stored on a password protected computer
- To protect your child's identity, any information about them will be blurred (name, pictures, address)
- To better understand your child's Thai learning environment, a questionnaire will be sent to you. The questions will include questions about languages used in your home.

Participation

- Your child's participation is completely voluntary and will not affect their education in school
- You may choose to opt-out of the research at any time during the study





Appendix E: Child Information Letter and Assent form

Dear Student,
My name is _____. I am a research student at the University of Oxford. I am doing a research study with my supervisor, _____, about ways to improve writing in Thai.
I would like to look at your writing activities because at this age you have only been learning Thai for a couple of years.

1. What will I do?
I will be taking many of your writing activities to look for ways to improve on your Thai writing skills.

2. Do I have to do this?
You can choose not to participate, and you can also change your mind later. This will not affect your learning or your grades in any of your classes.

What do I do now?
If you have any questions please ask me or your parent/guardian. Afterwards, please sign the attached form with your decision. You can ask your parent/guardian for help.

I hope you will agree to participate in my study.

Thank you for reading this.
Yours sincerely,





Research Project: Write or Wrong!
Child (parent/researcher/teacher on their behalf if child is unable to read) to circle all they agree with:

I understand what this project is about.
YES NO

I have asked all the questions I want.
YES NO

I understand that I can stop participating at any time.
YES NO

I am happy for you to collect my writing samples to study
YES NO

If <u>any</u> answers are "no" or if you don't want to take part, that's OK! No one will be angry with you.

Student Name: _____

Date: _____

Year Level: _____

Appendix F: Email to Parents

This email was sent to parents once a signed consent form was received in order to help them understand the next steps needed for the project. Contents of the email were taken from the initial information sheet (Appendix C). In the email, the information sheet (Appendix D) mentioned included examples produced by the researchers to help parents understand what type of writing samples the researcher was looking for.

Dear _____,

Thank you for providing consent for you and your child to participate in my research project. By participating in this research, you would be contributing to a project that will deepen our understanding of the productivity and richness of narrative writing in Thai.

The next step of the project requires you to send me images/screenshots of your child's Thai written work from the current academic year. The portfolio will consist of existing written work that children have submitted to their teachers. An example is provided in the attached Information Sheet PDF.

Parents who have provided consent to participate in the questionnaire will receive an email from me in the next few weeks. Your child's writing samples and home language environment will help me understand your child's Thai writing development. One potential use of this study is to design an intervention to improve children's Thai narrative writing skills.

All information collected will be anonymised and only seen by myself and my research supervisor.

In addition, to help your child understand the research project, I have attached a simple summary with a form asking for your child's signature and school year.

If you have any questions, please feel free to contact me.

Thank you for your time and attention. I look forward to hearing from you.

Sincerely,

[Researcher's name]

Appendix G: Email to Parents regarding the HLLE Survey

This email was sent to parents who provided consent for the HLLE survey. The email was sent after the writing samples were received. Contents of the email were primarily taken from Appendix C.

Dear _____,

Thank you so much for your email. The writing samples have been well received.

Also, thank you for providing consent to conduct the Home Language and Literacy Environment Survey. This survey asks questions regarding the use of the Thai language at home. The data from the survey will be anonymised and will only be seen by myself and my research supervisor. By completing this survey, you contribute to a project that will deepen our understanding of the richness of writing.

The survey is compatible with a computer, iPad and phone and should not take you longer than 10 minutes. However, I advise you to complete the survey on a computer or an iPad for a better visual of the questions and answer options.

Survey link:

If you have any questions, please feel free to contact me.

Thank you for your time and attention.

Sincerely,

[Researcher's Name]

Appendix H: Thai Initial Consonants based on Place and Manner of Articulation adopted from Winskel's 2010 study

This table is adopted from Winskel (2010, 2013) and Winskel & Iemwanthong (2010) research papers. In the present study this table was used to help distinguish the homophonous consonants and visually similar consonants while coding for spelling errors.

Place of articulation / Manner of articulation		Bilabial	Labio-dental	Alveolar	Palatal	Velar	Glottal
Stop	Voiceless aspirated	ผ พ ภ (ph)		ฐ ท ฒ ถ ทร (th)	ฉ ช ฌ (tçh)	ข ฃ ค ฅ ฆ (kh)	
	Voiceless unaspirated	ป (p)		ฏ ต (t)	จ (tç)	ก (k)	อ (ʔ)
	Voiced	บ (b)		ฎ ด (d)			
Nasal		ม (m)		ณ น (n)		ง (ŋ)	
Fricative			ฝ ฟ (f)	ซ ศ ษ ส (s)			ห ฮ (h)
Lateral				ล ฬ (l)			
Trill				ร (r)			
Approximant		ว (w)			ญ ย (j)		

Appendix I: Spelling Coding Scheme

I1. Table set up

Spelling Code	Type of Error	Example of Error

I2. Consonant Errors

Consonant Errors		
Initial position		
C1	Initial consonant only	This error refers to when the child used only the initial consonant when writing a word (e.g., for ให้ / hâi/ (give) the child only wrote ห /h/)
C2	Unrelated initial consonant	The substitution of an unrelated initial consonant (e.g., child wrote พลูก /plôok/ instead of ปลูก / bplòok/ (plant))
C3	Visually similar consonant	Substitution of visually similar consonant (e.g., child wrote ฟา /fa/ instead of พา /Pha/ (take))
C4	Homophonous consonant (Refer to Appendix 6)	The substitution of the incorrect homophonous consonant. For example, the child wrote พลไม้ / pon mái/ instead of ผลไม้ /pŏn-lá-mái/.
C5	Consonant cluster: Omission of the initial second consonant in the consonant cluster	This error was made when the child omitted the second initial consonant in a consonant cluster (e.g., for หลง /lŏng/ (be lost) the child wrote หง / hŏng/)
C6	Class-change cluster. Omission of the initial class-change consonant (Silent consonants, ห and อ)	The omission of the silent initial class-change cluster consonant (e.g., for หวาน /wăan/ (sweet) the child wrote วาน /waan/ (the day before))
C7	Omission of initial consonant	E.g., for มา /Maa/ (come) the child wrote า (a)
Final position		
C8	Substitute the final consonant	E.g., for ลม /Lom/ (wind) they wrote ลบ / lóp/ (delete)
C9	Added final consonant	E.g., for แล้ว / láew/ (already) they wrote แล้วญ / láe-won/

C10	Omitted final consonant	E.g., for โครง /krohng/ (structure) they wrote โคร /kroh/
C11	Final-change consonant (nine final consonant phonemes): final consonant is different, but the sound is the same	Substitution of a consonant that sounds similar to the final consonant (e.g., for ประสาท / bprà-sàat/ (to give; nerve) they wrote ประสาด / bprà sàat/)
C12	Final silent consonant	Omission of a final silent consonant (e.g., for ประโยชน์ / bprà-yòht/ (benefit) they wrote ประโยช / bprà-yôht/)
		Other
C13	RL confusion error. Children confused the letters /r/ and /l/	The letters /r/ and /l/ were mixed up (e.g., for รับ / ráp/ (receive) they wrote ลับ / láp/ (secret))
C14	Adding a consonant in the middle position	E.g., instead of writing this ผม /pŏm/ (I; me (used by men only)) they wrote this ผอม /pŏm/ (thin)
C15	Substitution of middle consonant	E.g., for วันอังคาร /wan ang-kaan/ (Tuesday) they wrote วันอังการ /wan ang gaan/
C16	Omitting a consonant in the middle position	These errors were made for words that were longer than three letters (orthographic units). For example, for ปล่อย / bplòi/ (let go) they wrote ปล่ย
C17	Wrote vowel instead of Consonant	Substituted vowel instead of consonant (e.g., for เยอะ / yúh/ (much) they wrote เยาะ /yór/ (to laugh at))

I3. Vowel Errors

Vowel Errors		
V1	Omissions	E.g., for เป็น /bpen/ (to be) they wrote เปน /bpen/
V2	Substitutions	The child substituted a vowel. The substituted vowel may have a similar pronunciation to the correct vowel. E.g., for คือ /Keu/ (is) they wrote ค็อ
V3	Vowel Length errors	E.g., for หนู / nŏo/ (she; her) they wrote หนุ /nù/
V4	Visually similar vowels	Substituted an incorrect visually similar vowel (e.g., for ใจ /jai/ (heart; mind) they wrote ไจ /jai/ (skein of wool, thread))
		Other

V5	Adding vowels	This error was made when children added extra vowels in the word or when they added vowels in words that did not require vowels. For example, for เสีย / sĭia/ (to damage) they wrote เสียา / sĭia aa/
V6	Vowel above/below the wrong consonant	Children wrote the vowel either above or below the wrong consonant (e.g., for มัน /Man/ (he; she; it) they wrote มน)
V7	Reversed Vowel	This error was made when children wrote a reversed version of a vowel. For example, for the word เล็ก / lék/ (small), the vowel above ็ was written in the opposite direction. Another example would be if the children wrote the reverse of ไ- ใ- โ-.

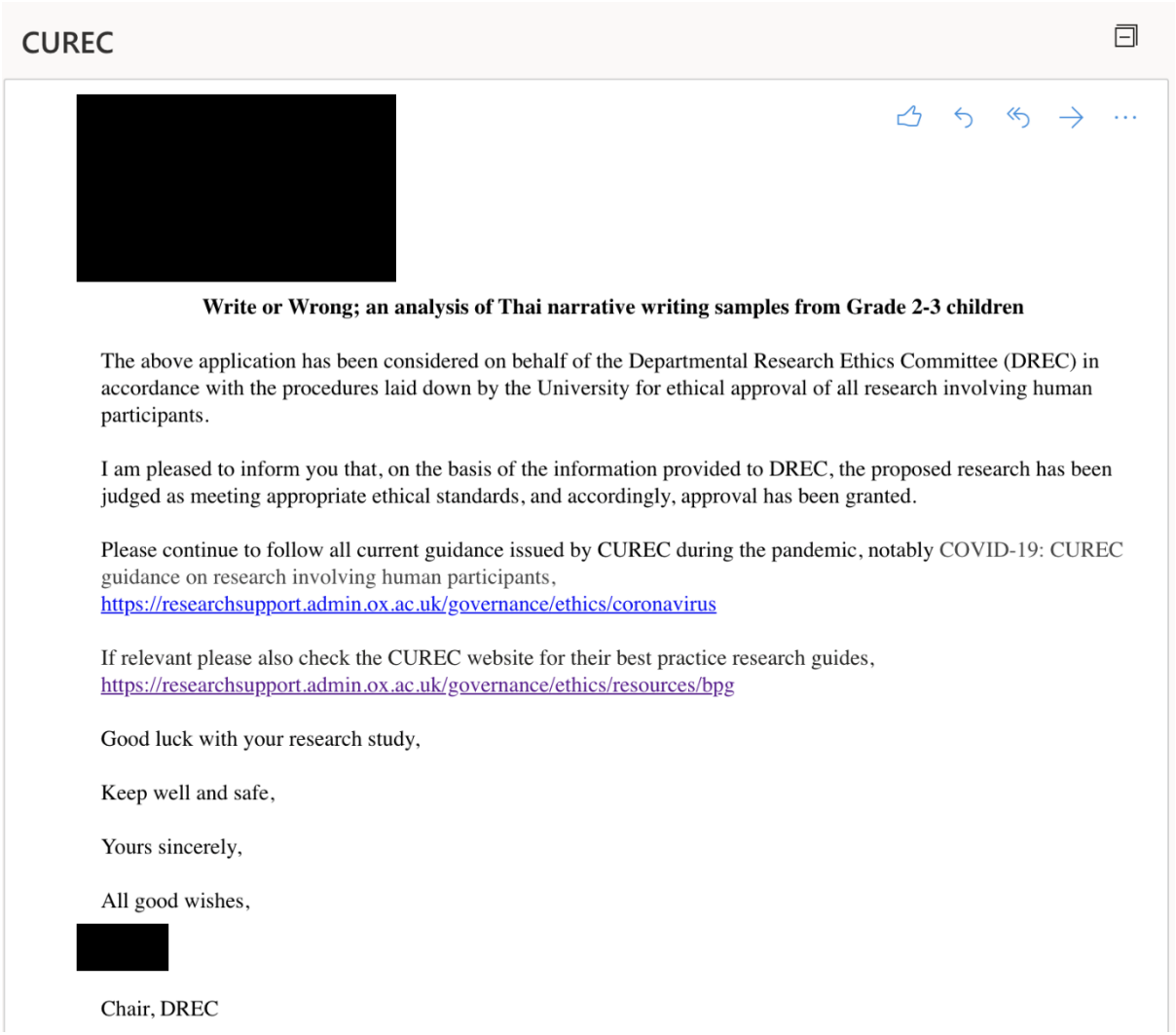
I4. Tone Marker Errors

Tone Marker Errors		
T1	Omissions	E.g., for ต้อง /dtông/ (must) they wrote ตอง /dtong/
T2	Substitutions	Child substituted a different tone marker (e.g., for ว่า / wâa/ (that) they wrote ว้า / wáa/)
Others		
T3	Adding tone	E.g., for ถาม / tăam/ (ask) they wrote ถ่าม /tàam/
T4	Tone above the incorrect akson	This error occurred when child wrote the tone either above the wrong consonant or wrong vowel (e.g., for ด้วย / dûuay/ (along with) they wrote ดว้ย)
T5	Wrote Vowel instead of tone	E.g., for ป้า / bpâa/ (aunt) they wrote ป็า

I5. Other Errors

Other Errors		
S1	Unrelated word: word completely unrelated to the target word	These errors were considered as whole word substitutions. For example, the child wrote เม่าน but meant เหม็น /měn/ (smell).
S2	English Words	Child substituted Thai words with English words

Appendix J: CUREC Approval



CUREC

[redacted]

Write or Wrong; an analysis of Thai narrative writing samples from Grade 2-3 children

The above application has been considered on behalf of the Departmental Research Ethics Committee (DREC) in accordance with the procedures laid down by the University for ethical approval of all research involving human participants.

I am pleased to inform you that, on the basis of the information provided to DREC, the proposed research has been judged as meeting appropriate ethical standards, and accordingly, approval has been granted.

Please continue to follow all current guidance issued by CUREC during the pandemic, notably COVID-19: CUREC guidance on research involving human participants,
https://researchsupport.admin.ox.ac.uk/governance/ethics/coronavirus

If relevant please also check the CUREC website for their best practice research guides,
https://researchsupport.admin.ox.ac.uk/governance/ethics/resources/bpg

Good luck with your research study,

Keep well and safe,

Yours sincerely,

All good wishes,

[redacted]

Chair, DREC

Appendix K: Total number of Writing Samples and Words Written for each participant

Unique Child id	Number of Writing Samples	Total Words Written
cd1	9	148
cd2	8	343
cd3	8	146
cd4	3	151
cd5	16	537
cd6	8	406
cd8	2	132
cd9	9	214
cd10	6	388
cd11	6	111
cd12	6	84
cd13	4	155
cd14	3	98
cd15	3	174
cd16	5	221
cd17	5	104
cd18	1	251
cd19	2	205
cd20	15	318
cd21	2	353
cd22	1	167
cd23	2	161
cd24	6	164
cd25	7	410
cd26	4	142
cd27	4	202
cd28	4	67
cd29	3	84
cd30	5	66
cd31	6	191
cd32	1	133

Appendix L: Point-biserial correlation of Average Word Count and Techniques Parents use to assist in Writing Thai

		Average Word Count
	Average Word Count	--
Techniques Parents use to assist Thai Child in Writing Thai	**Help with Spelling**	.187
	Help with Idea Production	-.039
	Help with Space	.405
	Suggest Alternate Words	.144
	Structure the Writing	.352

Appendix M: Associations between Thai HLLE and Spelling Error rate

M1. Spearman's Rho correlation of Total Spelling Errors and Thai HLLE

	Total Spelling Error Rate	Thai Books at Home	Child Activities in Thai	Parent-Child Activities in Thai
Total Spelling Error Rate	--			
Thai Books at Home	.109	--		
Child Activities in Thai	-.179	.717**	---	
Parent- Child Activities in Thai	.290	.741**	.612**	--

Note. n=20. **p<.01

M2. Point-biserial correlation of Total Spelling Error Rate and Techniques Parents use to Assist in Writing Thai

		Techniques Parents use to assist Thai Child in Writing Thai				
	Total Spelling Error Rate	Help with Spelling	Help with Idea Production	Help with Spacing	Suggest Alternate Words	Structure the Writing
Total Spelling Error Rate	--					
Help with Spelling	.011	--				
Help with Idea Production	.008	.101	---			
Help with Spacing	-.228	.452*	.250	--		
Suggest Alternate Words	-.160	.328	.612**	.357	--	
Structure the Writing	-.222	.522*	.115	.577**	.471*	--

Note. n=20. *p<.05. **p<.01

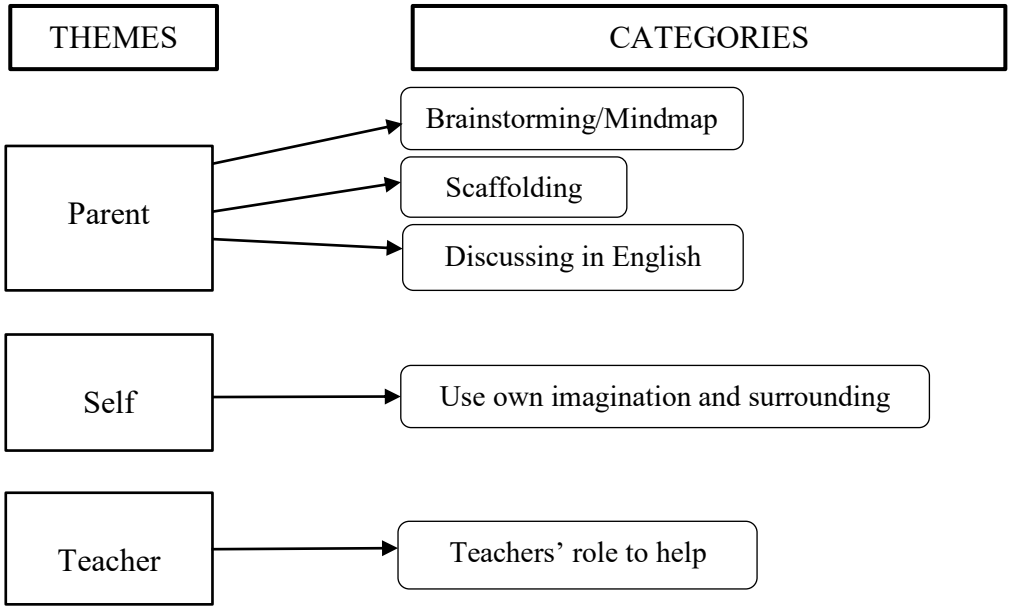
Appendix N: Individual differences in Idea Units, Space Knowledge and Word Count

Child ID	School Year	Writing Sample	Idea Units[1]	Space Knowledge[2]	Word count[3]
cd2	Year 6	1	11	12	140
cd4	Year 3	2	11	5	60
		3	5	5	58
		4	7	2	33
cd5	year 3	5	9	2	83
cd6	Year 5	6	12	6	90
cd8	Year 3	7	7	0	86
cd10	Year 6	8	6	11	72
		9	9	4	57
		10	9	7	90
		11	7	9	64
		12	5	5	59
cd13	Year 3	13	7	0	90
cd18	Year 6	14	21	11	251
cd19	Year 6	15	16	2	157
cd21	Year 6	16	17	1	255
		17	8	1	98
cd22	Year 5	18	10	3	167
cd23	Year 4	19	17	8	135
cd25	Year 5	20	10	2	117
	Total		**96**	**204**	**2162**

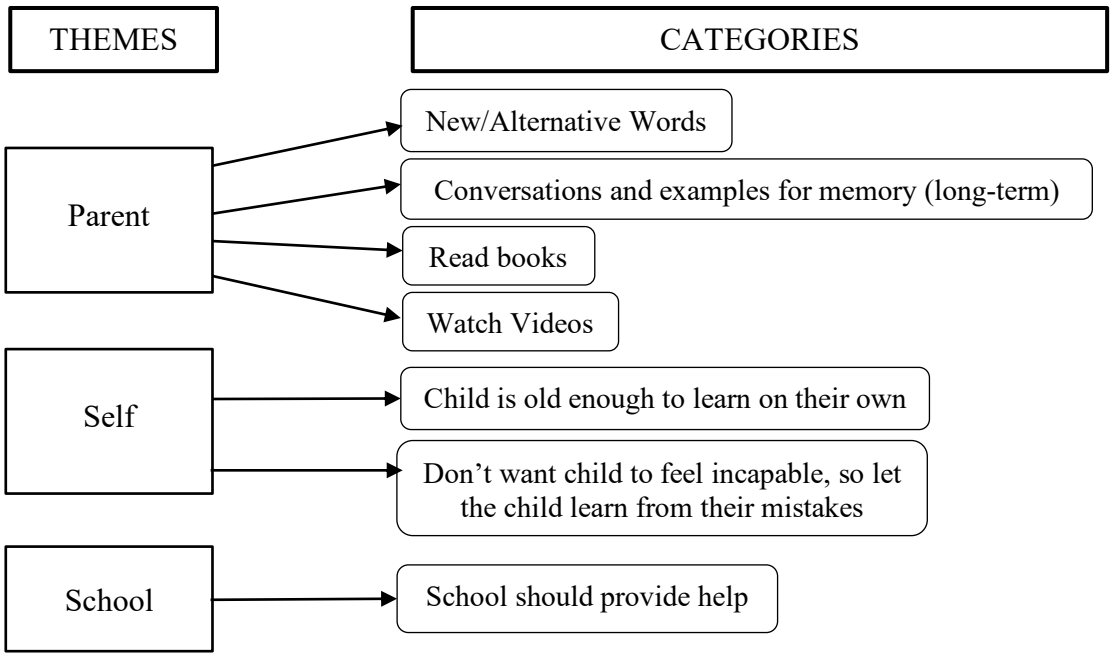
Note: [1]The idea units are the total number of ideas in a writing sample. [2]The space knowledge is a count of the number of spaces between words in a writing sample. [3]The word count is the total number of words for the writing sample.

Appendix O: Thematic Analysis Figures

O1. Themes and Categories from Parent Responses on assisting with Idea Production



O2. Themes and Categories from Parent Responses on Vocabulary Development



Appendix P: Cross-Tabulation of Child Home Activities as reported by Parents

Children tended to conduct most of their activities in English (65.31%) followed by Thai (29.59%). According to parent reports, children tend to part-take most in activities such as reading books and watching TV/series. Specifically, seven parents reported that their child watches Thai TV and/or Thai series.

			English	Thai	Hindi	Punjabi	Mandarin	Total
Activities Children do at home	Read Books	Count	15	7	0	0	1	**23**
		Row%	65.22	30.43	0	0	4.35	**100**
		Column %	26.79	26.92	0	0	33.33	**87.04**
		% of total	17.24	8.05	0	0	1.15	**26.44**
	Watch Tv/Series	Count	14	8	0	0	1	**23**
		Row%	60.87	34.78	0	0	4.35	**100**
		Column %	25.00	30.77	0	0	33	**89.10**
		% of total	16.09	9.20	0.00	0.00	1.15	**26.44**
	Listen to Music	Count	13	4	2	0	0	**19**
		Row%	68.42	21.05	10.53	0	0.00	**100**
		Column %	23.21	15.38	100	0	0	**138.60**
		% of total	14.94	4.60	2.30	0.00	0.00	**21.84**
	Watch Videos	Count	13	7	0	0	1	**21**
		Row%	61.90	33.33	0	0	4.76	**100**
		Column %	23.21	26.92	0	0	33.33	**83.47**
		% of total	14.94	8.05	0	0	1.15	**24.14**
	Other: Games	Count	1	0	0	0	0	**1**
		Row%	100.00	0.00	0	0	0	**100**
		Column %	1.79	0.00	0	0	0	**1.79**
		% of total	1.15	0.00	0	0	0	**1.15**
	Total	**Count**	**56**	**26**	**2**	**0**	**3**	**87**
		Column %	**100**	**100**	**100**	**0**	**100**	
		% of total	**64.37**	**29.89**	**2.30**	**0.00**	**3.45**	**100.00**

Appendix Q: Cross-tabulation of Books-at-home

The cross-tabulation presents the frequencies and percentages of the books-at-home and the languages of the books reported by parents through the HLLE survey. From the parent survey it was found that most households had English prints (53.55%) followed by Thai prints (41.23%) . Of these prints, the highest number were books from school (15.17%) followed by books owned (13.27%).

			English	Thai	Hindi	Punjabi	Mandarin	Total
Books-at-home	Newspaper	Count	7	7	0	0	0	**14**
		Row%	50.00	50.00	0	0	0	**100**
		Column %	6.19	8.05	0	0	0	**14.24**
		% of total	3.32	3.32	0	0	0	**6.64**
	Books owned	Count	14.00	13.00	0	0	1	**28**
		Row%	50.00	46.43	0	0	3.57	**100**
		Column %	12.39	14.94	0	0	25	**52.33**
		% of total	6.64	6.16	0.00	0.00	0.47	**13.27**
	Books from school	Count	15	16	0	0	1	**32**
		Row%	46.88	50.00	0	0	3.13	**100**
		Column %	13.27	18.39	0	0	25	**56.67**
		% of total	7.11	7.58	0.00	0.00	0.47	**15.17**
	Information Pamphlets	Count	11	10	0	0	1	**22**
		Row%	50	45.45	0	0	4.54	**100**
		Column %	9.73	11.49	0	0	25	**46.23**
		% of total	5.21	4.74	0	0	0.47	**10.43**
	Magazines	Count	9	8	0	0	0	**17**
		Row%	52.94	47.06	0	0	0	**100**
		Column %	7.96	9.20	0	0	0	**17.16**
		% of total	4.27	3.79	0	0	0	**8.06**
	Calendars	Count	13	8	0	0	0	**21**
		Row%	61.90	38.10	0	0	0	**100**

	Column %	11.50	9.20	0	0	0	**20.70**
	% of total	6.16	3.79	0	0	0	**9.95**
Holy books	Count	4	3	2	4	0	**13**
	Row%	30.77	23.08	15.38	30.77	0	**100**
	Column %	3.54	3.45	100	80	0	**186.99**
	% of total	1.90	1.42	0.95	1.90	0	**6.16**
Workbooks	Count	13	10	0	1	1	**25**
	Row%	52	40	0	4	4	**100**
	Column %	11.50	11.49	0	20	25	**68.00**
	% of total	6.16	4.74	0	0.47	0.47	**11.85**
Comic books	Count	12	7	0	0	0	**19**
	Row%	63.16	36.84	0	0	0	**100**
	Column %	10.62	8.05	0	0	0	**18.67**
	% of total	5.69	3.32	0	0	0	**9.00**
Drawing books	Count	13	5	0	0	0	**18**
	Row%	72.22	27.78	0	0	0	**100**
	Column %	11.50	5.75	0	0	0	**17.25**
	% of total	6.16	2.37	0	0	0	**8.53**
Others: Letter	Count	2	0	0	0	0	**2**
	Row%	100	0	0	0	0	**100**
	Column %	1.77	0	0	0	0	**1.77**
	% of total	0.95	0	0	0	0	**0.95**
Total	**Count**	**113**	**87**	**2**	**5**	**4**	**211**
	Column %	**100**	**100**	**100**	**100**	**100**	
	% of total	**53.55**	**41.23**	**0.95**	**2.37**	**1.90**	**100.00**

Appendix R: Cross-tabulation of Parent Activities with their Child

			English	Thai	Hindi	Punjabi	Mandarin	Total
Parent Activities with the Child	Help with School Homework	Count	12	11	0	0	0	**23**
		Row%	52.17	47.83	0	0	0	**100**
		Column %	27.91	40.74	0	0	0	**68.65**
		% of total	15.19	13.92	0	0	0	**29.11**
	Recite Rhymes	Count	7	1	0	0	0	**8**
		Row%	87.50	12.50	0	0	0.00	**100**
		Column %	16.28	3.70	0	0	0	**19.98**
		% of total	8.86	1.27	0.00	0.00	0.00	**10.13**
	Sing Religious Songs	Count	1	3	1	5	0	**10**
		Row%	10	30	10	50	0.00	**100**
		Column %	2.33	11.11	100	71.43	0	**184.87**
		% of total	1.27	3.80	1.27	6.33	0.00	**12.66**
	Read Books	Count	12	5	0	0	1	**18**
		Row%	66.67	27.78	0	0	5.56	**100**
		Column %	27.91	18.52	0	0	100	**146.43**
		% of total	15.19	6.33	0	0	1.27	**22.78**
	Tell Stories	Count	11	7	0	1	0	**19**
		Row%	57.89	36.84	0	5.27	0	**100**
		Column %	25.58	25.93	0	14.29	0	**65.79**
		% of total	13.92	8.86	0	1.27	0	**24.05**
	Others: tuition	Count	0	0	0	1	0	**1**
		Row%	0.00	0.00	0.00	100.00	0.00	**100**
		Column %	0.00	0.00	0.00	14.29	0.00	**14.29**
		% of total	0.00	0.00	0.00	1.27	0.00	**1.27**
	Total	**Count**	**43**	**27**	**1**	**7**	**1**	**79**
		Row%	**274.24**	**154.95**	**10.00**	**155.26**	**5.56**	
		Column %	**100**	**100**	**100**	**100**	**100**	
		% of total	**54.43**	**34.18**	**1.27**	**8.86**	**1.27**	**100.00**

Appendix S: Home Tutoring

S1. Home Tutoring Responses

From 20 parents, 11 parents said that their child does not attend paid home tutoring sessions, while nine said that their child do attend paid home tutoring sessions. Parents who said yes, were asked to report how many hours a week their child learns for. The table presents s the frequencies for the hours listed by parents.

Hours of tutoring/week	Frequency
1 Hour	5
1.5 hours	1
1-2 hours	2
3 hours	1

S2. Mann-Whitney U Test

The spelling error rate of children who attend paid home tutoring classes (*Mdn*=.38, *n*=9) were lower than those who did not attend paid home tutoring classes (*Mdn*=.75, *n*=11). A Mann-Whitney test indicated that the difference was not statistically significant, *U*=43, z=--.49, p=NS, r=-.09.

The average word count of children who attend paid home tutoring classes (*Mdn*=27.3, *n*=9) were lower than those who did not attend paid home tutoring classes (*Mdn*=38.8, *n*=11). A Mann-Whitney test indicated that the difference was not statistically significant, *U*=36, z=-1.03, p=NS, r=-.18.

Appendix T: Descriptive Statistics by Year Level

The main analysis did not involve looking at year-level differences because of the unequal and small sample size. So, this section only provides descriptive statistic of each writing measure across year level. Table Q1 provides the word count and total spelling errors for each year level. Word count was calculated by taking the sum of the average words for each child. The number of words were higher for children in Year 6, followed by Year 5. The spelling errors was the sum of the total error rate for each child. Children in Year 3 made more spelling errors followed by children in Year 6.

Table T1

Word Count and Total Spelling Errors by Year Level (percentage from the total in brackets)

Year Level	Word count (%)	Total spelling errors (%)
Year 3 (N=9)	311.12 (17.41)	9.47 (44.28)
Year 4 (N=5)	152.94 (8.56)	3.61 (16.86)
Year 5 (N=8)	440.82 (24.67)	3.41 (15.93)
Year 6 (N=9)	882.08 (49.36)	4.90 (22.93)

For the measures of idea units and space knowledge, the sample size (N=20) across year levels and the number of writing samples varied. From the 20 writing samples, half were produced by children in Year 6, resulting in more idea units and space knowledge.

Table T2

The Frequency of Idea Units and Space Knowledge by Year Level

Year Level	Number of Writing Samples	Idea Units	Space Knowledge
Year 3 (N=4)	6	46	14
Year 4 (N=1)	1	17	8
Year 5 (N=3)	3	32	11
Year 6 (N=5)	10	109	63

Appendix U: CUREC Form

The University of Oxford places a high value on the knowledge, expertise, and integrity of its members and their ability to conduct research to high standards of scholarship and ethics. The research ethics clearance procedures have been established to ensure the University is meeting its obligations as a responsible institution. They start from the presumption that all members of the University take their responsibilities and obligations seriously and will ensure that their research involving human participants is conducted according to the established principles and good practice in their fields and in accordance, where appropriate, with legal requirements. Since the requirements of research ethics review will vary from field to field and from project to project, the University accepts that different guidelines and procedures will be appropriate.

Please refer to Where and how to apply for ethical review and the CUREC flowchart first to see if you need ethics approval.

Please complete this form using a word processor and email it, together with your supporting documents, to your Departmental Research Ethics Committee (DREC) (if applicable). If you don't have a DREC please email this form to ethics@socsci.ox.ac.uk using your official ox.ac.uk email address. Only type-written, emailed applications will be accepted.

SECTION A: Filter for CUREC 2 application		
This section determines whether your study raises more complex issues requiring the completion of a full application for ethical review, known as the CUREC 2 application. **(Please mark 'X' in the Yes/ No column.)**		
1. Are research participants classed as people whose ability to give free and informed consent is in question? (This may include under 18s (although see competent youths), prisoners, or adults at risk.) Your attention is drawn to the University's Safeguarding Code of Practice and its implications for researchers involving children or adults at risk. This includes the need for the work to be risk assessed and for researchers to undertake related training. (**Note**: If any of your participants are aged 16 or under, answer 'Yes' here **and** also answer question 5 below.)	Yes ☒	No ☐
2. By taking part in the research, will participants be at risk of criminal prosecution (e.g. by providing information on drug abuse or child abuse)?	Yes ☐	No ☒
3. Does the research involve the deception of participants?	Yes ☐	No ☒
4. Does your research raise issues relevant to the Counter-Terrorism and Security Act (the Prevent duty), which seeks to prevent people from being drawn into terrorism? Please see advice on this on our Best Practice Guidance web page.	Yes ☐	No ☒
If you answered 'No' to **all** the questions above, go to **Section B**. If you answered 'Yes' to **any** question above, continue to question 5 below.		
5. Is your project covered by a CUREC Approved Procedure?	Yes ☒	No ☐

If yes, list the number(s) of the Approved Procedures:	AP25-Non-invasive methods with children as participants in institutional and non-institutional settings

If you answered '**Yes'** to **ANY** of questions **1-4**, **and** answered '**No'** to question **5**, **stop completing this checklist and do not submit it for ethical review**. Instead, complete the CUREC 2 application form from the CUREC website, then submit that for ethical review.
If you answered '**Yes'** to ANY of questions 1-3, **and** answered '**Yes'** to question 5, go on to **Section B**.

SECTION B: Contact details and project description	
Contact details:	
1. Principal Investigator **or** supervisor (if student research) (give title and full name)	
2. Name of student (if student research)	
3. Degree programme (if student research), e.g. BA, BSc, MSc, MPhil, DPhil	MSc
4. Department or Institute name	Education
5. Address for correspondence (if different from above)	15 Norham Gardens, Oxford (Dept. of Education)
6. University (not private) e-mail address and telephone number	
7. Name and status of others taking part in the project (e.g. third year undergraduate; postdoctoral research assistant)	Not applicable

Project description:	
8. Title of research project	Write or Wrong; an analysis of Thai narrative writing samples from Grade 2-3 children
9. List of location(s) where project will be conducted	International School in Bangkok, Thailand
10. If your research involves overseas fieldwork or travel and your department requires a travel risk assessment, will you have completed and returned a risk assessment form beforehand? (This must be approved by your department before you travel. If you are travelling	Yes ☒ The researcher arrived at her home country, Bangkok, Thailand before the National Lockdown in the United Kingdom. Travel approval papers are linked to personal travel not relevant for this application.

overseas, you are strongly advised to take out University travel insurance.) Please also address any physical or psychological risks for Oxford researchers and local fieldworkers in question 16 below and discuss with your Safety Officer.	No ☐ Not required in this instance ☐
11. Anticipated duration of overall research project	4 months
12. Anticipated start and end dates of the part of the research project involving human participants and/or personal data	From: (25/05/21) To: (15/08/21) Note: You will need ethics approval before you start your research. CUREC 1As may take up to **30 days** to process. Retrospective ethics approval **cannot** be granted.
In the case of international or collaborative research, will you submit or have you submitted this project for ethical review or consideration elsewhere (e.g. collaborator's/ local ethics committee, or other local approval)?	Yes ☐ No ☒ If 'Yes', please attach ethics or other approvals and give more details below. If 'No', please explain your reasons below. Please also refer to the Best Practice Guidance on Ethical Review of social-sciences based research conducted outside the UK (BPG 16), which includes an Ethics Issues Checklist for International Research (Appendix A)
Please supply further details in response to question 12b here. The Head of Elementary of the International School in Bangkok has said that they will give permission based on the University of Oxford Ethics Approval.	
13. External organisation funding the research (if applicable)	Not applicable
14. Brief description of research (about 150 words) in lay language. a) When describing the research, include your methodology, how you are applying professional guidelines, and the use to which results/ data will be put. Please also declare any conflicts of interest here.	
Thai is an alphasyllabic orthography and a tonal language with a non-linear arrangement of vowels. The orthographic unit in this writing system is called /akson/ (a syllable block with phonemic markers), and written Thai uses spaces between clauses and phrases rather than between words. The complexity of the orthography is demonstrated in primary school children's written work. So far, spelling, tone and reading are aspects of Thai language that has been heavily published in English language academic outlets (e.g., Ratitamkul, 2010; Winskel, 2010; Winskel & Iemwanthong, 2010). The proposed research will replicate analyses of spelling and tone and go further to also examine the understudied areas of space knowledge, idea production and vocabulary features in children's Thai writing (e.g., Nag, 2016; Kasisopa et al., 2013, 2016).	

The study will be based on a portfolio of written samples of participating children. The writing samples will include the spontaneous sample from routine school activities and researcher-guided activities that teachers will include in their routine class (Appendix 13 and 14). The research of children's written sample will include error analysis and a calculation of written language productivity and richness of writing (Appendices 6 to 10). This research aims to discover the frequent errors made by children in this age band. The writing sample for each participating child will consist of a minimum of 30 sentences from multiple writing activities. Currently, school is conducted remotely due to COVID-19, so the writing samples collected are digital samples that participating children have submitted to their teachers. If the school reopens before the end of the school year, the researcher will collect and scan hardcopy of written samples.

In addition, data will be collected from parents regarding their Home Learning and Literacy Environment (HLLE). This survey will include information about how often the Thai language is used at home, how many Thai books they have, and whether the child has a Thai tutor at home (based on Nag et al., 2018; Appendix 5).

The researcher will also conduct semi-structured interviews with language teachers regarding the current teaching methods and resources for Thai writing (Appendix 11). The information will also include current assessments and coding schemes used to grade writing, what errors teachers see most in children, and what needs to be improved.

The child's writing samples, home environment and teaching practice all link together to help us understand Thai writing development. One potential use of this study is to design an intervention in children's narrative writing skills.

The research questions of this study are:

1. What are the word count, vocabulary features, idea units, space knowledge and spelling performance of children who are in year 3 and year 4?
2. What is similar and different in word count, vocabulary features, idea units, space knowledge and spelling performance for children who are in year 3 versus year 4?
3. What are the associations between reported home language and literacy environment and children's word count, vocabulary features, idea units, space knowledge and spelling performance?
4. What are teachers perspective and experiences with Thai written language development of children in year 3 and year 4?

b) Description of participants and how you will obtain informed consent to take part in the research.

i. Description of participants and your criteria for inclusion/ exclusion.

Inclusion Criteria

Participating Child

- The participants will be from one international school in Bangkok and follow the International Baccalaureate Primary Years Program curriculum.
- Thai should be the first language (Note: Thai children, enrolled with a Thai passport, must study Thai as Language A in line with the Thai Ministry of

Education requirements. Language A is usually the main language spoken at home. So, Thai A classrooms follow a curriculum that teaches Thai as a first language.)

Parents

- Parents of the year 3/year 4 students who provide consent for their child to participate and also to fill in the home language and literacy questionnaire

Teachers

- Four elementary Thai A teachers from the same International school teaching either year 3 or year 4 or both, and who provide consent to participate in a semi-structure interview.

Exclusion Criteria

Participating Child

- Participant in Thai B classrooms will be excluded because they follow a different curriculum to the Thai A participants.

ii. Your method(s) of recruitment.

Recruitment material (Appendix 1) will be emailed to the Head of Elementary of the school.

After receiving an interest to participate from the Head of Elementary, the school will send out an email on behalf of the researcher to the Thai teachers along with parent information materials and teacher recruitment material. The Thai teachers will send an email of the parent information materials to the parents (Appendix 2-3) of the Year 3 and Year 4 Thai A children. The email contains the introduction to the research, information to parents, parent consent form and child assent form. Teacher recruitment material consists of information regarding the study and an invitation for the Thai language teachers to participate for the semi-structured interview (Appendix 12).

iii. Your processes for obtaining informed consent from participants.	
Participating Child- The child participant will sign an assent form (Appendix 4), which will be distributed to them by the class teacher. *Parents*- The parent or guardian of the participants will be asked to sign a consent form (Appendix 2-3) prior to taking part in the study. The consent form asks permission for the child to participate in the study and for the parents to complete the questionnaire. *Teachers*- Teachers will be asked to sign a consent form (Appendix 12) prior to the interview.	
Please attach separate supporting documents (in Word), if appropriate, for your research (English language versions only). Tick those you are submitting below. If appropriate supporting documents are not submitted, you will be asked to provide these separately, which may delay the ethical review process.	
Recruitment and advertisement material (e.g. a poster, social media recruitment text, or brief invitation letter/ email).	☒
Information for participants to read (or hear) before they agree to take part (e.g. written information or, if applicable, an outline oral information script).	☒
A document to record informed consent. Templates for written consent forms and/ or oral information scripts (in case of an oral consent process) are available from the CUREC website.	☒
Questions to be asked of participants (e.g. interview questions, or a preliminary scope of questions, or a sample questionnaire).	☒
(If applicable) debriefing document after participants have taken part.	☒
Please add any further details. If you feel the above approaches are not appropriate for your study, provide details on how you will obtain consent from participants Please answer question 15 if you cannot obtain informed consent.	
15. If you cannot obtain informed consent from participants according to CUREC guidelines and good practice in your discipline, please give a brief explanation and justification of this decision below.	
Not Applicable	
16. What are the ethical issues connected with your research and what steps have you taken to address them? Please do not answer 'none'. We need to see that you have identified	

potential ethical issues with respect to your research and have taken steps to address them. If applicable, please address:

a) Participant burdens and/or risks

Participating Child

Participants in the research are 7- to 9-year-old children. The researcher will not meet the children at any point but will have access to their writing samples. Their writing may contain information that could identify who they are, including their name, address and photo, putting them in a vulnerable position. In these circumstances, the child's personal information will be redacted prior to start of data analysis.

Parents

Due to COVID-19 and the lockdown in Thailand, parents might find it a burden to fill out a research questionnaire. Parents may also be busy to fill a consent for a questionnaire and for their child to participate, so the researcher will be flexible and wait for parent action. To reduce pressure to comply, reminders will be prompted by school teachers and after two reminders, the researcher will consider the parent as not opting for the research for themselves and for their child.

Teachers

Similarly, teachers are busy and harassed by the lockdown and may find it a burden to commit to doing an interview. The researcher will be sensitive to the time pressures and will aim to schedule the meetings at a time that is comfortable for the participant. There is a lot of flexibility about the time teachers may choose as the researcher is in the same time zone.

b) Your own physical and psychological safety as a researcher or of fieldworkers you may employ (see the University's and Social Science Division's Safety in Fieldwork guidance)

The researcher is from Bangkok, Thailand. She is comfortable with the country.

The researcher will wear culturally appropriate clothing when conducting the teacher interviews via Microsoft Teams.

c) Data protection/ confidentiality (also see Section 18).

PARTICIPATING CHILD:

Photographs (images of the portfolio): The school is currently remote due to COVID. Children are currently providing images of their written work and submitting them to their teacher. Teachers will provide me with the digital copies via email, which will be transferred to a password protected folder in the email. The email attachments will be downloaded on a password protected computer. If the school reopens and the researcher will go collect the hard copy writing samples. The portfolio of written samples will be captured via scanning devices (phone, scanner) and secured on a computer with a password and on the department-provided storage system (e.g. Nexus365 OneDrive)

PARENTS:

Questionnaire answers: all questionnaire answers will be recorded digitally (via Qualtrics) and will be stored safely and securely using encrypted files in the departmental-provided storage system (e.g. Nexus365 OneDrive) and on a password protected computer.

TEACHERS:
The interviews are conducted on the university's secure Microsoft TEAMs platform. A recording of the teacher interview will be made following which the audio transcript will be developed. Till such time that the transcription is developed the Teams recording will be saved on a password protected computer. The transcription of the interviews will be conducted on a Microsoft Word document, which will be save on a password protected computer. The transcription of these notes will use pseudonyms for the names of the teachers. In use of the data, all identifying information related to the teachers will be removed.

Consent records/contact details: all consent records along with the digital version will be stored safely and securely using encrypted files in departmental-provided storage system (e.g. Nexus365 OneDrive) and on a password protected computer. The file with contact details will be destroyed in August 2021.

Any other ethical issues. For more guidance on ethical issues, please see http://researchsupport.admin.ox.ac.uk/governance/ethics/resources

17. Will your research involve discussing sensitive issues? This could be information relating to race or ethnic origin, political opinions, religious beliefs, physical/ mental health, trade union membership, sexual life or criminal activities. If you answered 'Yes', make sure you include some supporting information (as directed in **section 14b** above, showing the range of questions covering these issues.	Yes ☒	No ☐

Please provide further details:

Participating Children: While the research itself does not involve discussing sensitive issues, the children's writing samples may consist sensitive topics, such as their race or religious belief. This information will not be included in the analysis.

Parents: Parents will be asked questions about how often the Thai language is used at home, how many Thai books they have, and whether the child has a Thai tutor at home. The questionnaire is not expected to cover sensitive issues, but if any such issues come up, it will not be included in the analysis. These issues may include the behaviours of the parent towards the child or family related stress factors (illness or death of a family member). Participants can withdraw at any time in the course of the study.

Teachers: Teachers will be asked questions relating to the curriculum, specifically related to writing. The teachers will be aware of the topics in advance so that they can make informed decision about participating. The interview is not expected to cover sensitive

issues, but if any such issues come up, it will not be included in the analysis. These issues include racism or sexism or political stance. Participants can withdraw at any time in the course of the study.

18.Management and handling of personal and other research data	
All information provided by participants is considered research data for the purpose of this form. Any research data from which participants can be identified is known as personal data; any personal data which is sensitive is considered special category data. Management of personal data, either directly or via a third party, must comply with the requirements of the UK General Data Protection Regulation (GDPR) and the Data Protection Act 2018, as set out in the University's Guidance on Data Protection and Research. In answering the questions below, please also consider the points raised in the Data Protection Checklist and whether, for higher-risk data processing, a separate Data Protection Impact Assessment (DPIA) may also be required for the research. Advice on research data management and security is available from Research Data Oxford and your local IT department. Advice on data protection is available from information.compliance@admin.ox.ac.uk. a) Please mark 'X' against the data you will collect for your research	
Consent records (written consent forms, audio-recorded consent, assent forms (for research involving minors) including participant name)	☒
Online consent (may be anonymous)	☒
Opt-out forms	☐
Contact details for research purposes only (destroyed when no longer needed for this research)	☒
Contact details kept for future studies	☐
Audio recordings (preferably using PIN-protected audio recorder and stored on device's hard drive) [ONLY FOR TEACHER INTERVIEWS via Teams]	☒
Video recordings[ONLY FOR TEACHER INTERVIEWS via Teams]	☒
Transcript of audio/ video recordings [ONLY FOR TEACHER INTERVIEWS]	☒
Photographs (images of the portfolio of the writing sample)	☒
Task results (e.g. paper/ online tasks, diary completion)	☐
Questionnaire answers (Parent questionnaire)	☒
Field notes	☐
Other (please specify below)	☐

b) For each of the types of data selected above, state how this will be physically transferred from where it is collected to a local secure storage site (and backed up as necessary). This includes paper records and data captured electronically.
Online Consent: Online consent received from participating child, parents and teachers will be received via email as an attachment. The attachment will be downloaded and stored safely on a password protected computer. Consent records/contact details: all consent records along with the digital version will be stored safely and securely using encrypted files in department-provided storage system (e.g. Nexus365 OneDrive) and on a password protected computer. The contact details will be destroyed in August 2021. Photographs (scanned images of the portfolio): All the data will be captured via scanning devices (phone, scanner) and secured on a computer with a password and on the department-provided storage system (e.g. Nexus365 OneDrive) Questionnaire answers: The questionnaire will be distributed via Qualtrics. All questionnaire answers will be recorded digitally and will be stored safely and securely using encrypted files in department-provided storage system (e.g. Nexus365 OneDrive) and on a password protected computer. Video Recording: In Microsoft TEAMs, the video recording occurs in conjunction with the audio recording. The video recording will be via Microsoft TEAMs during teacher interviews. The video recordings will be stored on a password protected computer. The recording will be transcribed, and the transcription will also be stored safely and securely using encrypted files on a password protected computer.
c) How and where will each type of data be stored during the research (until the end of all participant involvement)? Describe the arrangements for ensuring confidentiality, i.e. location of storage (e.g. Nexus 365 OneDrive for Business, SharePoint), security arrangements and de-identification of such data. Do not store unencrypted data in freely available cloud services or unprotected USB drives.
Consent forms, questionnaire answers, interview transcription and photographs/scanned copies of the portfolio will be pseudonymised and will be stored securely in an Excel/word/pdf/jpeg document using encrypted files in the department-provided storage system (e.g. Nexus365 OneDrive) and on a password protected computer for three years after the study. The contact details of participants will be destroyed immediately after participant involvement is complete.
d) Will you use a unique participant number on research data instead of a participant name? If yes, state whether or not you will retain a list of participant names against

numbers (i.e. pseudonymisation via a linkage list). Where will the list be stored, and when will it be destroyed?		
Yes, I will use a unique identifier for the participants. I will also retain a list of participants names against the numbers, which will be stored in an Excel document on a password protected computer and destroyed immediately after participant involvement is complete which will be on August 12th, 2021.		
e) Who will have access to the research data?		
Only the researcher and the supervisor will have access to the data.		
f) If research data is to be shared with another organisation, how will it be transferred/ disclosed securely?		
N/A		
g) When and how will identifiable data (including audio/ video recordings & photos) be destroyed or deleted? Note: Records of consent should be retained for a minimum of three years after publication or public release. Some funders may require longer periods. If you wish to retain contact details in order to re-approach participants about future studies, you must detail this in information provided to them and obtain specific consent for this.		
Identifiable data will be destroyed on August 15th, 2021. The pseudonymised data will be retained for 3 years after the study's completion.		
h) Please confirm that you will store other research data safely for at least 3 years after final publication or public release and adhere to any additional research funder policies. For more information about the University policies, please see the University's web pages on research data management.	Yes ☒	No ☐
If 'Yes', please give details of who will store the data and on storage format, location and security. Note that open science is encouraged. If 'No', please provide further details below.		
The research data will be stored securely Excel/word/pdf/jpeg documents on a password protected computer and on a personal hard-drive.		
i) Does your research involve the use of secondary (i.e. previously collected) data? Common sources of secondary data include censuses, information collected by government departments, organisational records and data that was originally collected for other research purposes. (If "No", please go to question 19.)	Yes ☐	No ☒

j) Do you have data access agreements for the use of this secondary data? (If so, please attach these.)	Yes ☐	No ☐
k) Is your use of this secondary data compatible with what the data subjects/ participants agreed that their data should be used for?	Yes ☐	No ☐
l) Could this data be linked back to an individual or individuals? If yes, address how securely any personally identifiable data will be transferred to you, and where and for how long it will be stored during or after the research. Who will have access to it?	Yes ☐	No ☐

19. Publication and dissemination of research data and outputs. How will you disseminate and feedback project outcomes at the end of the research?
The data will form part of an MSc dissertation. It is expected that the dissertation will be disseminated through both journal articles and conference presentations. A lay summary will be developed for (a) participating children on the strength and weaknesses of the samples seen, (b) participating teachers with a more detailed representation of the findings on each writing aspect and a summary of the common themes from the interview, and (c) participating parents with a general overview of each writing aspect and a summary of the information from the questionnaire. (Appendix 16, 17 and 18). Individual-level data will not be shared with the participants for confidentiality reasons.

SECTION C: Methods and procedures to be used	
1. Please indicate the methods to be used:	**Mark 'X'**
a) Analysis of existing records [written samples: digital/hardcopy]	☒
b) Snowball sampling (recruiting through contacts of existing participants)	☐
c) Use of casual or local workers e.g. interpreters	☐
d) Participant observation	☐
e) Covert observation	☐
f) Observation of specific organisational practices	☐
g) Participant completes questionnaire in hard copy	☐
h) Participant completes online questionnaire or other online task	☒
i) Using social media	☐

j) Participant performs paper and pencil task [written samples]	☒
k) Participant performs verbal or aural task (e.g. for linguistic study)	☐
l) Focus group	☐
m) Interview	☒
n) Audio recording of participant [Teacher interviews] (you will generally need specific consent from participants for this)	☒
o) Video recording of participant [Teacher interviews, since recording is on Teams platform] (you will generally need specific consent from participants for this)	☒
p) Photography of participant (you will generally need specific consent from participants for this)	☐
q) Others (please specify below)	☒

Please ensure you have addressed any potential ethical issues related to these methods in question B14 and in your Participant Information Sheet.

- Others: Scanned copy of children's writing samples.
  Thai language teachers will provide the researcher with scanned images/files of the participating child's written samples. These samples will include written work from the start of the academic school year.

SECTION D: Professional guidelines and training		
In this section, please mark 'X' against at least one of the following professional guidelines you aim to adhere to. You should use the principles listed in your chosen guideline(s) in conducting your own research. This is not an exhaustive list.		
Research specialism/ methodology	**Association and guidance document**	**Please mark 'X'**
Anthropology	Association of Social Anthropologists of the UK and Commonwealth	☐
Computer Sciences	ACM Code of Ethics and Professional Conduct	☐
Criminology	British Society of Criminology	☐
Education	British Educational Research Association Ethical Guidelines for Educational Research	☒
Geography	Association of American Geographers Statement on Professional Ethics	☐
History	Oral History Society of the UK Ethical Guidelines	☐
Internet-based Research	British Psychological Society: Conducting Research on the Internet Association of Internet Researchers Ethics Guide ACM Code of Ethics and Professional Conduct Association of Internet Researchers (AoIR) Also see CUREC's BPG 06 on internet-mediated research	☒
Law (Socio-Legal)	Socio-Legal Studies Association: Statement of Principles of Ethical Research	☐
Management	Academy of Management's Professional Code of Ethics	☐
Political Science	American Political Science Association (APSA) Guide to Professional Ethics in Political Science	☐
Politics	Political Studies Association. Guidelines for Good Professional Conduct	☐
Psychology	British Psychological Society Code of Ethics and Conduct	☒
Social Research	Social Research Association: Ethical Guidelines	☐
Sociology	The British Sociological Association: Statement of Ethical Practice	☐
Visual Research	ESRC National Centre for Research Methods Review Paper: Visual Ethics: Ethical Issues in Visual Research	☐
Other professional guidelines. Please specify the other guidelines used here:		☐
Please indicate what training in research ethics (or research methodology) the researchers involved with this study have received, e.g. the title of the course and date completed (online training available at http://researchsupport.admin.ox.ac.uk/support/training/ethics), or discussions between researchers and supervisors, if applicable. Note that the core		

module of the University's online research integrity course is compulsory for all researchers.
Research Integrity Core Courses Online Training- 05/14/2021 The researcher and supervisor have biweekly discussions regarding the development of the project.

Appendix V: Approved DPIA Screening Form



Privacy by Design
Reference number:
Project Name/ Processing Activity/Business Practice: Write or Wrong; an analysis of Thai narrative writing samples from Grade 2-3 children

Screening assessment for Data Protection Impact Assessment

Description of personal data to be processed and the purpose of the processing:
The study will be based on a portfolio of written samples of participating children. The writing samples will include the spontaneous sample from routine school activities and researcher-guided activities that teachers will include in their routine class. The research of children's written sample will include error analysis and a calculation of written language productivity and richness of writing. This research aims to discover the frequent errors made by children in this age band. The writing sample for each participating child will consist of a minimum of 30 sentences from multiple writing activities. Currently, school is conducted remotely due to COVID-19, so the writing samples collected are digital samples that participating children have submitted to their teachers. If the school reopens before the end of the school year, the researcher will collect and scan hardcopy of written samples. The researcher will also conduct semi-structured interviews with language teachers regarding the current teaching methods and resources for Thai writing. The information will also include current assessments and coding schemes used to grade writing, what errors teachers see most in children, and what needs to be improved.

Part 1

Certain processing automatically requires a DPIA because it is considered to be high risk to the individuals whose data is involved. This processing has been identified by the ICO.
Complete the checklist below to help you identify if the processing you are intending to carry out requires a DPIA **before** you begin processing.
Examples are given to help you identify the type of processing in each category, the lists of examples are not exhaustive.
Answer Yes or No for each category of processing operation.

Are you intending to carry out processing which involves the following:	**Yes**	**No**
1. new technologies? examples: • machine learning and deep learning • connected and autonomous vehicles • intelligent transport systems • smart technologies (including wearables) • market research involving neuro-measurement (emotional response analysis and brain activity)		No
2. existing technology used in novel way?		No
3. AI?		No
4. decisions about an individual's access to a product, service or opportunity based in any way on automated decision- making (including profiling)? examples: • credit checks • mortgage or insurance applications • pre-check processes related to contracts (smartphones)		No
5. decisions about an individual's access to a product, service or opportunity which involves special category data *?		No
6. any profiling of individuals on a large scale +? examples; • data processed by Smart meters or IoT applications • hardware/software offering lifestyle/fitness monitoring • social media networks • application of AI to an existing process		No

7. any processing of biometric data? examples: • facial recognition systems • workplace access systems/identity verification • access control/identity verification for hardware/applications (including voice recognition/fingerprint/facial recognition) 15.		No
8. any processing of genetic data? examples: • medical diagnosis • DNA testing • medical research		No
9. combining, comparing or matching personal data from multiple sources? examples: • fraud prevention • direct marketing • monitoring personal use/uptake of statutory services or benefits • federated identity assurance services		No
10. personal data not obtained direct from the individuals and the right of those individuals to be informed would be impossible to achieve or involve disproportionate effort? examples: • list brokering • direct marketing • online tracking by third parties • online advertising • data aggregation/data aggregation platforms • re-use of publically available data		No
11. tracking an individual's geolocation or behaviour online or otherwise? examples: • social networks, software applications • hardware/software offering lifestyle/health/fitness monitoring		No

• IoT devices, applications and platforms • Online advertising • web and cross-device tracking • data aggregation/data aggregation platforms • eye tracking • data processing at the workplace • data processing in the context of home and remote working • processing location data of employees • loyalty schemes • tracing services (tele- appending, tele-matching) • wealth profiling- identification of high net-worth individuals for the purposes of direct marketing		
12. personal data of children or other vulnerable ** individuals for marketing purposes? examples: • connected toys • social networks		No
13. personal data of children or other vulnerable individuals for profiling? examples: • connected toys • social networks		No
14. personal data of children or other vulnerable individuals for automated decision- making? examples: • connected toys • social networks		No
15. personal data of children with the intention of offering online services directly to children? examples: • connected toys • social networks		No
16. a risk that a personal data breach could jeopardise the physical health or safety of individuals? examples: • whistleblowing procedures • complaint procedures • social care records • criminal convictions and offences		No
17. systematic and extensive profiling with significant effects***?		No

examples: • credit checks • mortgage/ loan applications • fraud prevention • insurance underwriting • application of AI		
18. special category data on a large scale? examples: • political parties membership data • trade union membership data • health records processed by hospitals/health clinics/gym chains • social care records • research (including medical research) • fraud prevention • application of AI • dating websites/applications 16. 17.		No
19. systematic++ monitoring of publicly accessible places on a large scale? examples: • automatic number plate recognition • intelligent transport systems • traffic management systems involving monitoring of vehicle/driver behaviour • Wi-Fi/Bluetooth/RFID tracking • audio/video surveillance of public areas • application of AI 18.		No

* *Special category* data is information about an individual's:
race, ethnic origin, politics, religion, trade union membership, genetics, biometrics (where used for ID purposes), health, sex life or sexual orientation.
Criminal offence data is not included in the definition of special category data but there are separate safeguards for personal data relating to criminal convictions and offences or related security measures.
+ *large scale* means considering:
the number of individuals concerned, the volume of data, the variety of data, the duration of processing and the geographical extent of processing
** *vulnerable* means where there is a power imbalance between individuals and the controller so that the individuals are unable to easily consent or object to the processing of their data or exercise their rights e.g. children, employees, segments of the population requiring special protection such as the mentally ill. asylum seekers, the elderly, patients and individuals in any relationship where an imbalance in the relationship is identified.

***significant effect* means something that has noticeable impact on an individual that can affect their circumstances, behaviour or choices in a significant way
++ *systematic* means according to a system, is pre-arranged, organised, methodical, occurs as a result of a general plan for data collection or is carried out as part of a strategy

If you have answered Yes to <u>any</u> of the above questions you are required to carry out a DPIA before you begin processing. Complete Part 3 and then please refer to our DPIA template.

<u>Part 2</u>
This part applies where your answers to <u>all</u> the questions in Part 1 are No.
The GDPR states that a DPIA must be carried out where processing **is likely to result in a high risk** to the interests of individuals. This means <u>any</u> interests, it is not limited to privacy rights. You must consider the **potential for harm**, which includes significant economic or social disadvantage, to individuals or society at large, arising from the processing. Assessing the **level of risk** means considering **both the likelihood and severity of any potential harm to individuals**.
"High risk" means:

- harm is more likely or
- the potential harm is more severe or
- both

Complete the checklist below to help you identify if the processing you are intending to carry out is likely to result in a high risk to the interests of individuals.

Are you intending to carry out processing which involves the following?	**Yes**	**Likelihood of potential harm to individuals (unlikely, likely, highly likely)**	**Severity of potential harm to individuals (minor, moderate, severe)**	**No**
Evaluation	Yes	Unlikely	Minor	
Scoring	Yes	Unlikely	Minor	
automated decision- making which has legal or similar significant effect				No
Systematic monitoring				No
sensitive data	Yes	Unlikely	Minor	
data of a highly personal nature				No
data processed on a large scale				No

matching datasets				No
combining datasets				No
data concerning vulnerable individuals				No
innovative use of new technological or organisational solutions				No
applying new technological or organisational solutions				No
preventing individuals from exercising a right				No
preventing individuals from using a service				No
preventing individuals from using a contract				No

Sensitive data: Teachers will be asked questions relating to the curriculum, specifically related to writing. The teachers will be aware of the topics in advance so that they can make informed decision about participating. The interview is not expected to cover sensitive issues, but if any such issues come up, it will not be included in the analysis. These issues include racism or sexism or political stance. Participants can withdraw at any time in the course of the study

A **Yes** answer where the likelihood of potential harm is **likely** or **highly likely** and/or the potential harm is **moderate** or **severe** indicates the processing is likely to result in a high risk to the rights and freedoms of individuals and a DPIA is needed. **Complete Part 3 and then please refer to our DPIA template.**

Part 3

If your screening assessment indicates no DPIA is required, you must keep this under **review**. If there is any proposed change to the processing you are intending to carry out or after processing has begun, you must carry out another screening assessment before the change to processing takes place.

Retain your screening assessment documentation in accordance with your retention schedule.

To help you ensure the processing you are going to carry out has data privacy included in the project plan **carry out a Privacy by Design Assessment** of your processing. **Please refer to our DPA template.**

Screening Assessment Outcome:	No DPIA is required
Reasons:	The potential of harm to participants is unlikely and the severity of harm is minor.

Carried out by:	
Role:	Student Researcher
Date:	29.05.2021
Approved by:	Lisa Holmes
Role:	Deputy Director of Research
Date:	02/06/2021
First review Date:	

Appendix W: DPA forms

W1. Approved DPA Form



Privacy by Design
Reference number:
Project Name/ Processing Activity/Business Practice: Write or Wrong; an analysis of Thai narrative writing samples from Grade 2-3 children

Privacy by Design Assessment

Screening assessment outcomes and reasons:
Set out the outcomes and reasons identified in your screening assessment here to explain why you have concluded a DPA is necessary
My research is concluded to be a low-risk research based on the DPIA screening outcomes. *The study will be based on a portfolio of written samples of participating children. The writing samples will include the spontaneous sample from routine school activities and researcher-guided activities that teachers will include in their routine class. The research of children's written sample will include error analysis and a calculation of written language productivity and richness of writing.* This research aims to discover the frequent errors made by children in this age band. The writing sample for each participating child will consist of a minimum of 30 sentences from multiple writing activities. Currently, school is conducted remotely due to COVID-19, so the writing samples collected are digital samples that participating children have submitted to their teachers. If the school reopens before the end of the school year, the researcher will collect and scan hardcopy of written samples. The researcher will also conduct semi-structured interviews with language teachers regarding the current teaching methods and resources for Thai writing. The information will also include current assessments and coding schemes used to grade writing, what errors teachers see most in children, and what needs to be improved.

Stage 1: Necessity and Proportionality Assessment of Proposed Processing of Personal Data

*What is your **lawful basis** for processing?*	The researcher will strictly adhere to the GDPR guidance for the processing of

*What additional **condition** are you relying on for processing special category data?* ***Transparency:*** *When you collect the data, will you be giving individuals the following information:* *a. The purposes for which their personal data will be processed?* *b. The people or organisations their personal data will be shared with?* *c. The lawful basis for processing their personal data?* *d. Any international transfers of their personal data* *e. When their personal data will be erased?* *f. Their rights under GDPR?* *19.* *20.* ***Accuracy:*** *Are individuals able to update their personal details in the event of any changes?* ***Data minimisation:*** *a. Is the personal data to be collected the minimum necessary to achieve your purpose(s)?* *b. Will access to the personal data be restricted to those with a strict need to know?* *c. How will access be controlled?* *d. Is there any scope to anonymise or pseudonymise the data* *21.* ***Retention:*** *a. Is there a documented retention schedule?* *b. Is there a clear reason for the length of time personal data will be kept?* *c. Is the reason documented?* *d. Is there a procedure for implementation of the retention schedule?* *e. Is there a procedure in place for monitoring the implementation of the retention schedule?* *22.* ***Security:***	personal data. The lawful basis is public interest task, along with consent. The study does not collect special category data. ***Transparency:*** All the information outlined in points a. to f. will be provided to the participants in recruitment materials for the Head of Elementary, teachers, parents and participating child. All participants will have access to the student researcher and lead investigators email, so they can contact one of us if they have any questions. The research strictly follows the research ethics principles of the University and hence follows GDPR. ***Accuracy:*** The personal data collected would be the child's written samples, home Thai language and literacy environment through a parent questionnaire and teacher interview about the school Thai curriculum and teaching ways. The personal data collected from the child will include their age and school grade. The personal data collected from the teacher will include their gender and work history. There is a low likelihood that this data would need to be altered. However, if participants needed to make a change to their personal details, they can contact either the student researcher or the lead investigator through email. ***Data minimisation:*** Minimal amount of basic descriptive data will be collected – Thai books at home, how often the Thai language is used, Thai home tutor. The data will only be seen by myself and my supervisor. All the data will be pseudonymised using unique identifier codes. ***Retention; Security:*** The student researcher has created a process of data collection.

a. *Will personal data be collected, transmitted and stored securely?* b. *Is the level of security to be provided appropriate to the risks presented by the processing?* c. *Will arrangements be put in place for the secure disposal and/or destruction of data when it is no longer required?* ***Data processors:*** a. *Will a third party be used to process the personal data on behalf of the University?* b. *What processing will the processor carry out?* c. *Is there an agreement in place with the third party?* d. *Does the agreement include all the provisions required under the GDPR?* *23.* ***Data sharing:*** a. *Are decisions about how the personal data will be used being taken jointly with another organisation?* b. *Is the personal data to be shared with that other organisation?* c. *Is there an agreement with the other organisation covering respective roles & responsibilities including request and complaints handling?* *24.* ***International transfers:*** a. *Will personal data be transferred outside the EEA?* b. *If so, will the transfer be to a country approved by the EU?* c. *If not, will appropriate safeguards be in place e.g. model clauses/Privacy Shield*	Online Consent: Online consent received from participating child, parents and teachers will be received via email as an attachment. The attachment will be downloaded and stored safely on a password protected computer. Consent records/contact details: all consent records along with the digital version will be stored safely and securely using encrypted files in department-provided storage system (e.g. Nexus365 OneDrive) and on a password protected computer. The contact details will be destroyed in August 2021. Photographs (scanned images of the portfolio of writing samples): All the data will be captured via scanning devices (phone, scanner) and secured on a computer with a password and on the department-provided storage system (e.g. Nexus365 OneDrive). There will be no images stored in the memory of the scanning device being used. Questionnaire answers from parents: The questionnaire will be distributed via Qualtrics. All questionnaire answers will be recorded digitally and will be stored safely and securely using encrypted files in department-provided storage system (e.g. Nexus365 OneDrive) and on a password protected computer. Audio Recordings/Transcription of Audio recording from teacher interviews: The audio recording will be via Microsoft TEAMs during teacher interviews. The audio recordings will be stored on a password protected computer. The recording will be transcribed, and the transcription will also be stored safely and securely using encrypted files on a password protected computer. Video Recording: In Microsoft TEAMs, the video recording occurs in conjunction with the audio recording. The video recording will be via Microsoft TEAMs during teacher interviews. The video recordings will be stored on a password protected computer.

	Data Processors: No third party will have access to personal data. The student researcher and the principle investigator will be the only ones with access to the data. ***Data sharing:*** Personal data will not be shared with another organisation. ***International Transfers:*** Personal data will be collected in Bangkok, Thailand and will be stored on the department-provided storage system (e.g. Nexus365 OneDrive). Files will be transferred using the University's email system and file transfer system.

Stage 2: Risks Identification and Assessment Matrices

Remote likelihood of harm + minimal impact = LOW risk

Possible likelihood of harm + minimal impact = LOW risk

Probable likelihood of harm + minimal impact = LOW risk

Remote likelihood of harm + significant impact = LOW risk

Possible likelihood of harm + significant impact = MEDIUM risk

Probable likelihood of harm + significant impact = HIGH risk

Remote likelihood of harm + severe impact = LOW risk

Possible likelihood of harm + severe impact = HIGH risk

Probable likelihood of harm + severe impact = HIGH risk

		SEVERITY OF IMPACT		
		Minimal	Significant	Severe
LIKELIHOOD OF HARM	Remote	LOW	LOW	LOW
	Possible	LOW	MEDIUM	HIGH

	Probable	LOW	HIGH	HIGH

Risks of Processing Matrix

Impact on Individuals **Will the processing lead to individuals suffering…**	**Likelihood of Harm** **Remote** **Possible** **Probable**	**Severity of Impact** **Minimal** **Significant,** **Severe**	**Overall risk** **Low,** **Medium** **High**	**Reasons**
Inability to exercise their privacy rights ie: • *To be given information about processing* • *To access their personal data* • *To request correction* • *To request erasure* • *To object to personal data being processed for marketing purposes* • *To object to processing where the lawful basis is legitimate interests* • *To restrict processing* • *To request transfer to another party* • *Inability to request decisions are made by a person and not by automated processing*	**Remote**	**Minimal**	**Low**	Participants will be informed about their privacy rights through information letters prior to the study.
Inability to access services	**Remote**	**Minimal**	**Low**	Participating Children: While the research itself does not involve discussing sensitive issues, the children's writing samples may consist sensitive topics, such as their race or religious belief. This
Inability to access opportunities	**Remote**	**Minimal**	**Low**	
Loss of control over personal data	**Remote**	**Minimal**	**Low**	
	Remote	**Minimal**	**Low**	

Discrimination *Identity theft* *Fraud* *Financial loss* *Reputational damage* *Physical harm* *Emotional harm* *Loss of confidentiality* *Reidentification of pseudonymised data* *Any other significant economic disadvantage* *Any other significant social disadvantage*	**Remote** **Remote** **Remote** **Remote** **Remote** **Remote** **Remote** **Remote**	**Minimal** **Minimal** **Minimal** **Minimal** **Minimal** **Minimal** **Minimal** **Minimal**	**Low** **Low** **Low** **Low** **Low** **Low** **Low** **Low**	information will not be included in the analysis. Parents: Parents will be asked questions about how often the Thai language is used at home, how many Thai books they have, and whether the child has a Thai tutor at home. The questionnaire is not expected to cover sensitive issues, but if any such issues come up, it will not be included in the analysis. Participants can withdraw at any time in the course of the study. Teachers: Teachers will be asked questions relating to the curriculum, specifically related to writing. The teachers will be aware of the topics in advance so that they can make informed decision about participating. The interview is not expected to cover sensitive issues, but if any such issues come up, it will not be included in the analysis. These issues include racism or sexism or political stance. Participants can withdraw at any time in the course of the study. Consent forms, questionnaire answers, interview audio

Inability to access personal data because IT systems used for processing are unavailable *Inability to access personal data in a timely manner due to inability of the University or a third party to restore access to systems in a timely manner*	**Remote** **Remote**	**Minimal** **Minimal**	**Low** **Low**	recordings, interview transcription and photographs/scanned copies of the portfolio will be pseudonymised and will be stored securely in an Excel/word/pdf/jpeg document using encrypted files in the department-provided storage system (e.g. Nexus365 OneDrive) and on a password protected computer for three years after the study. The contact details of participants will be destroyed immediately after participant involvement is complete. The personal data will be stored on a password protected computer along with the department-provided storage system. So this does not impact the participant's ability to access personal data.

Security Risk Matrix

Source of Risk to Individuals A breach of security leading to individuals suffering…..	**Likelihood of Harm** **Remote** **Possible** **Probable**	**Severity of Impact** **Minimal** **Significant,** **Severe**	**Overall risk** **Low,** **Medium** **High**	**Reasons and Measures to be Taken**

loss of personal data examples: • Insecure electronic devices • Unencrypted memory sticks • Paper copies removed from secure work environment • IT system 25.	Remote	Minimal	Low	All data will be stored on a password protected computer and, on the department-provided storage system (e.g. Nexus365 OneDrive).
destruction of personal data	Remote	Minimal	Low	Identifiable data will be destroyed on August 15th, 2021. The pseudonymised data will be retained for 3 years after the study's completion.
alteration of personal data	Remote	Minimal	Low	The personal data will mainly come from home language and literacy environment questionnaire. Personal data would not be altered.
Unauthorised disclosure of personal data examples: • Insecure paper waste disposal • Insecure hardware disposal • Use of insecure email accounts 26. Phishing by email, telephone or face to face	Remote	Minimal	Low	The student researcher has created a process of data collection that ensures safe collection, transfer and storage of data for all participating members.

Unauthorised access to personal data examples: • Inadequate doors and locks • Inadequate supervision of visitors • Inadequate IT system security 27.	Remote	Minimal	Low
Inability to access personal data because IT systems used for processing are unavailable	Remote	Minimal	Low

Data Protection Principles Risks Matrix

Source of Risk to Individuals Will individuals suffer harm because….	**Likelihood of Harm** **Remote** **Possible** **Probable**	**Severity of Impact** **Minimal** **Significant,** **Severe**	**Overall risk** **Low,** **Medium** **High**	**Reasons and Measures to be Taken**
Personal data will not be obtained direct from individuals & informing them of processing is impossible to achieve or will involve disproportionate effort	Remote	Minimal	Low	Personal data will be obtained from the participating child, parents of the child and teachers. The researcher will provide written and verbal notice of the data collection process.
The purpose of processing is unclear	Remote	Minimal	Low	The purpose of processing will be clearly informed and will not be changed after the approval of the CUREC.
The purpose changes over time	Remote	Minimal	Low	In a case that the purpose changes overtime or a new purpose arises, the
A new purpose arises	Remote	Minimal	Low	

				researcher will file for an amendment to the CUREC.
Inadequate personal data is collected for the purpose	Remote	Minimal	Low	Only minimal descriptive personal data will be collected.
Irrelevant personal data is collected	Remote	Minimal	Low	
More personal data is collected than necessary	Remote	Minimal	Low	
The personal data held is not accurate	Remote	Minimal	Low	The personal data will be collected directly from the participants themselves (Participating child, parent, teacher)
The personal data is collected from unclear sources	Remote	Minimal	Low	
The integrity of the personal data is unclear	Remote	Minimal	Low	
The personal data is kept for longer than needed	Remote	Minimal	Low	Identifiable data will be destroyed on August 15th, 2021. The pseudonymised data will be retained for 3 years after the study's completion.

Carried out by:	
Role:	Student Researcher
Date:	29.05.2021
Approved by:	Lisa Holmes
Role:	Deputy Director of Research
Date:	02/06/2021
First review Date:	
Measures to be incorporated into project plan	By: Role: By date:

W2. Approved DPA Amendment Form

AMENDMENT FORM (C2)

Project name/processing activity/business practice:	Write or Wrong; an analysis of Thai Children's Writing Samples
Reference number:	

SEQUENTIALLY ATTACH ALL AMENDMENT FORMS TO THE UPDATED DPA/DPIA AS APPENDICES

Amendment Form Number:	***1ST AMENDMENT***
Corresponding DPIA Version:	***RELATES TO THE FIRST DPA FORM AND DPIA SCREENING FORM***

Stage 1. Summary of amendments

EVERY AMENDMENT AND/OR ADDITION TO THE DPA/DPIA SHOULD BE RECORDED BELOW A SEPARATE BOX SHOULD BE USED FOR AMENDMENTS TO DIFFERENT PARTS OF THE ASSESSMENT.
ADD/REMOVE BOXES WHERE REQUIRED

AMENDMENT ONE

State what part of the DPA or DPIA is being amended. Summarise the amendment being made. Detail why the amendment is being made.

Section of the document being amended (include section number and part number).

Section 1

Detailed summary of the amendment and/or addition.

Recruitment methods were changed from emailing the Head of Elementary to contacting parents via instant communication applications, such as Whatsapp and LINE using the method of snowball sampling. The researcher sent their personal contacts a message inviting them to participate to the study. In the message, the researcher requested parents to forward the message and a pdf information sheet to other parents who fit the eligibility criteria of the study (Appendix 1-2). If parents were interested to participate in the study, they were requested to revert via email communication by sending the consent form. The online consent from participating child and parents were received via email as an attachment. The attachment was downloaded and stored safely on a password protected computer.

Consent forms were pseudonymised and stored securely in an word/pdf/jpeg document using encrypted files in the department-provided storage system (e.g. Nexus365 OneDrive) and on a password protected computer for three years after the study. The contact details of participants will be destroyed immediately after participant involvement is complete.

The researcher is aware that the University of Oxford has not conducted a formal assessment on the Third Party Security for Whatsapp. All messages sent and received via Whatsapp will be deleted after participant involvement is complete. For LINE, the personal data is located on secure servers in Japan and the European Commission has deemed that Japan has secured sufficient protection standards regarding personal data. Similarly, all messages sent and received via LINE will be deleted after participant involvement is complete.

Purpose and reasons for the amendment.

The third wave of COVID-19 lead to school closures in Thailand. Through email recruitment methods the head of elementary expressed concerns of teachers being extremely busy and stressed, so the researcher needed to find another way of collecting participants for the study. Since children were learning from home, the researcher decided to collect participants via parents. Fortunately, the researcher has personal contacts with parents whose children are eligible for this study and requested them to pass along the message.

Stage 2. Revised Risk assessment and mitigation

Populate the risk table where individual risks have been introduced or revised by the amended processing

Use this matrix to determine each new or revised level of risk and fill out the table below:

		SEVERITY OF IMPACT		
		Minimal	Significant	Severe
LIKELIHOOD OF HARM	Remote	LOW	LOW	LOW
	Possible	LOW	MEDIUM	HIGH
	Probable	LOW	HIGH	HIGH

Revised risk assessment and mitigation table

	Risk Assessment			Risk Mitigation	
Impact on Individuals	Likelihood of harm Remote Possible Probable	Severity of impact Minimal Significant Severe	Overall risk rating (Low/Medium/High) and reasons	Measures to reduce risk and residual risk rating (Low/Medium/High)	Risk Eliminated Reduced Accepted
Inability to exercise their privacy rights ie: • *To be given information about processing* • *To access their personal data* • *To request correction* • *To request erasure* • *To object to personal data being processed for*	**Remote**	**Minimal**	**Low** Parents were informed about their privacy rights through the information letter sent along with the Whatsapp and LINE messages. The personal data will be stored on a password protected computer along with the department-provided storage system. So, this does not impact the participant's ability to access personal data.	**LOW** loss of personal data examples: • Insecure electronic devices • Unencrypted memory sticks • Paper copies removed from secure work environment • IT system **LOW:** destruction of personal data	Reduced All data will be stored on a password protected computer and, on the department-provided storage system (e.g. Nexus365 OneDrive). Identifiable data will be destroyed on September 30th, 2021. The

marketing purposes • *To object to processing where the lawful basis is legitimate interests* • *To restrict processing* • *To request transfer to another party* • *Inability to request decisions are made by a person and not by automated processing*					pseudonymised data will be retained for 3 years after the study's completion.	
Loss of control over personal data	**Remote**	**Minimal**	**Low**			
Identity theft	**Remote**	**Minimal**	**Low**			
Loss of confidentiality	**Remote**	**Minimal**	**Low**			
Reidentification of pseudonymised data	**Remote**	**Minimal**	**Low**			

Inability to access personal data in a timely manner due to inability of the University or a third party to restore access to systems in a timely manner	**Remote**	**Minimal**	**Low** Consent forms received by parents will be pseudonymised and will be stored securely in a word/pdf/jpeg document using encrypted files in the department-provided storage system (e.g. Nexus365 OneDrive) and on a password protected computer for three years after the study. The contact details of participants will be destroyed immediately after participant involvement is complete.			

Stage 3. Completion and review

The amendment form must be reviewed and signed by the departmental data protection risk owner (See Data Protection Policy for details)

a. Amendment form completed by (name):

b. Role / Job Title:

c. Complete relevant stakeholder signature boxes below:

A	**Measures approved for incorporation into project plan:**	
	Name:	Dr Katrina May Dulay
	Role / Job Title:	Designated Member, Departmental Research Ethics Committee (DREC)
	Signature:	KMD
	Date:	10 September 2021
	Date:	