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# Comparative Analysis of Digital Learning Applications in Jawi Literacy Development among Malaysian Preschoolers

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**Abstract**

The Malaysian educational system introduced modern technology which revolutionized the methods of teaching Jawi education programs. Research evaluates how digital learning tools improve Malaysian children's abilities and skills to learn Jawi competency such as writing an reading during their early years. Two academic sources received analysis based on specified criteria through a rubric methodology in this study which included the thesis "Mobile Learning Applications for Basic Jawi for Malaysian Preschoolers" and the journal article "Bijak Jawi: Interactive Multimedia Tools Using Phonic 'Makhraj' Techniques for Preschoolers." The research outcomes showed that using these programs on children had positive impacts on Jawi literacy development through separate methods of instruction. Through interactive educational resources this thesis developed and evaluated mobile learning applications for better Jawi reading education of young children. The integration of technology within Malaysian education has produced substantial changes to instructional practices primarily regarding Jawi education in Malaysia. A study objective demonstrates a need to understand how digital learning tools help Malaysian toddlers learn Jawi reading effectively. Using a predefined set of criteria the study analyzed and differentiated between two scholarly publications including "Mobile Learning Applications for Basic Jawi for Malaysian Preschoolers" from a master's thesis and "Bijak Jawi: Interactive Multimedia Tools Using Phonic 'Makhraj' Techniques for Preschoolers" which appeared in a journal publication. Both pedagogical approaches that were used with children produced positive outcomes for Jawi literacy development. This thesis evaluated the development process of mobile applications for Jawi reading education with a focus on interactive learning materials for preschoolers.

**Keywords:** Technological-Based Learning, Jawi Script, Multimedia Tools, Phonetic Approach, Preschool Education, Self-Learning.

## Introduction

Jawi script stands as a fundamental linguistic and cultural cornerstone in Malaysia's heritage because it enables both Islamic teachings and Malay cultural heritage comprehension (Yusof, 2005) (Musa & Abdul Aziz, 2009). Jawi script at early childhood education stages is essential for passing this knowledge down to future generations who live in the current period. The literacy foundation of preschools along with early learning institutions demands that educators use game-based learning approaches as these pedagogical strategies to improve Jawi education (Ahmad et al., 2024).

The process of teaching Jawi to preschoolers faces numerous significant difficulties although it remains culturally and historically valuable. The main issue exists in creating smooth connections between Jawi letters (Malik et al., 2020) while the limited availability of educational materials (Zakaria, 2020) creates further challenges along with low learner interest (Hamdzah et al., 2021). Children lose interest and fail to understand their learning when they rely on traditional study methods which include rote memorization using textbooks.Educational technology development introduced digital learning resources that serve as alternative solutions to improve Jawi literacy education. Jawi literacy shows great promise for improvement through interactive learning applications as well as game-based educational activities and multimedia instruction that yield promising results according to Rashid and Noor (2023).

This current study assessed Jawi educational education for preschoolers by examining technology-driven resources that improve foundational education delivery. The study has been conducted for multiple purposes. First and foremost, this study primarily examines the qualities of digital apps that enhance Jawi learning, including interactivity, gamification, audio-visual elements, and pedagogical methodologies. Play-based learning is a significant factor in enhancing children's motivation to acquire skills (Parker et al., 2022). Prensky (2003) elucidated that including game aspects into Jawi learning facilitates learning through play, hence enhancing student motivation, as it deviates from traditional learning methods (Prensky, 2003). This approach is appropriate for preschoolers who have not yet engaged in formal education (Ashari et al., 2013). This study was also undertaken to identify the research gap about additional features necessary in Jawi applications to enhance children's motivation for learning a subject.

Furthermore, another aspect is that this study aimed to elucidate the effects of digital applications vs traditional approaches on preschool children's learning. If educators continue to employ traditional pedagogical methods, such as prioritizing teacher-centered learning (Zafar & Hafeez, 2023), they may juxtapose their prior instructional approaches with modern techniques, such as gamification-based teaching. A notable aspect of gamification in education is the incorporation of storytelling sessions, which utilize tales to foster immersive learning experiences and link lessons to a wider context (Dehghanzadeh et al., 2024). This empirical comparison will also contribute to future study regarding the suitability of contemporary versus classic learning strategies. Research by Falasi (2024) demonstrated that traditional teaching methods emphasize memorizing and examination readiness. Conversely, contemporary pedagogical methods integrate interactive and student-centered strategies, like project-based learning and gamification. This contrast will be a crucial discourse for future research. Alongside observing the optimal practices of both methodologies, it will also

provide recommendations for future researchers to create instructional materials more appropriate for contemporary children.

On the other hand, this analysis was was undertaken to conserve and enhance Jawi education. This study aims to conserve and enhance the usage of Jawi among the younger generation from the early stages of schooling, influenced by globalization and the prominence of Rumi's writings. Hamid et al. (2016) elucidated that a contributing factor to the deterioration of the appreciation for Jawi education is an unsupportive school atmosphere and a waning desire among youngsters in learning Jawi. This analysis offers a clearer perspective for educators and researchers regarding more effective methods for safeguarding Jawi education, beginning at the preschool level. Smith et al. (2023) elucidated that visual and auditory stimulus, including vibrant sights and captivating sounds, attract children's attention and enhance memory retention, so improving their reading proficiency. This can enhance their motivation to learn in an enjoyable manner.

**Problem Statements**

Students encounter substantial obstacles in learning Jawi script despite Malaysian government initiatives to protect and restore the script that include school policies requiring Jawi education in Islamic primary institutions and its return into Islamic Studies curricula nationwide (Ministry of Education Malaysia, 2019). Sarawak's J-QAF monitoring program (2008) showed that two out of five primary school pupils under investigation failed to identify Jawi letters according to Ahmad and Tamuri (2010). Some J-QAF teachers demonstrated limited understanding of Jawi Remedial Classes in their report according to the study findings. The research by Yacob (2007) involving 400 students from Shah Alam and Kuala Lumpur showed severe decline in Jawi literacy capabilities.

Future marginalization of the Jawi script seems likely because learning skills continue to decline. Early intervention for preschoolers holds essential value according to Yusoff (2005) because it assures continuous use of Jawi in society. In addition to its position as Malay culture and Malay history heritage Jawi serves as the backbone needed to study classical Islamic material and ancient formal documents (Jusoh & Elias, 2018; Lubis, 2018). Continuous proactive actions need to be established for improving Jawi literacy skills among contemporary youth.

The lack of interesting interactive educational tools acts as a fundamental obstacle for students seeking mastery in Jawi (Wahab et al., 2017). The teaching strategies from traditional textbooks which exclude modern educational methods produce learning difficulties among students while simultaneously diminishing their interest level (Osman et al., 2017). The traditional teaching methods with their emphasis on memorization led students to feel bored as demonstrated by Mardhiyyah's (2012) study. Student learning of Jawi material suffers when educators do not incorporate active and original teaching methods.

The instruction of Jawi should shift to a more dynamic strategy to achieve better results. Incorporating gamification, interactive multimedia, and digital applications could significantly boost student motivation and comprehension (Zin et al., 2022). Jawi stands as an alternative script for Malay language according to provisions written in the National Language Act. Many

Malay speakers born in Malaysia face challenges in reading Jawi fluently even though they excel at reading the Qur'an (Salehuddin & Jaafar, 2024). The educational importance of Jawi literacy requires new teaching methods which will make this knowledge accessible to students while keeping it engaging for use in modern learning environments.

**Literature Review**

*Jawi Literacy among Preschool Children*

Jawi literacy refers to an individual's ability to read, write, comprehend, and effectively utilize the Jawi script (Hashim, 2013). Beyond its significance in the education system, Jawi literacy plays a crucial role in preserving the cultural and religious heritage of the Malay community. As society progresses, strengthening Jawi literacy among younger generations is essential to ensure its continued relevance and survival.

At the preschool level, children are introduced to the differences between Jawi and Rumi scripts from various perspectives. Unlike Rumi script, which is read and written from left to right, Jawi follows the right-to-left orientation, similar to Arabic script. However, Jawi does not share the same number of letters as Arabic (refer to Figure 1). While the Arabic script consists of 28 letters, Jawi comprises 36 letters. Some Jawi letters were adapted from Persian, such as چ (cha) for /tʃ/ and ﻙ (ga) for /g/. Meanwhile, certain letters—ڠ (nga) for /ŋ/, ڤ (pa) for /p/, and ڽ (nya) for /ɲ/—are believed to have been independently developed by the Malays, making them unique to the Jawi script (Abdul Aziz et al., 2012). This linguistic adaptation highlights the script's evolution and its role in reflecting the phonetic structure of the Malay language.

Education at the preschool level introduces children to understand Jawi and Rumi script distinctions through multiple educational perspectives. The reading and writing direction of Rumi script proceeds from left to right whereas Jawi aligns its orientation in a right-to-left pattern that mirrors Arabic script. The total number of letters in the Jawi script differs from Arabic because of reference to Figure 1. Jawi contains 36 letters whereas the Arabic script uses 28 letters. Jawi script adopted two of its letters from Persian during its development by using چ (cha) for /tʃ/ while adopting ﻙ (ga) for /g/. Meanwhile, certain letters—ڠ (nga) for /ŋ/, ڤ (pa) for /p/, and ڽ (nya) for /ɲ/—are believed to have been independently developed by the Malays, making them unique to the Jawi script (Abdul Aziz et al., 2012). The linguistic transformation of the script demonstrates its development process while maintaining its capacity to represent Malay phonetic speech structures.

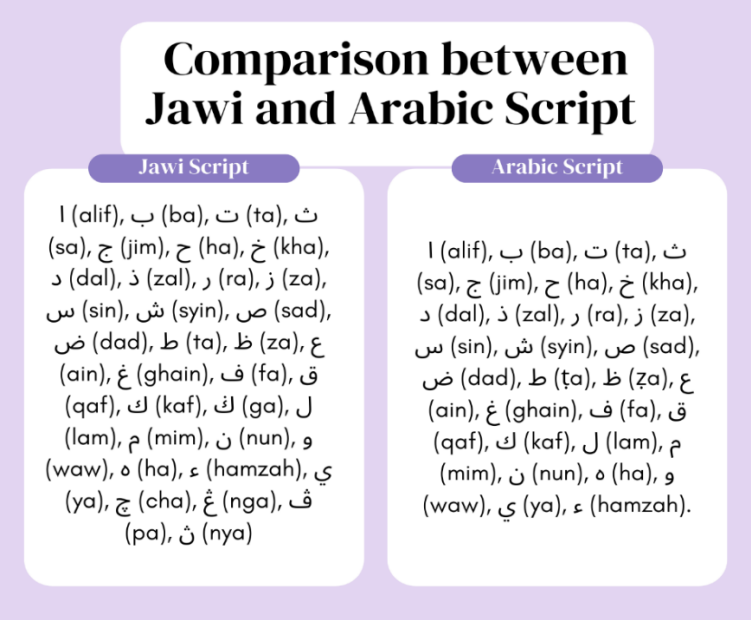


Figure 1: Comparison between Jawi and Arabic Script

Different Jawi learning tasks run actively at preschool institutions to advance reading abilities and scriptwriting skills in children. The Ministry of Education Malaysia (2016) established NSPC 2017 National Preschool Standard Curriculum 2017 for children aged four to six years old because it identified early literacy as essential. The learning of Jawi enjoys special attention within the Spiritual, Attitude and Values Strand of the curriculum. Preschoolers must gain fundamental literacy competencies through this section because it ensures their development of essential Jawi reading and writing abilities. The curriculum uses Table 1 to present its main Jawi-themed content which systematically develops young students' proficiency. The integration of Jawi education into the national curriculum works to maintain cultural heritage while it reinforces Islamic literacy and helps children acquire linguistic abilities thus allowing them to progress into primary Jawi learning.

Table 1
*Jawi Activities for Preschool Children Allocated in NSPC 2017*

| **Content Standard** | **Learning Standard** | |
|---|---|---|
| | **4 – 5 years old** | **5 – 6 years old** |
| **Focus: PI 6.0 Jawi** | | |
| PI 6.1 Know Jawi letters | **Children can:**<br>PI 6.1.1 Say Jawi letters | **Children can:**<br>PI 6.1.2 Identify the shapes of Jawi letters |
| PI 6.2 Read words with two syllables | **Children can:**<br>PI 6.2.1Sound out Jawi letters which are joined with the vowel *aliff* | **Children can:**<br>PI 6.2.2 Sound out Jawi letters which are joined with the vowels *wau* and *ya*<br>PI 6.2.3P Read according to syllables<br>PI 6.2.4 Read words with two syllables |
| PI 6.3 Write Jawi letters | **Children can:**<br>PI 6.3.1 Sketch shapes, patterns and lines from right-to-left using hand- eye coordination | **Children can:**<br>PI 6.3.2 Write single Jawi letters<br>PI 6.3.3Copy words with two syllables |

The activities allocated in NSPC 2017 mentioned in Table 1 focus on developing Jawi literacy among preschool children aged 4 to 6 years old, with three main learning objectives: recognition, reading, and writing of Jawi letters. For 4–5-year-olds, the emphasis is on identifying and saying Jawi letters, providing a foundation for phonetic awareness. As children progress to 5–6 years old, they learn to recognize letter shapes and read two-syllable words by sounding out Jawi letters with vowels (Alif, Wau, and Ya). This step enhances pronunciation and decoding skills, essential for early reading development. In terms of writing, children first practice sketching shapes and patterns to develop hand-eye coordination, a critical pre-writing skill. Gradually, they write single Jawi letters and later copy two-syllable words, reinforcing their motor skills and letter recognition. The structured activities follow a progressive learning approach, ensuring gradual mastery of Jawi literacy. However, integrating interactive multimedia and gamified elements could further enhance engagement and retention for young learners.

According to Selamat Pagi Guru (2024), one of the most fundamental and effective Jawi learning activities involves connecting single-syllable readings, which helps children grasp the relationship between letters and sounds in Jawi (refer to Figure 2). This method is particularly suitable for early learners, as it allows them to develop reading skills progressively and systematically, establishing a strong phonetic foundation before advancing to more complex words. Alternatively, Ningmin (2022) proposes a comparative reading approach, emphasizing the differences and similarities between Jawi and Rumi scripts (refer to Figure 3). This method aims to enhance children's literacy by creating clear connections between the two writing systems. By analyzing letter forms and their phonetic counterparts, children can better understand the structural and phonological similarities between Jawi and Rumi, facilitating a smoother and more intuitive learning experience. Both approaches offer valuable pedagogical benefits—the single-syllable reading method strengthens basic phonetic recognition, while the comparative approach provides a broader linguistic perspective, making Jawi literacy more accessible and engaging for young learners.

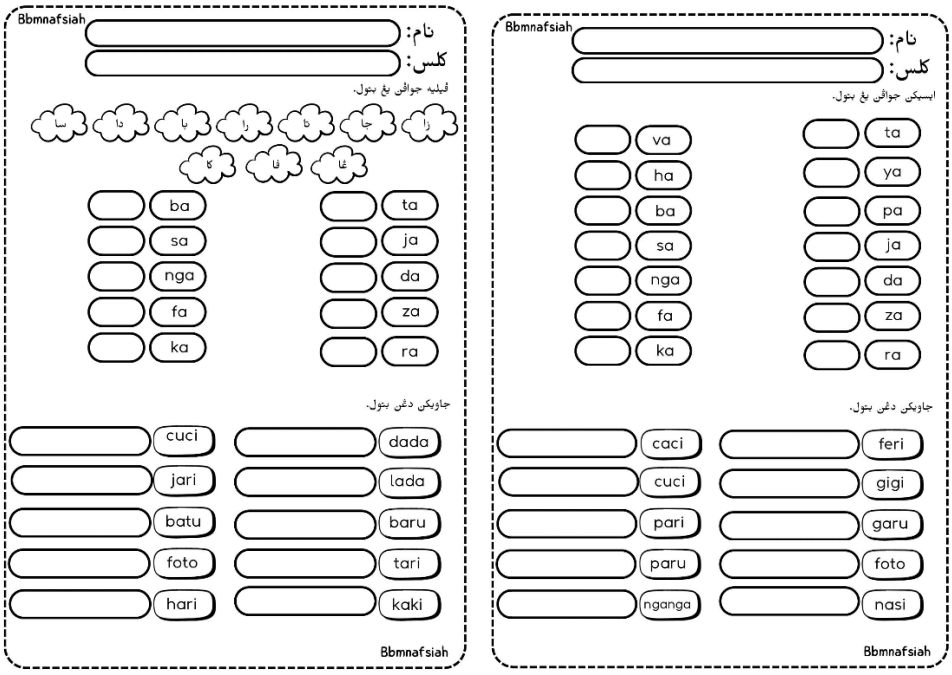


Figure 2: Reading and Writing Activities for One Syllable in Jawi Education

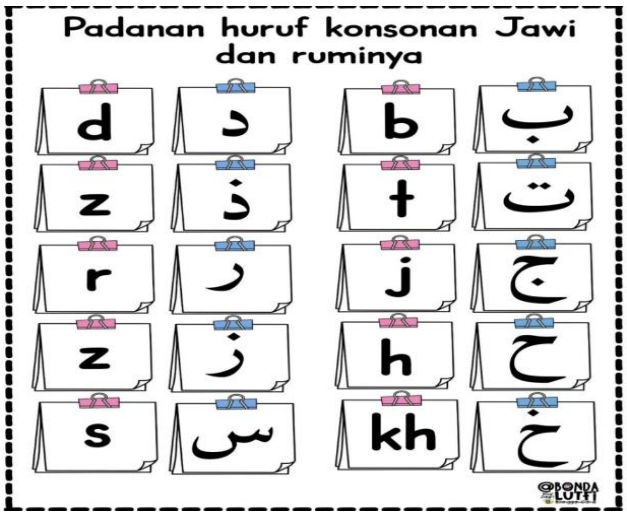


Figure 3: Jawi and Rumi Consonant Letter Matching Activity

While both methods possess their own strengths and limitations, their effectiveness largely depends on children's cognitive development and the teaching strategies employed by educators. Integrating both approaches could offer a more comprehensive learning experience, reinforcing Jawi literacy among preschoolers. Figure 1 uses a teaching method that matches traditional methods by focusing on students writing letters followed by reading them. When children learn with this method, they develop their fine motor abilities along with letter recognition though it can be uninteresting to students who struggle with memorization. The educational method shown in Figure 2 employs modern-learning principles through "listening, choosing, and interacting" features. Modern learners benefit from this method because it lets them listen to sounds while using a mouse or phone screen for selecting correct answers through an interactive educational framework. Educators can improve Jawi literacy learning outcomes through a combination of comtemporary technological methods and conventional teaching methods (Amarathunga, 2025).

*The Use of Technology-Based Materials in Learning Jawi in Preschool*

Educational institutions now use technology-based learning tools as a highly effective pedagogical approach that greatly enhances Jawi literacy skills and promotes child engagement and motivation (Kitikedizah & Maimun, 2022; Figueroa). Through mobile apps and interactive software and digital gamification knowledge dissemination has revolutionized to become more stimulating while providing immersive learning experiences which are intellectually rewarding (Gasaymeh & AlMohtadi, 2024). Through animated presentations and audio-visual interactions with phonetic learning approaches children can master Jawi letters and develop their handwriting accuracy successfully. Bijak Jawi represents a well-known digital learning platform which uses Makhraj method to let learners correctly recognize and pronounce Jawi letters which enhances their reading abilities and linguistic skills (Ahmad, 2018).

The main strength of technology-based learning materials lies in their self-paced education system which combines educator and parent real-time monitoring capabilities. Through e-learning platforms children gain the self-regulated opportunity to study and review material according to their personal cognitive growth and understanding capability (Bismala et al., 2022). Educational staff utilizes data from digital learning platforms to develop personalized

teaching methods according to the findings (Cahyono & Rusiadi, 2025). Moreover, digital tools cultivate technological literacy, equipping children with essential 21st-century skills (Quinn, 2024).

Furthermore, the incorporation of digital innovations in Jawi education not only enhances children's intrinsic motivation (Hamdzah & Surat, 2021) but also transforms the learning process into an interactive, dynamic, and flexible experience (Mansor, 2021). As illustrated in Figure 4, one such integration of technology in Jawi education involves an interactive task where children must verbalize a Jawi letter before identifying an object spelled with that letter, reinforcing both phonetic awareness and cognitive association. Thus, the continuous advancement of technology in early childhood education must be prioritized, ensuring that Jawi literacy is not only preserved but elevated, fostering a generation of digitally proficient and culturally literate learners.

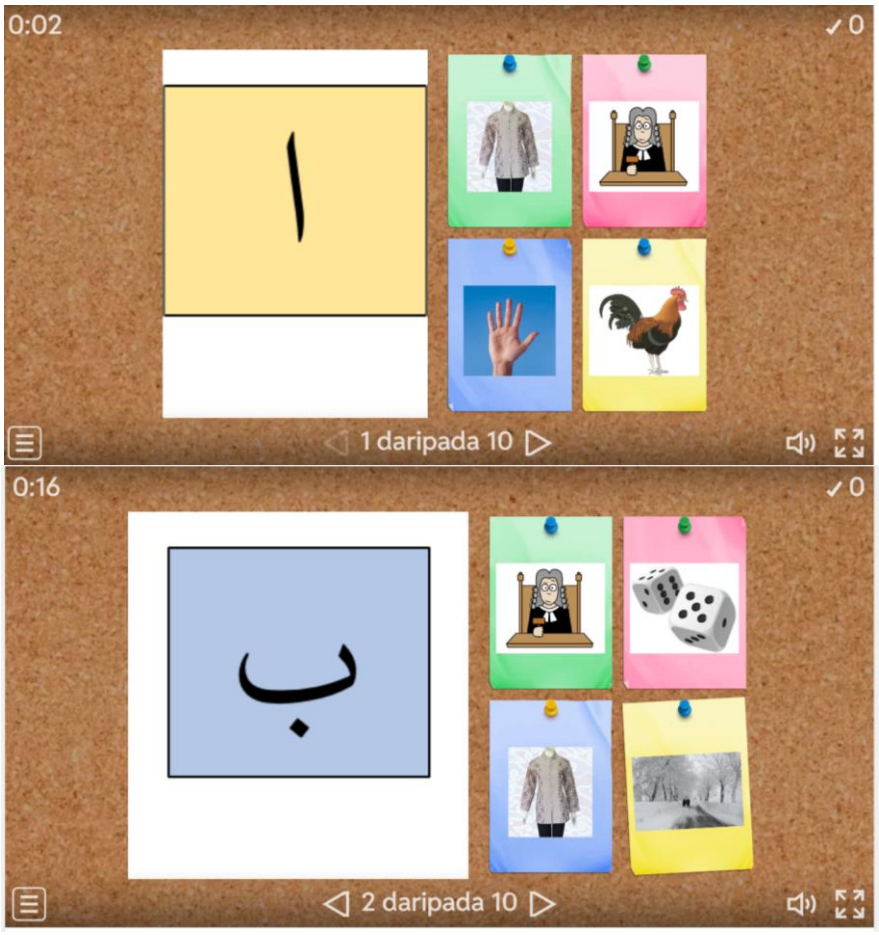


Figure 4: Matching Pictures with Jawi Prefixes
Source: Norsyariah (n.d)

**Methodology**

In this study, the researchers employed a comparative analysis method (Blair-Walcott, 2023), which is used to compare and analyse differences and similarities across one or more studies. The researchers chose the rubric method as their main approach to perform thorough and structured comparability assessments. Use of the rubric method in comparative analysis demands organizers to group data or specific categories under one rubric system for

enhanced structured focus during comparison assessments. The rubric enables researchers to assign different data sets or categories such as learning tools characteristics along with teaching approaches and method effectiveness (Reddy & Andrade, 2010).

A thorough examination of every study element becomes feasible through this method since researchers can detect essential patterns and differences between evaluated datasets. Such research strategies result in findings that become more objective while also making them easier to analyze in terms of Jawi education and comparable investigations. The analysis requires five essential steps according to Younas and Ali (2021) when executing this process:

1. The table needs to include comprehensive descriptions about study frameworks and research methodologies and main outcomes.
2. The table should clearly demonstrate positive attributes and weaknesses in each study to provide a full understanding.
3. The table should use a unified structure for data presentation to support analytical assessment of the studies.
4. Research papers which directly pertain to the study question or issue should be prioritized because they create both focus and clarity.
5. Use accurate and concise language: Convey the tools clearly, avoiding challenging and hard language or complexity.

**Findings**

*Comparative Analysis*

According to the research data presented in Table 3 they selected two primary studies to analyze learning Jawi using technological materials for preschool children. The researchers evaluated two studies which are "A Mobile Learning Application on Basic Jawi for Malaysian Preschool Children" (2019) and "Bijak Jawi: An Interactive Multimedia Reading Tool Using Phonic 'Makhraj' Technique for Preschool Children" (2018). Both studies highlight the technological approach as a learning aid to improve Jawi mastery among children. However, there are differences in the methods, focus, and effectiveness discussed in these two studies.

Table 2

*Comparative Analysis about Using Digital Applications in Jawi Education*

| **Criteria** | **Study 1** | **Study 2** |
|---|---|---|
| Title | A Mobile Learning Application on Basic Jawi for Malaysian Preschool Children | Bijak Jawi: An Interactive Multimedia Reading Tool Using Phonic 'Makhraj' Technique for Preschool Children |
| Year of Publication | 2019 | 2018 |
| Main Source | UNIMAS Institutional Repository | Journal of Advanced Research in Computing and Applications |
| Type | Master's Thesis | Research Article |
| Institution | Universiti Malaysia Sarawak (UNIMAS) | Universiti Teknologi MARA (UiTM) |
| Scope | Development and evaluation of a mobile learning application for Jawi | Development and usability testing of "Bijak Jawi" reading tool |

| | | |
|---|---|---|
| Problem Statement | Need for interactive and accessible Jawi learning for preschoolers | Jawi spelling method is ineffective; need for phonics-based interactive learning |
| Methodology | ADDIE instructional model; tested with preschoolers through observations and interviews | Development based on multimedia & phonics "makhraj" technique; usability & heuristic testing with teachers and experts |
| Best Practice | Multimedia integration, phonics-based learning, interactive exercises | Phonic "makhraj" technique, multimedia elements (audio, video, animations), interactive learning |
| Strength | Practical development and direct testing of a Jawi learning application | Positive user feedback, engaging interface, effective phonics method |
| Weakness | Small sample size, potential platform dependency | Limited target group (5-6 years old), Flash-based compatibility issue |

*Differences in Types and Sources of Studies*

One of the significant differences between these two studies is in terms of the type and source of research. The first study is a master's thesis published in the UNIMAS Institutional Repository, while the second study is a research article published in the Journal of Advanced Research in Computing and Applications. The first study is more academic and in-depth, focusing on the development of learning applications, while the second study is more of a practical application study that examines the effectiveness of existing learning tools. This difference gives the impression that the first study focuses more on the development aspect of technology, while the second study evaluates the user experience in interactive learning.

*Focus and Problem Statement*

The first study emphasized the importance of more interactive and accessible Jawi learning, especially for preschool children who are still in the early stages of cognitive development. This study stated that the need for more interesting and effective learning methods is increasingly urgent to ensure that Jawi writing remains relevant in the modern education system. On the other hand, the second study identified weaknesses in the traditional spelling method often used in teaching Jawi. This study emphasized that phonics techniques are more effective in helping children recognize and pronounce Jawi letters correctly. Therefore, the phonics approach is reinforced with multimedia elements such as audio, video, and animation to help children better master Jawi spelling and pronunciation.

*Methodology and Approach*

The research demonstrated the necessity of user-friendly interactive Jawi learning techniques which benefit children at their initial cognitive development period. The author highlighted the rising requirement for compelling and efficient Jawi teaching practices because Jawi writing must stay relevant within contemporary educational frameworks. The second analysis uncovered drawback in conventional Jawi spelling teaching approaches which teachers frequently apply to Jawi instruction. Research findings showed that phonics systems prove better than alternative teaching methods for enabling children to properly recognize and pronounce Jawi letters. Mobile media resources that include audio along with video and animation contribute to improving children's mastery of Jawi spelling and pronunciation under the phonics teaching approach.

*The Effectiveness of Best Practices in Learning Jawi*

In terms of methodology, the two studies used different approaches. The study used the ADDIE model to develop a Jawi learning application through its five phases starting from analysis to evaluation. The researchers observed and interviewed preschool children to evaluate how well the application worked in its natural environment during testing procedures. A second study conducting usability and heuristic test focused on evaluation from teachers alongside education experts in its research process. This evaluation strategy examined both the effectiveness of the learning tool design alongside its interface and the capacity of phonics techniques to facilitate easier Jawi writing comprehension.

*Strengths and Weaknesses of the Study*

Each research design uses unique methods that showcase distinct advantages as well as limitations. A learning application developed for the first study received direct testing with child participants thus generating evidence about implementation effectiveness. Local educational settings could be negatively impacted by the small test participant pool together with the narrow learning application scope. The second research model yielded favorable user reactions due to its enhanced interactive interface. The research investigated children between ages 5 to 6 using Flash technology yet this method has become obsolete because modern devices do not support it.

*Overview Analysis*

Technology demonstrates its value in advancing preschoolers' Jawi literacy as both research projects demonstrate. The first research concentrated on application development approaches, but the second research examined the success rate of phonics-based interactive education. The unified method of technological approaches with interactive phonics elements creates an outstanding tool to teach Jawi learning effectively. Modern technology along with increased accessibility and extensive user testing allows this effort to promote Jawi writing throughout the contemporary education system, so it survives and thrives among young learners.

**Recommendations**

*The Features in Application*

Educational application development faces major challenges because it relies on old technologies, specifically Adobe Flash (Firdaus & Samsudi, 2012) but this platform has lost browser support. Flash's implementation has been discontinued by main web browser programs while simultaneously creating major security risks and stability problems. Educational app development requires necessary improvement through moving away from Flash and adopting HTML5 software (Jain et al., 2024) and mobile application development that offers users easy access. The development of Jawi learning applications benefits greatly from the wide range of advantages that HTML5 provides. The cross-platform capability of this benefit makes applications function smoothly throughout computers and tablets and smartphones without needing added software. HTML5 provides enhanced security as well as greater stability and enables an effortless combination of graphics and videos together with animations and interactive elements. Users benefit from elevated learning experiences which become more engaging and immersive and access-convenient through these capabilities.

Mobile applications for Android and iOS platforms developed from HTML5 will improve Jawi learning tool accessibility and reach according to Lazareska et al. (2017). Users can now easily obtain the Jawi learning materials through direct downloads from both Google Play Store and Apple App Store which Tafesse (2023) reports. Jawi learning applications benefit from this strategic update because they become seamlessly compatible with contemporary educational environments leading to broader use by a wider group of users.

Overall, enhancing Jawi learning applications necessitates a two-pronged focus: technological modernization and pedagogical innovation. HTML5 as well as mobile application development brings enhanced accessibility together with better stability which ensures consistent usability throughout different mobile platforms. Modern learning experiences powered by phonic-related instruction and gaming approaches create compelling methods of teaching that satisfy both learning effectiveness and educational appropriateness for children. Through the synchronization of advanced technology with innovative teaching strategies Jawi learning applications create a new wave of early literacy education which offers interactive and adaptable learning experiences for modern students.

*Integration of Phonics Techniques and Game-Based Learning*

To achieve effective learning Jawi lessons require both technological improvement alongside an educational enhancement in their pedagogical approach for young students. The phonics-based learning method stands as the most proven strategy to teach letter-sound connections (Noor et al., 2022) which enables children to improve their reading ability while achieving proper pronunciation accuracy. The Jawi learning curriculum according to Ahmad et al. (2018) provides phonics classes by training students to establish connections between Jawi letters and their particular phonetic sounds through systematic pronunciation exercises. Audio features built into the system guide learners to hear correct pronunciations followed by pronunciation practice, so they build phonetic awareness through engaging audio lessons.

Phonics instruction enables children to remember letter sounds better (Langille, 2021) by teaching them through methodical progressive learning steps. The integration of phonics education into purposeful children's learning activities will help students learn better while making their educational journey both fun and effective. Children engage better with learning applications because gamified elements improve their drive to learn while boosting their concentration and involvement. The Jawi learning application benefits from three types of game techniques along with:

1. Children play Letter and Sound Matching Game developed by Cabug and Hatague in 2023 to match Jawi letters and their matching sounds enabling enhanced Jawi phonetic knowledge.
2. The Interactive Quiz feature on Mohamad's (2023) platform presents gamified quizzes where children get stars or achievement badges as a reward for selecting proper answers.
3. Children benefit from digital Jawi letter illustration through touchscreen technology in the Letter Writing Challenge application according to Smith and Brown (2023).

Modern technologies and innovative learning methods allow students to learn Jawi better while building real interest in studying the script through educational environments that combine creative interactivity. Digital tools and pedagogical enhancements combined into Jawi learning applications allow easy adoption both inside schools and homes where parents

actively help students perfect their literacy abilities. The transformation helps Jawi stay connected to modern educational practices to secure its linguistic value and cultural importance. This method creates a new generation of knowledgeable students who both master Jawi heritage and develop essential digital abilities that will serve them in future educational contexts.

**Conclusion**

Evidence reveals that technological integration improves Jawi language literacy development among pre-school children. Studies demonstrate that combining interactive approaches with phonics teaching produces better student understanding about letter-sound correspondences thus improving Jawi reading and writing abilities. The learning experience improves through multimedia additions that align with pedagogical modernization methods as well as gamification features which support the cognitive growth of young students. Until the technological barriers face modernization and platform flexibility are resolved we can maximize Jawi application functionality through HTML5 implementation and mobile application development. Moreover, the amalgamation of phonics-based instruction and digital games might enhance the learning experience and augment students' retention. The success of Jawi education depends on active initiatives which aim to upgrade pedagogical strategy development together with modern technology and facilitate interactive learning resource adoption. The effective combination of technological and pedagogical approaches will help the younger generation easily learn Jawi writing techniques thus protecting their Malay cultural and linguistic identity in the digital environment. The success of Jawi education depends on active initiatives which aim to upgrade pedagogical strategy development together with modern technology and facilitate interactive learning resource adoption. The effective combination of technological and pedagogical approaches will help the younger generation easily learn Jawi writing techniques thus protecting their Malay cultural and linguistic identity in the digital environment.

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