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ENHANCING MANDARIN VOCABULARY ACQUISITION
AMONG UiTM STUDENTS THROUGH MULTIMEDIA
MATERIALS: A CONCEPTUAL FRAMEWORK

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Abstract:

The growing importance of Mandarin skills in today's global economy highlights the need for effective language learning methods. This is especially true for students in Malaysia's multicultural institutions, such as Universiti Teknologi MARA (UiTM). Here, students from various linguistic backgrounds face unique challenges in learning Mandarin, mainly due to the language's tonal nature, logographic writing system, and limited exposure outside the classroom. While digital learning tools show promise for improving vocabulary learning, their practical use in teaching Mandarin to university students in Malaysia has not been fully explored. This gap reveals important areas for research. This paper offers a framework for integrating multimedia resources into Mandarin vocabulary teaching, specifically for the needs of UiTM students. It draws on theories such as Dual Coding Theory, Multimedia Learning Theory, and Sociocultural Theory. By reviewing past studies, this work highlights the benefits of digital tools, which include increased engagement, personalized learning, and cultural relevance. However, current research often ignores the specific linguistic backgrounds of Malaysian learners and the role of institutional support in using technology in teaching. The proposed framework focuses on three key areas: Input Variables (learner traits, multimedia materials, and educational setting), Process Components (engagement tactics, personalized learning, and cultural relevance), and Output Outcomes (better vocabulary retention, higher motivation, and real-world application). The findings suggest that digital learning resources could significantly improve Mandarin vocabulary learning for students in Malaysian universities. This offers valuable insights and solutions for educators and policymakers. By encouraging collaboration among researchers, teachers, and

higher education institutions, this study emphasizes the need for further investigation into localized content, adaptive technologies, and policy interventions. Ultimately, the framework aims to improve students' language skills and prepare them for success in an interconnected world.

Keywords:

Mandarin Vocabulary, Multimedia Materials, UiTM Students, Language Education, Conceptual Framework

Introduction

In recent years, Mandarin vocabulary learning has gained increasing importance due to the growing relevance of Mandarin in international communication, business, and cultural exchange (Li & Zhang, 2022). However, Mandarin vocabulary acquisition presents significant challenges for non-native learners, especially students in higher education, because of its tonal system, logographic script, and morphological complexity (Wang et al., 2021). As Xun and Zheng (2017) observed in their analysis of Mandarin learning difficulties among vernacular learners in Malaysia, similar challenges are also faced by students at Universiti Teknologi MARA (UiTM). These challenges highlight the importance of developing new teaching methods that utilize current technological tools and innovations to improve vocabulary learning and acquisition. An approach that shows great promise is the application of multimedia materials, which have been found to promote language learning through engaging, interactive and context-rich environments (Chen & Hsu, 2023). By delving into the role of multimedia materials, this paper provides a conceptual framework to understand their potential as a vehicle for improving Mandarin vocabulary acquisition among UiTM students, while guiding future research and pedagogical practice.

Multimedia resources in second language (L2) education have received much attention among researchers and practitioners in recent years. For instance, multimedia materials such as videos, audio clips, animations, and interactive applications provide dynamic methods of presenting linguistic content, making it more accessible and memorable to learners (Smith & Brown, 2022). Studies have found that providing instruction in the form of multimedia can improve vocabulary retention as it engages multiple sensory modalities thereby strengthening the associate between different representations through visual, auditory and kinesthetic engagement (Kim & Park, 2021). Furthermore, multimedia facilitates individualized and self-paced learning, enabling students to progress according to their needs and receive immediate feedback (Liu & Tan, 2023). Despite these advantages, the application of multimedia for Mandarin vocabulary teaching remains limited within the Malaysian context. This highlights the need to examine how multimedia materials can be effectively designed and implemented to meet the specific third-language (L3) learning needs of UiTM students.

The importance of Mandarin vocabulary learning extends beyond academic achievement to real-world employability and cross-cultural competence. With China's sustained global influence, Mandarin-speaking professionals are increasingly sought after in fields such as business, tourism, and international relations (Zhang & Lee, 2022). For UiTM students, developing Mandarin vocabulary proficiency not only enhances employability but also facilitates meaningful intercultural communication. However, achieving these outcomes requires pedagogical innovation. Traditional textbook-based instruction is insufficient for today's learners, who benefit from more interactive and technologically mediated approaches.

By presenting a conceptual framework for integrating multimedia materials into Mandarin vocabulary instruction, this study aims to support the development of relevant and effective learning strategies for L3 learners in Malaysian higher education.

Although multimedia resources have been widely acknowledged as effective tools for language learning, their application in teaching Mandarin vocabulary to UiTM students remains under-researched, revealing a significant gap in existing literature. Previous studies largely emphasize the general benefits of multimedia such as increased motivation, engagement, and retention (Chen & Hsu, 2023; Kim & Park, 2021) but they seldom address the unique needs of Malaysian learners who acquire Mandarin in a multilingual environment. Additionally, limited exposure to culturally relevant vocabulary (Wang et al., 2021) and the lack of authentic language input outside the classroom further impede vocabulary acquisition. While there is growing research on multimedia tools in language education (Liu & Tan, 2023), little attention has been given to how these resources can be localized, personalized, or aligned with the diverse proficiency levels of UiTM students. Without such considerations, the effectiveness of multimedia-assisted Mandarin vocabulary learning cannot be fully realized.

Against this backdrop, the main purpose of this conceptual paper is to develop a holistic framework for integrating various multimedia materials into Mandarin vocabulary lessons tailored specifically for UiTM students. By addressing the identified gaps, this study contributes to theoretical discussions on multimedia-supported vocabulary learning within multicultural and multilingual settings. It also emphasizes the importance of culturally relevant content, the role of personalized learning pathways, and the need for instructional strategies that account for learners' varied proficiency levels. The proposed framework outlines key components related to the design, implementation, and evaluation of multimedia-based interventions.

The remainder of this paper is structured as follows. The first section introduces the background and significance of learning Mandarin vocabulary among UiTM students, including the role of multimedia materials. The second section situates the study within the Malaysian context, reviews relevant literature, and highlights existing research gaps. The third section presents the conceptual framework and its theoretical foundations. This is followed by a discussion of academic and practical implications for language education. Finally, the conclusion summarizes the study's contributions and offers recommendations for future empirical research on multimedia-enhanced Mandarin vocabulary instruction.

Literature Review

Multimedia Materials and Vocabulary Teaching in Mandarin Classes

Multimedia materials, a necessary tool in modern-day language education, are great supplements that can provide new methods for teaching vocabulary and overcoming those challenges of learning the Mandarin language. These materials include various types of multimedia content, such as video, audio, interactive application, gamified learning platforms, each catering to diverse learner preferences and styles (Smith & Brown, 2022). Therefore, in Mandarin classes, the reliance on multimedia materials is embedded in mitigating linguistic complexities embedded in tonal pronunciation, logographic writing systems, and a large lexicon (Chen & Hsu, 2023). Audio recordings and video-based materials expose learners to authentic pronunciation, tones, and intonation patterns, enabling repeated practice in context

(Kim & Park, 2021). In a similar spirit, interactive applications and gamified platforms provide an avenue for practicing vocabulary in context, reinforcing retention through repetition, engagement, and instant feedback.

For UiTM students, who typically encounter Mandarin as an additional language in a multilingual environment, the benefits of multimedia are particularly significant. Due to limited exposure to Mandarin outside formal instruction, these tools provide simulated immersion, enhancing access to meaningful and contextualized input (Wang et al., 2021). Multimedia platforms also offer opportunities to incorporate localized or culturally relevant vocabulary, making learning more relatable and meaningful for Malaysian learners (Liu & Tan, 2023). Despite these advantages, the incorporation of multimedia materials in the teaching and learning of Mandarin vocabulary is lacking in the Malaysian context of education. This underscores a need to explore how these tools can be appropriately designed and deployed to support the unique learning needs of UiTM students.

Relevant Theories and Models

The effectiveness of multimedia materials in Mandarin vocabulary instruction is supported by several cognitive and sociocultural theories.

Dual Coding Theory (Paivio, 1986) proposes that individuals process information through verbal and non-verbal channels. Multimedia instruction leverages this by pairing linguistic input with visual and auditory cues, strengthening encoding and retrieval. For example, animated Mandarin vocabulary videos help learners associate words with meaningful visual representations (Smith & Brown, 2022).

Multimedia Learning Theory (Mayer, 2020) further underscores the importance of designing instructional materials that minimize cognitive overload. Effective multimedia resources should balance text, images, and audio to optimize cognitive processing, engagement, and comprehension. For UiTM learners, this could involve app-based vocabulary tasks that sequence content in manageable steps and provide immediate corrective feedback (Kim & Park, 2021).

Similarly, Cognitive Load Theory (Sweller, 1988) highlights the need to reduce extraneous cognitive demands so learners can focus on essential vocabulary acquisition. Well-structured multimedia designs help students concentrate on processing new Mandarin vocabulary without being overwhelmed by unnecessary information.

From an acquisition perspective, Krashen's Input Hypothesis (1985) emphasizes the value of comprehensible input. Multimedia offers rich and contextualized input through realistic scenarios, which supports implicit vocabulary learning (Ellis, 2008). This contextual input accelerates natural vocabulary acquisition by exposing learners to repeated target-language use in meaningful settings.

Sociocultural Theory (Vygotsky, 1978) reinforces the role of social interaction and cultural context in language development. Multimedia tools can facilitate collaborative digital activities such as virtual discussions or role-play simulations that allow UiTM learners to practice Mandarin vocabulary in authentic, socially relevant situations. Lantolf and Thorne (2006)

further note that digital tools serve as mediational artefacts that scaffold learners' participation in communicative tasks, thereby enhancing linguistic and intercultural competence.

Together, these theories inform the development of multimedia-based instructional strategies that are cognitively appropriate, culturally grounded, and pedagogically effective for Mandarin learners within Malaysia's multilingual educational context.

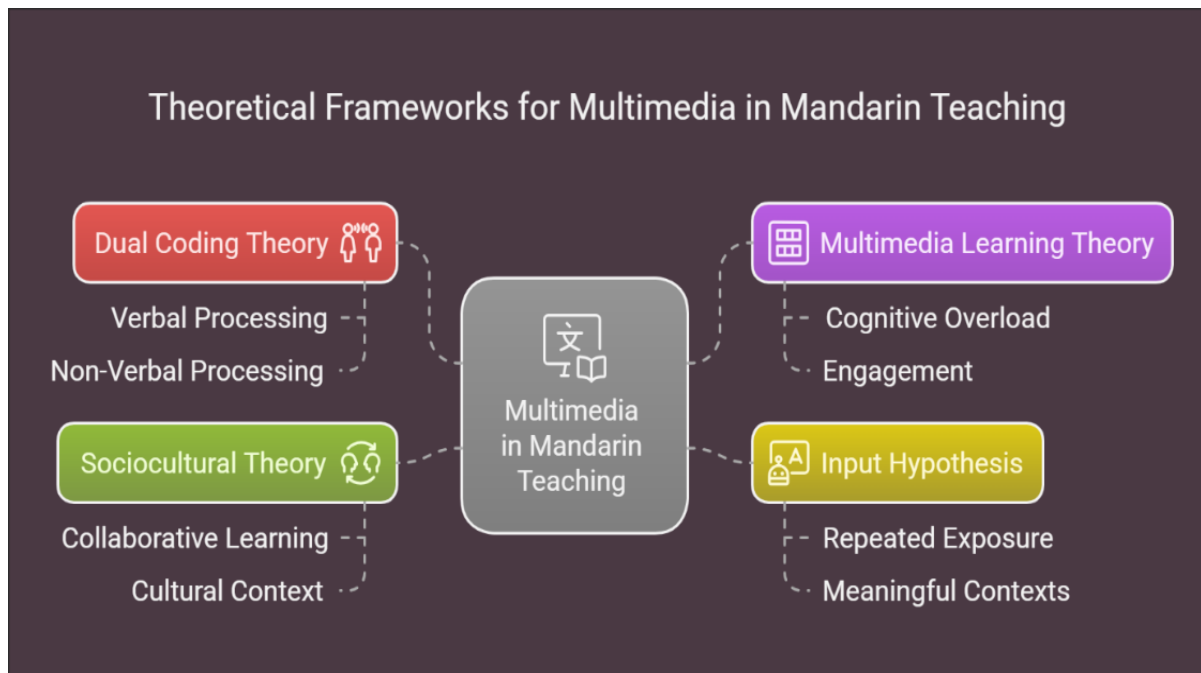


Figure 1. Theoretical Frameworks for Multimedia in Mandarin Teaching.

Research Gaps

Although multimedia-assisted language learning has been widely explored, much of the existing research focuses on general L2 contexts and offers limited insight into the specific needs of UiTM students or Malaysian learners more broadly. Previous studies often highlight the overall benefits of multimedia—such as enhanced engagement and improved retention—but frequently overlook challenges unique to local learners, including limited exposure to Mandarin beyond the classroom and the lack of culturally relevant learning materials (Wang et al., 2021).

Furthermore, while some scholars have investigated individual multimedia tools, few have examined how these tools can be systematically integrated into a coherent, context-responsive instructional framework that accommodates learners with varying proficiency levels (Zhang & Lee, 2022). Research also rarely addresses how multimedia resources can be localized to reflect the Malaysian sociocultural environment or how they can effectively support Mandarin learning as a third language (L3). These gaps point to significant practical and theoretical shortcomings in current scholarship.

Addressing these limitations is essential for developing vocabulary instruction models that are grounded in robust cognitive principles while remaining responsive to the linguistic backgrounds, lived realities, and sociocultural experiences of Malaysian learners. A more contextually informed and learner-sensitive approach would not only enhance the pedagogical

effectiveness of multimedia-based instruction but also make Mandarin learning more meaningful, accessible, and engaging for L3 learners in Malaysia.

Conclusion of Literature Review

The reviewed literature highlights the potential of multimedia materials to transform Mandarin vocabulary learning for UiTM students by making learning more engaging, contextualized, and culturally relevant. However, the full benefits of multimedia cannot be realized without a structured approach that accounts for the unique characteristics and learning realities of Malaysian students. This literature review therefore underscores the need for a conceptual framework that integrates localized content, personalized learning pathways, and scaffolded instruction. Such a framework can advance theoretical understanding, inform pedagogical practice, and provide a solid foundation for future empirical research.

Relevant Previous Studies

Table 1
Summary Of Past Studies on Enhancing Mandarin Vocabulary Acquisition Through Multimedia Materials

AUTHOR(S)	YEAR	TITLE	METHOD	KEY FINDINGS
Chen & Hsu	2023	Multimedia tools in foreign language education: A meta-analysis	Meta-analysis of 45 studies on multimedia use in language learning	Multimedia tools significantly enhance vocabulary retention and engagement; however, their effectiveness depends on cultural relevance and learner proficiency levels.
Kim & Park	2021	Enhancing vocabulary retention through multimedia-based instruction: Evidence from Korean EFL learners	Experimental study with 120 Korean EFL learners using video-based instruction	Multimedia-based instruction improved vocabulary retention by 30% compared to traditional methods; visual and auditory stimuli were particularly effective for tonal languages like Mandarin.
Wang et al.	2021	Challenges in teaching Mandarin as a foreign language: Insights from learner perspectives	Qualitative study involving interviews with 50 Mandarin learners in multilingual settings	Limited exposure outside the classroom and lack of culturally relevant materials hinder vocabulary acquisition; multimedia tools could address these gaps effectively.
Liu & Tan	2023	Personalized learning in	Mixed-methods study with	Gamified apps increased motivation and personalized learning experiences; students

		language education: The role of digital tools	200 participants using gamified apps	progressed at their own pace, improving vocabulary acquisition significantly.
Zhang & Lee	2022	Career opportunities for Mandarin speakers in the global economy	Survey of 300 university students and industry professionals	Mandarin proficiency enhances employability in global industries; vocabulary mastery is a critical skill for career advancement, emphasizing the need for innovative teaching methods.
Smith & Brown	2022	Multimedia and language learning: A review of theoretical foundations and empirical evidence	Systematic review of 60 studies on multimedia in language education	Multimedia materials align with Dual Coding Theory and Multimedia Learning Theory, enhancing memory retention and comprehension; underutilized in non-Western educational contexts.
Abdullah & Rahman	2020	The role of technology in Malaysian language education: Challenges and opportunities	Case study of 150 UiTM students using e-learning platforms	Students responded positively to multimedia tools but faced challenges such as technical issues and lack of localized content; tailored resources are needed for better outcomes.
Mohd Ali et al.	2022	Integrating multimedia in Mandarin classes: A pilot study among Malaysian university students	Pilot study with 80 UiTM students using interactive videos and apps	Interactive videos improved pronunciation accuracy, while apps enhanced vocabulary recall; students preferred multimedia over traditional textbooks.
Tan & Lim	2021	Cultural relevance in multimedia-assisted language learning: A study of Malaysian learners	Mixed-methods study with 100 UiTM students	Culturally relevant multimedia materials increased engagement and understanding; learners struggled with generic content that lacked local context.

Synthesis of Findings

The table summarizes recent studies (2020–2023) that investigate the impact of multimedia materials on Mandarin vocabulary acquisition, with potential relevance to UiTM students and similar contexts to be highlighted. A meta-analysis by Chen and Hsu (2023) covering 45 studies identified that multimedia tools are significantly efficient in improving vocabulary retention and engagement in language learning, albeit their effectiveness is dependent on the cultural

relevance of the tools used and the proficiency levels of the learners. Again, prefer to the experimental study of Kim and Park (2021), when analysing video-based instruction for Korean EFL learners, they found a 30% gain in vocabulary retention for those two methods which claims the effectiveness of audio and visual stimuli, applying it to tonal languages such as Mandarin that needs auditory perception. Wang et al. (2021), brought attention to the challenges faced by Mandarin learners in multilingual environments, including limited exposure outside the classroom and lack of culturally relevant materials, adding to the evidence that multimedia tools could help fill these gaps.

In a mixed-methods paper, Liu and Tan (2023) found that gamified apps provided personalized learning experiences which enhanced motivation and pacing autonomy, leading to increased vocabulary acquisition. Zhang and Lee (2022) highlighted the real-world relevance of Mandarin proficiency, illustrating that mastering vocabulary is crucial for career development in global industries, thereby reinforcing the necessity for innovative pedagogical approaches. In contrast, Smith and Brown (2022) performed a review of 60 studies and found that multimedia correspond to theoretical frameworks such as Dual Coding Theory or Multimedia Learning Theory but is still under-used in educational context of the non-Western world.

Abdullah Rahman (2020) noted problems unique to Malaysian learners, such as technical difficulties and a lack of localized material, whereas Mohd Ali et al. a pilot study that shows that interactive videos improved pronunciation accuracy and an apps improved vocabulary recall among UiTM students (2022). Lastly, Tan and Lim (2021) established the significance of cultural relevance, demonstrating that learners would more positively interact with multimedia materials that also represent their local culture. Together, these studies underscore the transformative possibilities of multimedia tools while also uncovering gaps, namely the absence of a tailored framework for Malaysian learners, which this paper seeks to address.

Conceptual Framework

The conceptual framework of this study illustrates how ubiquitous multimedia learning materials can enhance Mandarin vocabulary acquisition among UiTM students in Malaysia's multilingual learning environment. The model integrates three major components: Input Factors, Process Components, and Output Outcomes, and is grounded in Dual Coding Theory, the Cognitive Theory of Multimedia Learning, and Sociocultural Theory.

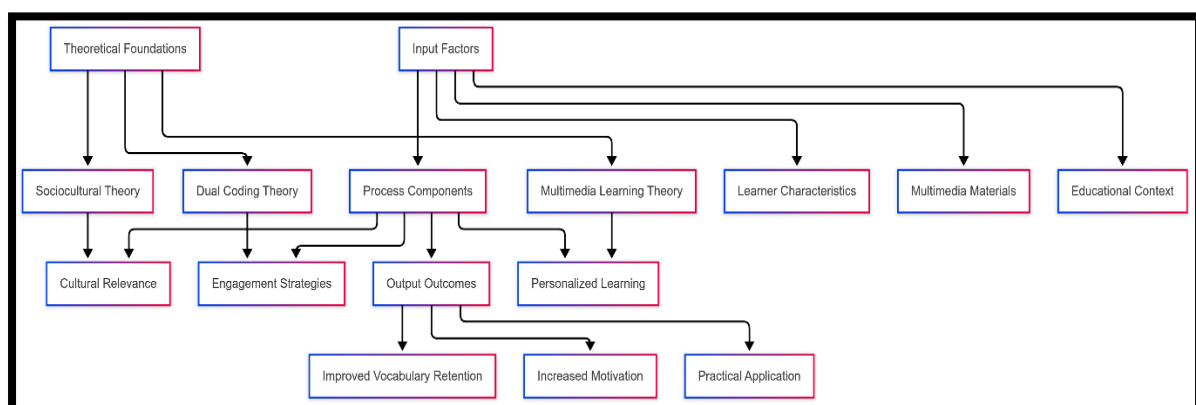


Figure 2. Conceptual Framework for Enhancing Mandarin Vocabulary Acquisition among UiTM Students Through Multimedia Materials.

This framework addresses the specific challenges UiTM students face when learning Mandarin vocabulary as a third language. The three components interact as follows:

Input Factors

These include learners' prior linguistic knowledge, proficiency levels, multimedia preferences, and multilingual backgrounds. The framework also incorporates multimedia tools such as instructional videos, interactive applications, and culturally relevant materials tailored for Malaysian learners. These inputs shape how learners process and internalize new vocabulary.

Process Components

The process stage focuses on engagement strategies, individualized learning pathways, multimodal presentation, and cultural relevance. Dual Coding Theory (Paivio, 1986) suggests that combining verbal and visual information enhances memory retention. Multimedia design features—such as pacing, segmentation, and modality—can optimize cognitive processing (Mayer, 2020). Sociocultural Theory (Vygotsky, 1978) further explains how contextualized and culturally grounded scenarios support learners' meaning-making, especially in Malaysia's diverse linguistic landscape.

Output Outcomes

The interaction between input and process components leads to desirable learning outcomes, including improved vocabulary retention, higher intrinsic motivation, and increased real-world application of Mandarin. By situating multimedia learning within relevant theoretical foundations, this framework responds to gaps in current literature and provides a foundation for future research and pedagogical innovation (Chen & Hsu, 2023; Liu & Tan, 2023; Wang et al., 2021).

Finding the Gaps in Current Literature

While research on multimedia-assisted language learning has grown steadily, there remains limited understanding of which specific multimedia features are most effective for supporting Mandarin vocabulary acquisition among UiTM students. Existing studies tend to highlight the general benefits of multimedia—such as increased engagement, motivation, and vocabulary retention (Chen & Hsu, 2023; Kim & Park, 2021)—yet they often overlook the distinct linguistic challenges and cultural realities faced by Malaysian learners. Although multimedia has been shown to aid memorisation, few studies have examined whether these materials can be localised to reflect Malaysia's multicultural environment, a factor that significantly influences how UiTM students relate to and engage with Mandarin as a third language (Tan & Lim, 2021).

Research also provides limited guidance on how multimedia tools can be adapted for learners across different proficiency levels, despite evidence that UiTM students experience varying levels of difficulty when learning Mandarin vocabulary (Wang et al., 2021). At the same time, much of the existing literature focuses primarily on pedagogical applications without addressing the broader institutional or policy-level factors necessary to ensure sustainable integration—such as infrastructure readiness, teacher training, and access to technology. As a result, many educators remain insufficiently prepared to implement multimedia-based innovations in their classrooms.

Addressing these gaps will require interdisciplinary research that draws from language education, instructional design, cognitive psychology, and educational technology. For example, integrating principles from Dual Coding Theory and the Cognitive Theory of Multimedia Learning could guide more effective instructional design (Mayer, 2020; Paivio, 1986), while advances in artificial intelligence and machine learning may enable personalized and adaptive learning platforms (Liu & Tan, 2023). Longitudinal studies are also needed to determine the long-term impact of multimedia-based instruction, as current research focuses mainly on short-term vocabulary gains.

Equally important is the development of localized multimedia materials that incorporate Malaysian cultural contexts, idiomatic expressions, and real-world scenarios (Mohd Ali et al., 2022). This effort must be supported by institutional policies that encourage the integration of digital tools, provide professional development for educators, and ensure equitable access for all learners (Abdullah & Rahman, 2020). UiTM, in particular, can play a central role by offering structured training that helps lecturers design culturally relevant content, utilize AI-driven platforms, and implement personalized learning strategies (Zhang & Lee, 2022).

Collaborative research involving universities, policymakers, and industry partners can further accelerate innovation and produce evidence-based solutions for enhancing Mandarin vocabulary acquisition. Ultimately, addressing these gaps is essential not only for improving academic outcomes but also for preparing UiTM graduates to thrive in Malaysia's multilingual and multicultural society. By strengthening multimedia design, teacher capacity, and policy support, future initiatives can foster deeper vocabulary retention, greater motivation, and stronger linguistic confidence among Mandarin learners.

Conclusion

This paper proposes a framework for integrating multimedia materials into Mandarin vocabulary learning for UiTM students and highlights its potential to reshape language teaching in a rapidly digitalizing world. The discussion began by underscoring the growing importance of Mandarin literacy in Malaysia's multilingual education landscape. While UiTM students face challenges similar to other language learners, these challenges are amplified when acquiring Mandarin due to limited exposure and minimal interaction with native speakers. These conditions create a strong rationale for using multimedia resources such as videos, apps and interactive activities to provide meaningful, culturally informed learning experiences.

The literature review demonstrated how established theories such as Dual Coding Theory, the Cognitive Theory of Multimedia Learning and Sociocultural Theory support the integration of multimedia into vocabulary instruction. Although these theories provide valuable insights, they also reveal gaps in current knowledge, particularly regarding which multimedia features best support Malaysian learners. Previous studies have often overlooked the significance of localized content, personalized pathways and institutional support structures needed for effective implementation.

To address these gaps, this paper presents a conceptual framework consisting of three components: Input Factors, which include learner characteristics, multimedia resources and educational context; Process Components, which emphasize engagement strategies, personalized learning and cultural relevance; and Output Outcomes, which focus on improved vocabulary retention, enhanced motivation and practical application. Together, these

components offer a structured approach to developing multimedia-enhanced instruction that is both theoretically grounded and sensitive to the linguistic and cultural realities of Malaysian students.

The proposed framework carries meaningful implications for educators, policymakers and students. For educators, it provides direction for designing flexible and relevant instructional materials. For policymakers, it highlights the importance of establishing supportive digital learning policies and equitable access to technological resources. For students, it offers the promise of improved language proficiency, expanded employability and deeper intercultural understanding.

Achieving these outcomes requires future research that examines interdisciplinary methods, long-term learning effects and the integration of emerging technologies such as artificial intelligence in adaptive learning environments. Longitudinal studies on vocabulary retention and practical usage would provide further evidence of the effectiveness of multimedia-supported instruction. Collaboration among academics, policymakers and institutions is essential for developing guidelines, professional development opportunities and digital infrastructure that sustain meaningful innovation.

The practical contribution of this study encourages educators to use multimedia more intentionally when teaching Mandarin vocabulary at UiTM. By addressing notable gaps in existing research, the framework sets the stage for effective and culturally responsive instructional design. Over time, this approach has the potential to reshape how Mandarin vocabulary is taught and learned, creating richer learning experiences and fostering linguistic and cultural competence among future generations. Ultimately, innovations in multimedia-supported instruction can empower learners to engage confidently with diverse cultural environments.

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