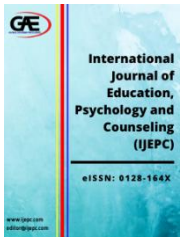
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A CONCEPTUAL FRAMEWORK FOR PROFILING DIFFICULTIES IN READING AND SPELLING CLOSED CVC SYLLABLES AMONG PUPILS IN THE PEMULIHAN KHAS PROGRAMME

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Abstract:

Proficiency in reading and spelling closed consonant–vowel–consonant (CVC) syllables is an important aspect of Malay literacy development, particularly for pupils in the Pemulihan Khas programme who still require support with Skills 8–15. This article aims to develop a conceptual framework to describe these pupils' profiles of difficulty in reading and spelling CVC syllables. Although previous studies have provided a basis for understanding phonological processing, relationships between written forms and sounds, CVC structure, and types of reading and spelling errors, the evidence reviewed remains fragmented across research foci and domains and has not been integrated into an account of CVC reading and spelling difficulty profiles. The framework is developed through a synthesis of linguistic concepts, theoretical foundations and evidence from previous studies. Psycholinguistic Grain Size Theory (PGST) informs the understanding of phonological unit processing, while Orthographic Mapping (OM) provides a basis for understanding relationships between written forms and sounds. The evidence is compared in terms of processing direction, the position of elements within the C–V–C structure, and reported error types. The synthesis yields seven components within three analytical groupings: three in the reading domain, comprising letter–sound correspondences, C–V–C blending and coda sound retention during reading; two in the spelling domain, comprising sound–letter correspondences and written CVC spelling; and two in the cross-

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domain grouping, comprising correspondence between reading and spelling performance and recurring error patterns. The article concludes that CVC reading and spelling difficulty profiles need to be described through an integrated account of accuracy, the processes involved, the position of affected elements, and the relationship between the two skills. The framework offers a conceptual basis for further empirical investigation within the Malay language Pemulihan Khas programme.

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Keywords:

Conceptual Framework; Reading and Spelling Difficulties; Phonological Processing; Pemulihan Khas Programme; Closed CVC Syllables

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Introduction

Reading and spelling are two important components of literacy development (Furnes et al., 2024). Together, they provide a foundation for understanding texts and producing more complex written work (Kim, 2026), supporting pupils' participation in learning across the curriculum (Organisation for Economic Co-operation and Development [OECD], 2019). The acquisition of basic literacy skills is also linked to efforts to provide inclusive, equitable and quality education (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2016). In Malaysia, KPM (2024) reported that 122,062 of the 448,113 Year 1 pupils who underwent literacy and numeracy screening had not yet mastered basic reading, writing and arithmetic skills (3M).

The Pemulihan Khas programme provides guidance and intervention for pupils who experience specific difficulties in acquiring basic reading, writing and arithmetic skills (KPM, 2017). In the Malay language component, skills are organised progressively, from letter recognition to proficiency in syllables, words and sentences (KPM, 2019). The consonant–vowel–consonant (CVC) structure is covered within Skills 8–15 and is used in reading and spelling activities involving syllables, words and combinations of related structures (KPM, 2019).

Although CVC extends the open consonant–vowel (CV) syllable pattern, the transition to CVC is not necessarily straightforward for all pupils. Ali and Nor Shaid (2025) found that a higher percentage of Year 1 pupils could sound out syllables and read words with open syllable patterns than those with closed syllable patterns. This finding suggests that closed syllable patterns may be more challenging for some pupils. However, their study involved mainstream pupils and focused on reading. It did not specifically describe the types of difficulty that pupils in the Pemulihan Khas programme experience when reading and spelling CVC syllables.

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Evidence from studies on Malay helps to clarify these difficulties by showing that reading and spelling difficulties can involve several distinct aspects. These include relationships between written forms and sounds, phonological processing, blending, final consonants, and spelling development and errors (Jamil & Rusli, 2024; Lee et al., 2019; Loo & Mariani, 2020; Rickard Liow & Lee, 2004). Studies in the Pemulihan Khas context also report difficulties in reading or spelling forms containing final consonants (Samsudin et al., 2017; Yuan, 2023), while cross-linguistic research has examined the relationship between reading and spelling (Furnes et al., 2024). Although these studies provide an important basis for understanding such difficulties, the evidence in the literature reviewed remains fragmented across research foci and domains and has not been integrated into an account of CVC reading and spelling difficulty profiles. Existing accounts have also not specifically integrated the direction of processing between written forms and sounds, the position of elements within the C–V–C structure, correspondence between reading and spelling performance, and tendencies towards recurring errors at the individual level.

Limitations in the description of these profiles are also evident in records of pupils' skill attainment. Data from the Malay language Pemulihan Khas programme in Kota Belud district in March 2025 recorded 62 of 678 pupils within Skills 8–15. However, these records indicate only the pupils' skill levels and do not detail the types and patterns of difficulty encountered when reading and spelling CVC syllables (Pejabat Pendidikan Daerah Kota Belud, Unit Pemulihan Khas, 2025). A pupil's placement within a particular range of skills is therefore insufficient to describe the types and tendencies of difficulty that characterise their CVC proficiency profile.

This article therefore aims to develop a conceptual framework for describing the profiles of difficulty experienced by pupils in the Pemulihan Khas programme when reading and spelling CVC syllables within Malay Language Skills 8–15. The proposed framework synthesises previously fragmented evidence from the reading and spelling domains into seven components. These distinguish the direction of processing from written forms to sounds during reading and from sounds to written forms during spelling, the position of elements within the C–V–C structure, the relationship between reading and spelling performance, and tendencies towards recurring errors. The framework's main contribution lies in integrating these aspects into a single analytical structure through which CVC difficulties can be described in terms of the processes involved, the position of affected elements, correspondence between reading and spelling performance, and tendencies towards recurring errors at the individual level. Although developed in the context of Malay, this analytical structure also provides a conceptual basis for comparison with research on reading and spelling in other languages with relatively transparent relationships between written forms and sounds, while accounting for differences in their syllable structures and orthographic features.

Approach to Developing the Conceptual Framework

To achieve this aim, the conceptual framework was developed by organising and connecting concepts, theoretical foundations and evidence from previous studies. This follows a theory synthesis approach that emphasises the integration of several perspectives or streams of literature to develop a more comprehensive conceptual understanding (Jaakkola, 2020). The purpose was to develop a more focused structure for describing CVC reading and spelling difficulty profiles, rather than to generate new empirical findings. The scope of the framework was defined by the place of CVC within Malay Language Skills 8–15 in the Pemulihan Khas

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programme (KPM, 2019), covering CVC reading and spelling processes at the level of syllables, words and combinations of related structures.

The framework drew on three complementary groups of sources. The first comprised linguistic sources used to define CVC syllable structure, including the position of the final consonant, or coda (Ahmad, 2004; Kasim, 2023; Teoh, 1989). The second comprised Psycholinguistic Grain Size Theory (PGST), which informed the understanding of phonological processing at different unit sizes (Ziegler & Goswami, 2005), and Orthographic Mapping (OM), which informed the understanding of relationships between written forms and sounds and the formation of memory representations of word spellings (Ehri, 2014). The third comprised empirical studies on Malay and international studies addressing types of reading and spelling difficulty. These covered letter–sound correspondences, C–V–C blending, final consonant or coda sound retention, sound–letter correspondences, CVC spelling, the relationship between reading and spelling, and reported error patterns.

Source selection focused on contributions to the description of CVC structure, reading and spelling processes, or types of difficulty relevant to the development of the framework components. Evidence from the Malay language context, particularly the Pemulihan Khas programme, was used where available, while international studies supplemented aspects addressed in less detail in the local literature. The main empirical studies supporting the development of each component are summarised in Table 1. The three groups of sources were then synthesised by examining similarities, differences and relationships among the linguistic concepts, theoretical foundations and empirical evidence assembled. This follows the theory synthesis approach of integrating multiple theories and streams of literature to develop a more comprehensive conceptual understanding (Jaakkola, 2020).

To develop the framework components, the types of reading and spelling difficulty identified in the assembled sources were compared on four main bases: processing direction, the position of elements within the C–V–C structure, types of difficulty within each domain, and cross-domain relationships. Processing direction was distinguished as proceeding from written forms to sounds during reading and from sounds to written forms during spelling (Ehri, 2014; Lee et al., 2019). Difficulties associated with the same elements or processes were grouped together, while those involving different processing demands were retained as separate components. Cross-domain relationships were examined by comparing reading and spelling performance and considering tendencies towards errors that appeared across several responses. A component was retained when it had a distinct conceptual function, involved types of difficulty identifiable through reading or spelling performance, and was supported by relevant theory or empirical evidence.

Through this process, seven components were organised into three analytical groupings. The reading domain comprises letter–sound correspondences, C–V–C blending and coda sound retention; the spelling domain comprises sound–letter correspondences and written CVC spelling; and the cross-domain grouping comprises correspondence between reading and spelling performance and recurring error patterns. These groupings provide the conceptual structure for describing CVC reading and spelling difficulty profiles. This structure allows CVC difficulties to be described in terms of reading and spelling accuracy, the processes involved, the position of affected elements, and the relationship between reading and spelling performance. The principles underlying the framework's development, together with its structure, functions and boundaries, are discussed in the following sections.

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Closed CVC Syllables: Structure and Requirements for Proficiency

In the Malay language Pemulihan Khas programme, proficiency in CVC structure is addressed within Skills 8–15 through reading and spelling activities at the level of syllables, words and combinations of related structures (KPM, 2019). Figure 1 shows the place of CVC structure within this range of skills. This section explains CVC structure and the processing demands involved in reading and spelling

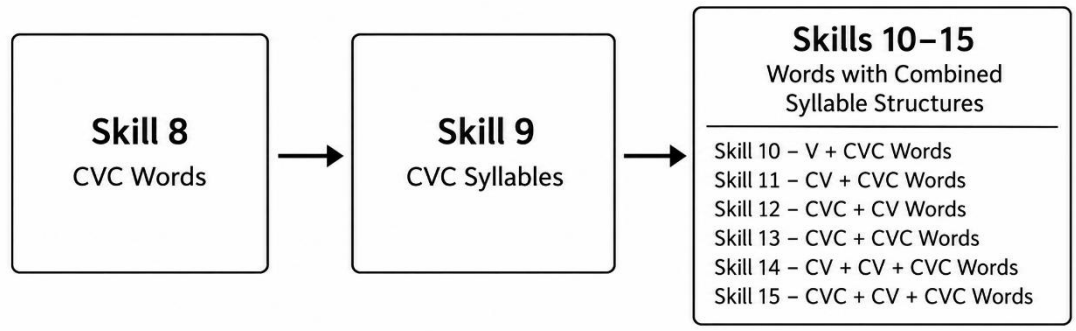


Figure 1: CVC within Malay Language Skills 8–15 in the Pemulihan Khas Programme
Source: Adapted by the researcher from Kementerian Pendidikan Malaysia (2019).

Figure 1 shows that Skills 8 and 9 focus on CVC words and syllables, respectively, while Skills 10–15 involve words formed by combining CVC syllables with V, CV or other CVC syllables (KPM, 2019). This sequence indicates that CVC proficiency involves using the structure in different forms and combinations. Understanding the structure and its processing demands is therefore important for explaining pupils' ability to read and spell CVC syllables within Skills 8–15.

To understand the processing demands of CVC syllables, the structure needs to be considered within the Malay Rumi writing system. Malay Rumi is generally described as a relatively transparent orthography because letter–sound relationships are largely straightforward, although there are exceptions, such as the letter e, which can represent different sounds (Winskel, 2020; Yap et al., 2010). These relatively predictable letter–sound correspondences can support early reading development (Seymour et al., 2003). Orthographic transparency does not, however, necessarily mean that all syllable types are easy to process, particularly when pupils need to decode more complex sound sequences and syllable structures (Lee & Wheldall, 2011; Seymour et al., 2003).

In this context, a closed CVC syllable has a consonant–vowel–consonant structure, with a consonant in the syllable-final position (Kasim, 2023). The initial consonant occupies the onset, the vowel forms the nucleus, and the final consonant occupies the coda; together, the nucleus and coda form the VC rime (Ahmad, 2004; Kasim, 2023; Teoh, 1989). Unlike an open CV syllable, which has no final consonant, a complete CVC structure requires all three C–V–C elements to be present (Kasim, 2023; Teoh, 1989). This distinction indicates that CVC proficiency involves more than the CV elements: the final consonant must also be processed as part of the complete C–V–C sequence.

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During reading, these demands require pupils to connect letters with sounds and blend the C–V–C sound sequence so that all three elements, including the final consonant in the coda position, are fully pronounced (Ehri, 2014; Foorman et al., 2016; Kasim, 2023). Difficulty in meeting these demands may be evident in the omission of final consonants, as reported in studies on Malay (Husni & Jamaludin, 2010; Subramaniam et al., 2022). Retention of the final consonant sound is therefore an important aspect of describing CVC reading difficulties.

During spelling, pupils need to connect sounds with letters, identify the sequence of sounds heard or spoken, and arrange the C–V–C letters accurately, including the final consonant (Ehri, 2014; Foorman et al., 2016; Kasim, 2023). Difficulties with the final part of word spellings have also been reported in studies on Malay (Rickard Liow & Lee, 2004; Mohd Rusli et al., 2022). Rickard Liow and Lee (2004) found that pupils with lower spelling proficiency could still blend CV units but failed to identify the final consonant in base words with a CV-CVC pattern. This finding is consistent with Mohd Rusli et al. (2022), who also reported consonant omissions in pupils' spellings. Both findings indicate that producing complete CVC spellings requires pupils to identify the sound elements through to the end and map them accurately onto the C–V–C letter sequence.

Overall, reading and spelling CVC syllables involve bidirectional relationships between written forms and sounds, but draw on different processes (Ehri, 2014). These relationships provide the basis for the theoretical account of phonological unit processing and relationships between written forms and sounds presented in the next section.

Theoretical Foundations of CVC Difficulty Profiles

For the purposes of this article, describing pupils' profiles of difficulty in reading and spelling CVC syllables requires a theoretical basis that explains the phonological units processed and the relationships between written forms and sounds. Psycholinguistic Grain Size Theory (PGST) is therefore used as the main theory to explain the processing of phonological units of different sizes, such as phonemes, rimes and syllables (Ziegler & Goswami, 2005). Orthographic Mapping (OM) serves as a supporting theoretical mechanism for explaining how connections between spellings and pronunciations are formed, binding information about word spellings, sounds and meanings in memory (Ehri, 2014). Within the proposed framework, PGST and OM are used in complementary ways to describe CVC reading and spelling difficulty profiles within Malay Language Skills 8–15. PGST focuses on the phonological units processed, while OM focuses on the relationships between written forms and sounds.

Psycholinguistic Grain Size Theory (PGST)

In Psycholinguistic Grain Size Theory (PGST), reading development is influenced by the size of the phonological units processed, such as phonemes, rimes and syllables, and by the nature of the relationships between written forms and sounds in a language's orthographic system (Ziegler & Goswami, 2005). For CVC structure, the concept of phonological grain size can be illustrated through the syllable /kan/. At the phoneme level, /kan/ consists of /k/, /a/ and /n/, while /an/ forms the rime and /kan/ constitutes the whole syllable (Kasim, 2023). This example shows that CVC structure can be considered at several phonological levels. In this framework, PGST helps to describe the phonological units involved when CVC reading difficulties are observed, while its application to spelling is limited to a supporting lens for identifying the sound units involved.

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Evidence for phonological unit processing in Malay reading comes from Lee and Wheldall (2011), who found that processing at the syllable level made a greater contribution to word recognition, while phoneme blending also made a significant contribution. These findings indicate that both syllable-level and phoneme-level processing are involved in Malay word recognition.

Processing at these phonological levels is also related to difficulties involving final consonants and differences in proficiency between open and closed syllables (Yuan, 2023; Ali & Nor Shaid, 2025). Yuan (2023) reported difficulties in forming CVC syllables, involving the omission or substitution of final consonants even when CV syllables had been mastered. Ali and Nor Shaid (2025) reported lower proficiency in closed syllables than in open syllables. Together, these findings suggest that the transition from CV to CVC involves processing an additional element, particularly in blending and retaining the final consonant.

On this basis, PGST is used to describe difficulties in terms of the phonological units involved and how these units are blended to form CVC syllables, rather than to identify a single cause of pupils' difficulties. The formation of connections between sounds and written forms is explained through OM in the following subsection.

Orthographic Mapping (OM)

Orthographic Mapping (OM) describes how readers form connections between written units, such as individual letters or larger spelling patterns, and their corresponding spoken units. These connections link a word's spelling, pronunciation and meaning in memory (Ehri, 2014). For example, in the CVC word bas, the spelling b–a–s is connected to the sound's /b/–/a/–/s/ and to the word's meaning as a type of vehicle. Once these connections between spelling, sounds and meaning are formed, the written form can support recognition of the word when it is encountered again in reading (Ehri, 2014).

The importance of relationships between written forms and sounds is also evident in Malay-language reading. Lee et al. (2019) examined phoneme–grapheme connections in word formation by comparing two groups of Year 2 Malay readers, classified in their study as high-performing readers (n = 32) and low-performing readers (n = 24). The findings showed that low-performing readers had more limited phoneme–grapheme connections than high-performing readers. These results demonstrate differences in phoneme–grapheme connections between the two groups and support the application of Ehri's phase theory of word reading development in the relatively transparent Malay orthography.

Difficulties with relationships between written forms and sounds among weaker readers were also reported by Lee and Wheldall (2011) in their study of low-progress early readers. The findings showed that these readers had insufficient grapheme–phoneme knowledge and were less efficient in forming phonemic codes during reading (Lee & Wheldall, 2011). Drawing on OM and this evidence from Malay, the proposed framework uses relationships between written forms and sounds to describe letter–sound correspondences during reading and sound–letter correspondences during CVC spelling. The application of OM is limited to relationships between written spellings and sounds and is not used to determine the causes of the observed difficulties.

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Integration of PGST and OM

PGST and OM are used in complementary ways to describe pupils' profiles of difficulty in reading and spelling CVC syllables. PGST provides a basis for understanding the phonological units involved in CVC processing (Ziegler & Goswami, 2005), while OM explains relationships between spellings and sounds (Ehri, 2014). In the reading domain, the concept of phonological grain size in PGST is used to describe the sound units involved in C–V–C blending and final consonant retention, while OM is used to describe letter–sound correspondences in CVC decoding. In the spelling domain, PGST has a limited role as a supporting lens for identifying the sound units involved, while OM is used to describe relationships between sounds and spellings. With these distinct roles, the two theoretical foundations allow difficulties to be described in terms of the sound units involved and the relationships between sounds and written forms, without assuming a causal relationship between reading and spelling difficulties. PGST is not used as a theory specifically concerned with spelling production, nor is OM used to explain CVC phonological processing in its entirety.

Beyond describing difficulties within the reading and spelling domains separately, the framework also examines correspondence between reading and spelling performance for the same CVC forms. Where differences occur, the framework describes them without determining their causes in the absence of additional empirical evidence.

Through this integration, the two theoretical foundations support the description of components in the reading domain, the spelling domain and the cross-domain grouping. The framework components are not derived directly from PGST or OM alone. Instead, they are developed through a synthesis of these theoretical foundations, CVC linguistic structure and evidence from previous studies. The structure and functions of the components resulting from this synthesis are described in the next section.

Development of the Conceptual Framework for CVC Reading and Spelling Difficulty Profiles

This section details the conceptual framework for CVC reading and spelling difficulty profiles, drawing on the synthesis presented in the preceding sections. The framework focuses on the types and patterns of difficulty shown by pupils, rather than simply classifying their performance as "mastered" or "not yet mastered". Table 1 summarises the basis for developing the framework's seven components by linking previous studies, the synthesis of evidence and limitations in the literature, and the place of each component within the proposed framework.

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Table 1: Synthesis Matrix of Previous Studies Informing the Development of Components of CVC Reading and Spelling Difficulty Profiles

Component	Related studies	Synthesis of evidence and limitations in the literature	Domain
Letter–sound correspondences	Lee & Wheldall (2011); Lee et al. (2019); Lee & Ha (2025)	Grapheme–phoneme correspondences support decoding, but difficulties involving CVC elements among pupils in the Pemulihan Khas programme remain insufficiently described.	Reading
C–V–C blending	Lee & Wheldall (2011); Loo & Mariani (2020); Wahap (2021)	Phoneme blending supports word recognition and reading, including the reading of closed syllable structures.	Reading
Coda sound retention	Husni & Jamaludin (2010); Subramaniam et al. (2022); Yuan (2023)	Final consonant omissions and substitutions have been reported, but coda retention has not been described as a distinct component of CVC difficulty profiles.	Reading
Sound–letter correspondences	Lee et al. (2019); Mohd Rusli et al. (2022); Di Blasi et al. (2023)	Spelling difficulties may involve inaccurate mapping of sounds to letters, but evidence specific to CVC structure remains limited.	Spelling
Written CVC spelling	Rickard Liow & Lee (2004); Mohd Rusli et al. (2022); de Bree et al. (2022)	Spelling difficulties involve structural completeness and final consonants, but the formation of the complete C–V–C sequence remains insufficiently described.	Spelling
Correspondence between reading and spelling performance	Lee (2008); Lee et al. (2020); Rahbari (2019)	Reading and spelling are interrelated and may show discrepancies, but correspondence at the level of specific CVC elements has not been described in detail.	Cross-domain
Recurring error patterns	O'Brien et al. (2020); Jeon et al. (2023); Jozipović et al. (2025)	Errors can be categorised across tasks and at the individual level, but their recurrence across multiple CVC reading and spelling responses remains insufficiently described.	Cross-domain

Source: Researcher's synthesis based on the studies listed in the table.

Based on this synthesis, the seven framework components are organised according to four principles. The resulting framework structure, functions and limitations are discussed in the following sections.

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Principles of Framework Development

The development of the seven components of the difficulty profile is guided by four principles: differences in processing direction between reading and spelling, the position of elements within the CVC structure, the forms of difficulty observed in each domain, and cross-domain relationships. These four principles provide the basis for organising the components into the reading domain, the spelling domain and the cross-domain grouping.

The first principle distinguishes the processing direction involved in reading and spelling. In this framework, the relationship between spellings and sounds is distinguished according to processing direction: from letters to sounds when reading CVC forms and from sounds to letters when spelling CVC forms (Ehri, 2014). The relationship between sounds and written forms is also supported by Malay research on phoneme–grapheme relationships in word formation (Lee et al., 2019). Because the processing directions differ, letter–sound correspondences and sound–letter correspondences are retained as two separate components, located in the reading and spelling domains, respectively.

The second principle focuses on the position of linguistic elements within the C–V–C structure. As explained earlier, the final consonant occupies the coda position (Ahmad, 2004; Kasim, 2023; Teoh, 1989). In this framework, two components in the reading domain are distinguished according to this structure. C–V–C blending involves the integration of the complete sound sequence (Foorman et al., 2016; Loo & Mariani, 2020), whereas coda sound retention during reading focuses specifically on the consonant sound in the final position (Kasim, 2023). In the spelling domain, the accuracy of the final consonant letter is described as part of written CVC spelling and is not established as a separate component.

The third principle distinguishes difficulties involving the coda sound during reading from those involving the final consonant letter during spelling. In reading, such difficulties may be indicated by the omission or substitution of the coda sound (Samsudin et al., 2017; Yuan, 2023). In spelling, they may involve the omission or substitution of the final consonant, or failure to identify and write the final consonant letter (Mohd Rusli et al., 2022; Rickard Liow & Lee, 2004; Yuan, 2023). Difficulties involving final elements are therefore described according to how they are manifested in each domain.

The fourth principle examines cross-domain relationships, comprising correspondence between reading and spelling performance and recurring error patterns. With regard to reading–spelling correspondence, the relationship between the two skills has empirical support, as Lee et al. (2020) reported a strong correlation between spelling and word-reading accuracy ($r = .80$). The study used the same set of 10 words to measure both spelling and word-reading accuracy, providing a basis for comparing the two skills using matched target items. Rahbari (2019) similarly asked pupils to read and spell the same set of 60 Persian words and showed that the relationship between reading and spelling varied according to word characteristics. For some word categories, pupils read the words more accurately than they spelled them, whereas the reverse pattern was observed for another category; for transparent-monographic words, reading and spelling accuracy did not differ significantly. On this basis, the reading–spelling correspondence component compares pupils' reading and spelling responses to the same CVC forms.

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Beyond the relationship between the two skills, Jozipović et al. (2025) showed that reading errors can be examined across several materials, including pseudowords, real words and text, and described at the individual level according to the types of errors that occur. In terms of error forms, Avdyli and Cuetos (2012) showed that phonological errors in transparent orthographies can be described using categories such as additions, omissions and substitutions. Together, these two bodies of evidence provide a basis for examining whether the same type of error recurs across several outcomes. In this framework, recurring error patterns refer to the tendency for the same error type or error position to reappear across several reading outcomes, spelling outcomes, or both.

Evidence for cross-domain comparison can also be found in previous studies. Rahbari (2019) compared reading and spelling performance using the same materials, while Jeon et al. (2023) used corresponding error categories to describe errors across reading and writing tasks involving decoding and spelling accuracy. However, the literature reviewed did not identify a study that examined the recurrence of the same error type or error position across several CVC reading and spelling outcomes at the level of individual pupil profiles, particularly among pupils in the Pemulihan Khas programme. For this reason, reading–spelling correspondence and recurring error patterns are placed in the cross-domain grouping because both involve comparison or the formulation of patterns rather than a distinct basic reading or spelling process. On the basis of these four principles, the seven framework components are organised according to processing direction, position within the CVC structure, domain-specific forms of difficulty, and cross-domain relationships.

Structure of the Conceptual Framework

Based on the development principles described above, the conceptual framework is organised into three main parts: the reading domain, the spelling domain and the cross-domain grouping. The reading domain comprises letter–sound correspondences, C–V–C blending and coda sound retention. The spelling domain comprises sound–letter correspondences and written CVC spelling, including the accuracy of final consonant letters. The cross-domain grouping comprises correspondence between reading and spelling performance and recurring error patterns. This grouping allows outcomes from the two domains to be compared and summarised at the individual level. The overall framework structure is shown in Figure 2.

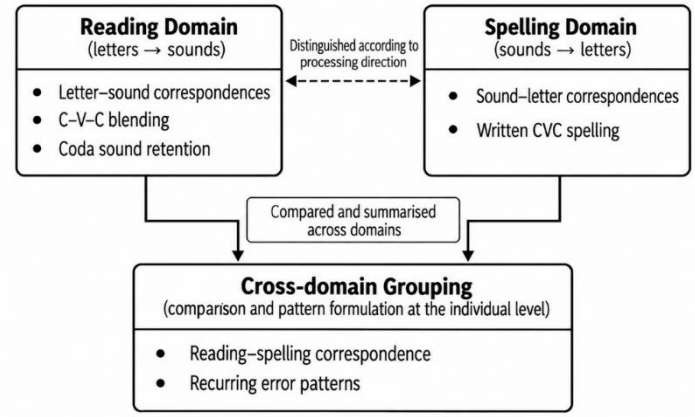


Figure 2: Framework Profiling Difficulties in Reading and Spelling Closed CVC Syllables

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Source: Developed by the researcher based on the synthesis of PGST (Ziegler & Goswami, 2005), Orthographic Mapping (Ehri, 2014), and previous studies discussed in the preceding sections and summarised in Table 1.

As shown in Figure 2, the reading and spelling domains are arranged in parallel rather than as a linear sequence. The two domains are distinguished according to processing direction: from letters to sounds in reading and from sounds to letters in spelling. Difficulties within each domain are first described according to the relevant components. Outcomes from the two domains are then compared and summarised through the cross-domain grouping. Reading–spelling correspondence examines the relationship between reading and spelling outcomes for the same CVC forms, whereas recurring error patterns examine tendencies for the same error type or element position to recur across several reading outcomes, spelling outcomes, or both, at the individual level.

The two-way dashed line between the reading and spelling domains represents the conceptual relationship between the two domains, which are distinguished according to processing direction. The solid arrows directed from both domains towards the cross-domain grouping indicate the analytical flow from describing domain-specific difficulties to comparing outcomes and formulating patterns at the individual level. Neither type of relationship represents a causal relationship or a developmental sequence between reading and spelling.

Functions and Limitations

This conceptual framework provides an organisational structure for describing pupils' difficulty profiles across the reading domain, the spelling domain and the cross-domain grouping. Its analytical value lies in connecting the direction of reading or spelling processing with the position of affected elements within the C–V–C structure, while comparing outcomes from the two skills through reading–spelling correspondence and tendencies towards recurring errors. This organisation allows variations in difficulty to be described in terms of the processes involved, the position of affected elements and cross-domain relationships, rather than solely through general classifications of mastery. In this article, the framework is used to describe the difficulty profiles of pupils in the Pemulihan Khas programme in acquiring CVC skills within Malay Language Skills 8–15.

The framework is descriptive in nature. It is not intended to diagnose learning disorders, identify a single cause of difficulty, or determine causal relationships between the reading and spelling domains. It is also not used to evaluate teachers' performance or determine the effectiveness of any intervention. PGST and OM are used to organise and describe forms of difficulty, rather than to draw conclusions about specific cognitive mechanisms in an individual pupil.

As summarised in Table 1, the evidence underlying the framework was drawn from studies involving different participants, word patterns and research contexts. The proposed components therefore do not necessarily represent all pupils in the Pemulihan Khas programme or all forms of difficulty in acquiring CVC skills. A pupil's position at a particular skill level also does not indicate that the pupil experiences all the components in the framework. In terms of scope, strategies, materials, assessment, instructional implementation and the teaching needs of Pemulihan Khas teachers are not included because these aspects fall outside the focus of the article.

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The seven proposed components are not intended to function as closed or fixed categories. Future empirical studies are needed to examine relationships among the components, identify related variations or other forms of difficulty in acquiring CVC skills, and assess the suitability of the framework in different contexts of use. The framework was developed specifically for the C–V–C structure and is not intended to be applied directly to other syllable patterns without appropriate conceptual adaptation.

KVK Components of the Conceptual Framework for CVC Reading and Spelling Difficulty Profiles

Drawing on the framework structure developed earlier, this section describes seven components of CVC reading and spelling difficulty profiles across the reading domain, the spelling domain and the cross-domain grouping. Each component is explained in the following subsections in terms of its conceptual meaning, theoretical basis, related forms of difficulty and descriptive boundaries.

Letter–Sound Correspondences during Reading

Within this framework, letter–sound correspondences during reading refer to pupils' ability to produce the sounds corresponding to the letters in a CVC form. This component involves processing from written forms to sounds (Lee & Wheldall, 2011; Lee & Lee, 2021), with a focus on the accuracy of the sounds associated with letters in the initial-consonant, vowel and final-consonant positions. Unlike C–V–C blending, which involves integrating the complete sound sequence, this component examines the accuracy of the correspondence associated with individual letters. The theoretical basis of this component was described earlier, while the supporting research evidence is summarised in Table 1.

Inaccurate letter–sound correspondences can be identified when the sound produced does not correspond to the target letter. Lee and Ha (2025) found that primary-school children showed higher decoding accuracy for words with consistent grapheme–phoneme correspondences than for words with inconsistent correspondences. Their error analysis also identified phonological processing errors involving the substitution, addition or omission of target graphemes or phonemes during reading. Substitution errors have also been reported in Malay reading among pupils with dyslexia (Jamil & Rusli, 2024). As an illustrative example, *bak* may be read as *pak* when /b/ is replaced by /p/. If the sound associated with each letter is produced accurately but the pupil fails to blend the sounds in the C–V–C sequence, the difficulty is more appropriately described under the C–V–C blending component.

C–V–C Blending

Unlike letter–sound correspondences, which focus on the accuracy of sounds associated with particular letters, C–V–C blending involves combining the initial consonant, vowel and final consonant sounds to produce a complete CVC pronunciation (Loo & Mariani, 2020). For example, Loo and Mariani (2020) used a task in which pupils were required to blend the phonemes /d/, /a/ and /n/ to produce /dan/. Blending is also used in Pemulihan Khas instruction, including sounding out closed syllables and reading words containing closed syllables (Wahap, 2021). Lee and Wheldall (2011) further showed that phoneme-blending ability is related to word recognition among low-progress readers. The phonological-unit processing involved in blending is explained theoretically through PGST (Ziegler & Goswami, 2005), while OM is

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used as a supporting framework to describe the relationship between letter sequences and the sounds read aloud (Ehri, 2014).

On this basis, the framework describes blending difficulty as occurring when pupils can produce the required sounds separately but cannot combine them into a complete CVC pronunciation. Following the task format used by Loo and Mariani (2020), for example, a pupil may be able to produce /d/, /a/ and /n/ separately but be unable to blend them as /dan/. Conversely, when a pupil produces a blended pronunciation but fails to retain or changes the final consonant sound in the reading response, the difficulty is described under the coda sound retention component.

Coda Sound Retention during Reading

Coda sound retention during reading refers to pupils' ability to retain the consonant sound in the final position until the CVC structure has been fully pronounced. In a closed CVC syllable, the final consonant occupies the coda position and distinguishes this structure from the CV pattern, which ends in a vowel (Kasim, 2023; Teoh, 1989). Unlike C–V–C blending, which involves combining the complete sound sequence, this component focuses on retaining the final consonant sound in the reading response. It also differs from written CVC spelling, which examines the completeness and ordering of the C–V–C letters in the spelling response.

PGST provides the theoretical basis for describing phonological processing through units at the phoneme, rime and syllable levels (Ziegler & Goswami, 2005). In a CVC structure, the rime comprises the nucleus and coda, with the final consonant occupying the coda position (Kasim, 2023). OM is used as a supporting framework to describe the relationship between written forms and sounds during reading (Ehri, 2014), with particular attention to the sound in the coda position.

Difficulty in the final position can also be shown through the omission of the consonant sound. For example, Husni and Jamaludin (2010) recorded the word *ayat* being read as *aya*, causing the final syllable *yat* to change from a CVC structure to *ya*, which has a CV structure. Subramaniam et al. (2022) similarly reported the word *cantik* being read as *canti* following the omission of /k/ in the final position. Both examples show that omitting the consonant occupying the coda position can change a closed syllable into an open form.

In addition to omission, difficulty with the coda sound may involve the substitution of the final consonant sound. Samsudin et al. (2017) reported the substitution of final sounds when pupils read CVC syllables, while Yuan (2023) identified the omission and substitution of consonants in the final position during reading among pupils in the Pemulihan Khas programme. In this framework, errors focused on the final consonant sound are described under the coda sound retention component, whereas failure to blend the final sound with the preceding sounds is described under C–V–C blending. When the same error type or error position recurs across several reading or spelling outcomes, this recurrence is described under the recurring error patterns component.

Sound–Letter Correspondences during Spelling

Within this framework, sound–letter correspondences during spelling refer to pupils' ability to select letters that correspond to the sounds heard or spoken in CVC syllables or words. This

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component involves processing from sounds to written forms, unlike letter–sound correspondences during reading, which proceed from written forms to sounds. The focus is on the accuracy of letter selection for particular sounds in the initial consonant, vowel or final consonant position.

The selection of letters to represent sounds is described through OM, which explains the connections between phonemes in pronunciation and graphemes in written spellings (Ehri, 2014). Phoneme–grapheme connections in Malay word formation were also demonstrated by Lee et al. (2019), while PGST is used only as a supporting lens for identifying sound units at the phoneme level during spelling (Ziegler & Goswami, 2005).

When the selected letter does not correspond to the target sound, the difficulty is described under the sound–letter correspondence component, particularly when the CVC structure is retained. Spelling errors involving the matching of consonant sounds to letters have also been reported among pupils learning Malay (Mohd Rusli et al., 2022), while Di Blasi et al. (2023) showed that spelling difficulties in Italian also involve phoneme-to-grapheme mapping.

As a conceptual illustration, the target sound sequence /bak/ may be written as *pak* when /b/ is represented by the letter *p*, or as *buk* when /a/ is represented by the letter *u*. In both forms, the number and C–V–C ordering of the letters are retained, but the selected letter does not correspond to the target sound. This distinguishes sound–letter correspondences from the written CVC spelling component, which focuses on the completeness and ordering of the entire C–V–C letter sequence.

Written CVC Spelling

Written CVC spelling refers to pupils' ability to write and arrange letters in the C–V–C sequence to produce a complete spelling. This component examines the completeness and ordering of the entire spelling rather than simply the selection of a single corresponding letter. All three C–V–C elements must be present and correctly ordered, with the final consonant letter representing the consonant sound in the coda position (Kasim, 2023; Teoh, 1989). Omitting the final consonant letter, for example, leaves the CVC structure incomplete.

Difficulties in producing complete spellings are evident in studies examining mastery of final consonants and the completeness of spelling structures. Rickard Liow and Lee (2004) found that pupils with lower spelling proficiency could still blend CV units but failed to identify the final consonant in root words with a CV-CVC pattern. Mohd Rusli et al. (2022) also reported the omission of final consonants in pupils' writing, such as *ayah* spelt as *aya* and *membasuh* as *membasu*, while Yuan (2023) identified difficulties in spelling words containing CVC patterns among pupils in the Pemulihan Khas programme. In other language contexts, de Bree et al. (2022) reported errors involving open and closed syllables and the spelling of final consonants. Taken together, this evidence indicates that mastery of the initial part of a structure does not necessarily extend to producing a complete spelling when the final consonant is not retained.

Written CVC spelling is examined in terms of the presence and sequence of letters and the completeness of the written form, including omissions, insertions and letter arrangements that do not follow the C–V–C sequence. As a conceptual illustration, the target form *bak* may be written as *ba* when the final letter *k* is omitted, as *baka* when the letter *a* is inserted, or as *bka* when the letters are not arranged in the C–V–C sequence.

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Reading–Spelling Correspondence

Reading–spelling correspondence refers to the relationship between reading and spelling responses for the same CVC form. The two skills involve different processing directions: from written forms to sounds during reading and from sounds to written forms during spelling. This component therefore examines matches or mismatches between the two responses, rather than reading or spelling performance separately. The developmental relationship between reading and spelling is also supported in the literature (Furnes et al., 2024).

The relationship between reading and spelling has also been demonstrated in the Malay language context. Lee (2008) reported a strong relationship between word reading and spelling, while Lee et al. (2020) also found strong relationships between spelling and several reading measures among Year 1 pupils. In Lee et al. (2020), the spelling and reading accuracy measures used the same set of words, providing a basis for comparing the two skills using matched target materials, although the relationships were reported at the score level.

A more direct comparison was made by Rahbari (2019), who asked pupils in Grades 1–4 to read and spell the same set of 60 Persian words. Reading and spelling accuracy varied according to word characteristics, including instances in which a word was read correctly but spelt incorrectly, or vice versa. These findings provide a basis for comparing reading and spelling responses for the same words. However, the study did not focus on CVC structures or the coda position, nor did it describe whether difficulties involving particular elements corresponded across reading and spelling within the same pupil.

On this basis, correspondence is examined by comparing reading and spelling responses for the same CVC form. For example, a pupil may read *bak* accurately but spell it as *ba*, indicating that the coda sound is retained during reading, but the final consonant letter is omitted during spelling. Conversely, a pupil may spell *bak* accurately but read it as *ba*, indicating that the final consonant letter is present in the spelling, but the coda sound is not retained during reading. This comparison considers accuracy and the position of the sound or letter involved. It is used to describe the relationship between reading and spelling difficulties, rather than a causal relationship. Recurring error patterns are discussed in the following subsection.

Recurring Error Patterns

Recurring error patterns refer to the recurrence of the same errors or similar error tendencies across several CVC reading or spelling responses. This component focuses on tendencies identifiable across several pupil responses rather than isolated errors. These tendencies may occur in reading, spelling or both, and may repeatedly involve the same error type or the same sound or letter position.

Studies of Malay reading show that errors can be described in terms of categories and tendencies. Husni and Jamaludin (2010) recorded several types of errors in Malay word reading among children with dyslexia, including vowel or consonant substitutions and omissions, additions, reversals and syllable omissions. Subramaniam et al. (2022) also identified omissions, reversals, substitutions, insertions and guessing, with tendencies varying according to learning level. This evidence shows that error analysis can provide information about the forms and tendencies of reading difficulties beyond simply establishing reading accuracy.

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In Malay spelling, O'Brien et al. (2020) classified spelling errors among English–Malay bilingual Primary 1 pupils into several categories, including phonological errors. The identified forms included vowel or consonant substitutions, additions and omissions, as well as partial reversals of phoneme sequences. These findings show that spelling responses can be described in terms of the types and tendencies of errors as well as accuracy.

International evidence extends error analysis to comparisons across tasks and at the individual level. Jeon et al. (2023) used the same analytical criteria to classify reading and writing errors among Korean-speaking pupils with dyslexia and typically developing pupils. These included phonological processing errors involving the substitution, addition or omission of target graphemes or phonemes. The findings showed that error categories and rates could vary by task. Jozipović et al. (2025) showed that reading error tendencies, such as substitutions, omissions and additions, could be described at the individual level across several reading materials.

Previous studies have described error categories in reading and spelling, used corresponding categories to compare reading and writing tasks (Jeon et al., 2023), and demonstrated individual tendencies in reading errors (Jozipović et al., 2025). However, this evidence has not detailed the recurrence of the same error type or element position across several CVC reading and spelling responses within the same pupil's profile. These studies also did not focus on CVC structures among pupils in the Pemulihan Khas programme. The recurring error patterns component therefore focuses on error tendencies that recur across several CVC responses at the individual level, whether in reading, spelling or both.

Recurring tendencies are identified when the same error type or element position is involved across several CVC forms. For example, the omission of final consonant sounds can be observed when *bak*, *dam* and *tin* are read as *ba*, *da* and *ti*, respectively. In spelling, the same tendency can be identified when /bak/, /dam/ and /tin/ are written as *ba*, *da* and *ti*, respectively. A pattern may also involve the same element position even when the error types differ, for example, when the final consonant is omitted in one CVC form but substituted in another.

The main distinction between recurring error patterns and reading–spelling correspondence lies in the comparison being made. Reading–spelling correspondence compares the two responses for the same CVC form, whereas recurring error patterns examine the recurrence of error tendencies across several CVC forms in reading, spelling or both. Patterns are interpreted with attention to the error type, the position of the sound or letter involved, and the context in which the errors occur. These patterns are used to describe tendencies within pupils' difficulty profiles, rather than to make diagnoses or identify specific cognitive causes. Differences in focus among the seven components are summarised in Table 2.

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Table 2. Synthesis of the Seven Framework Components

Component	Brief example	Interpretive focus
Letter–sound correspondences during reading	*bak → pak*	The sound produced does not correspond to the target letter.
C–V–C blending	*/b/, /a/ and /k/ not blended*	Individual sounds are not blended into a complete CVC pronunciation.
Coda sound retention during reading	*bak → ba*	The final consonant sound is not retained during reading.
Sound–letter correspondences during spelling	*/bak/ → pak*	The selected letter does not correspond to the target sound.
Written CVC spelling	*/bak/ → bka*	The letter arrangement does not follow the C–V–C sequence.
Reading–spelling correspondence	*Reads bak; writes ba*	Comparing reading and spelling responses for the same CVC form shows a mismatch.
Recurring error patterns	*bak, dam, tin → ba, da, ti*	A tendency to omit final consonants recurs across several responses.

Source: Prepared by the researcher based on the conceptual framework developed. The examples presented are conceptual illustrations intended to clarify the interpretive focus of each component, rather than empirical findings .

Implications of the Conceptual Framework

The proposed conceptual framework offers a more detailed way of understanding difficulties in CVC reading and spelling among pupils in the Pemulihan Khas programme. It considers not only the accuracy of reading and spelling responses but also the processes involved, the positions of the affected elements, the relationship between the two skills and error tendencies across several responses. This approach allows difficulty profiles to be described more specifically without assuming that the observed forms of difficulty indicate particular cognitive causes.

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In the Pemulihan Khas context, the framework could support a more focused description of CVC reading and spelling difficulties, in line with the place of CVC structures within Malay Language Skills 8–15 in the Pemulihan Khas programme (KPM, 2019). Observed errors can be examined in terms of the processes involved, the positions of the sounds or letters affected, and the forms of difficulty displayed, rather than reading or spelling accuracy alone. This allows pupils' difficulty profiles to be described more specifically. The framework is intended as a conceptual guide for organising and interpreting observed difficulties, rather than as a diagnostic tool.

From a research perspective, the seven proposed components provide a basis for empirically examining CVC difficulty profiles. Further research could examine the extent to which each component can be identified in pupils' reading and spelling responses, whether some components co-occur, and whether particular error patterns recur across different CVC forms. The relationship between reading and spelling could also be examined to determine whether difficulties involving particular elements occur in both skills within the same pupil. Studies across different contexts and pupil groups are needed to assess the suitability of the proposed components and relationships and to refine them. More broadly, the analytical principles that distinguish processing direction, element position and relationships across the reading and spelling domains could provide a basis for comparing reading and spelling difficulty profiles across languages, particularly those with relatively transparent relationships between written forms and sounds. Such comparisons must, however, account for differences in syllable structure, orthographic characteristics and learning contexts across languages. Understanding these difficulty profiles could also provide a basis for further research into teaching needs, without assuming that a particular form of difficulty directly determines a specific teaching approach.

Conclusion

This article develops a conceptual framework for describing profiles of difficulty in reading and spelling closed CVC syllables among pupils in the Pemulihan Khas programme, based on a synthesis of theory and previous studies. The proposed framework comprises seven components: letter–sound correspondences during reading, C–V–C blending, coda sound retention during reading, sound–letter correspondences during spelling, written CVC spelling, reading–spelling correspondence and recurring error patterns. These seven components allow CVC difficulties to be described not only in terms of reading or spelling accuracy, but also in terms of the processes involved, the positions of the affected elements, the relationship between the two skills and error tendencies that recur across several responses.

The proposed framework integrates previously separate evidence from the reading and spelling domains into an analytical structure that distinguishes processing direction, element position within the C–V–C structure and relationships across the two domains. By connecting processing direction, element position within the C–V–C structure, reading–spelling correspondence and recurring error tendencies, the framework provides a more detailed way of describing variation in CVC difficulty profiles at the individual level, beyond general levels of proficiency. It provides a conceptual basis for more detailed empirical investigation in the Pemulihan Khas context, although the proposed components and relationships still require examination through empirical studies.

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