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Interactive App Features for Vocabulary Development: Insights from Educators and Parents of Malaysian Preschoolers

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Abstract

This study examines the key features of interactive applications that support English vocabulary development among Malaysian preschool children, by obtaining insights from educators and parents through focus group discussions, a questionnaire with 47 respondents, and an analysis of user reviews of seven educational applications. The findings reveal that game tasks, adaptive content, multilingual support, contextual storytelling, and interactive feedback significantly enhance vocabulary acquisition, while concerns are raised about excessive screen time, limited contextual learning, and reduced real-world interaction. The novelty of this study lies in its dual focus on educators' and parents' perspectives in the Malaysian preschool context, offering one of the first empirical insights into the design of interactive applications for vocabulary growth and contributing to the field of social science by linking technology design with stakeholder perceptions to inform curriculum innovation, teacher training, and policy decisions.

Keywords: English Vocabulary Acquisition, Interactive Apps Features, Preschoolers, Parents, Educators, Perspective, Early Childhood Education

Introduction

The integration of educational technology into early childhood learning environments has gained significant momentum worldwide, with interactive apps emerging as promising tools to support language development. Globally, these apps are valued for their ability to combine visual, auditory and interactive elements, creating engaging multimodal experiences that enhance vocabulary acquisition among preschool children.

However, in Malaysia, the pedagogical use of interactive apps in preschool settings is still limited. Despite the increasing awareness of digital learning tools, many educators only have basic knowledge of interactive multimedia, resulting in superficial classroom integration. This gap between technology availability and effective practice raises concerns about educators' readiness to fully utilize the potential of interactive apps for language learning. Compounding this issue is the lack of empirical evidence comparing traditional vocabulary

teaching methods with digital interventions, leaving stakeholders uncertain about the true impact of mobile learning platforms in early childhood education.

Against this backdrop, this study examines educators' and parents' perspectives on the characteristics of interactive apps that effectively support English vocabulary development among Malaysian preschool children. By focusing on both groups, this research aims to identify design elements that are pedagogically sound, culturally relevant and practically implementable in the local preschool context.

This study contributes to the social science field by offering one of the first empirical examinations of the characteristics of interactive applications for vocabulary growth in Malaysian preschool education. Its novelty lies in bridging the gap between technology design and stakeholder perceptions, providing actionable insights that inform curriculum development, teacher training and policy decisions on the integration of digital learning in early childhood education.

Problem Statement

In recent years, the integration of educational technology into early childhood learning environments has gained momentum globally. Interactive apps, in particular, have emerged as promising tools for enhancing vocabulary acquisition among preschoolers. However, in the Malaysian context, the practical implementation and pedagogical impact of such technologies remain underexplored. Despite increasing awareness of digital learning tools, Malaysian preschool educators often only have basic knowledge of interactive multimedia, leading to limited and superficial classroom integration (Welly & Rani, 2024). This gap between awareness and effective practice raises concerns about educators' readiness to harness the full potential of educational apps.

Furthermore, experimental evidence confirming the effectiveness of interactive media in vocabulary development is limited. While traditional methods continue to dominate early language teaching, few studies have rigorously compared their outcomes with digital interventions (Nordin et al., 2022). This lack of empirical data hinders informed decision-making among stakeholders and limits the scalability of innovative approaches. Adding to this challenge is the limited research on mobile learning platforms—such as apps and smart devices—for early English language acquisition in Malaysia. While mobile technology is increasingly accessible, its pedagogical value in preschool settings remains largely unexplored (Chung & Hew, 2023).

This study aims to address this critical gap by exploring educators' and parents' perspectives on the features of interactive apps that support vocabulary development in Malaysian preschoolers. By capturing the views of both groups, the research aims to identify design elements that are pedagogically sound, culturally relevant, and practically implementable for early childhood education.

Significance of Study

English language proficiency is increasingly important in Malaysia not only as a medium of instruction but also as a gateway to global communication. Early vocabulary development lays the foundation for reading fluency, comprehension, and long-term

academic success. However, despite the increasing presence of digital tools in preschool classrooms, their integration remains inconsistent and underutilized.

Malaysian preschool educators often lack practical training in using interactive multimedia tools, resulting in limited classroom applications (Welly & Rani, 2024). Compounding this issue is the lack of experimental evidence supporting the effectiveness of interactive apps over traditional vocabulary teaching methods (Nordin et al., 2022). Furthermore, the potential of mobile learning platforms—such as educational apps and smart devices—for early English language acquisition has yet to be fully explored in the Malaysian context (Chung & Hew, 2023).

While interactive apps offer an engaging and playful environment that can make language learning more accessible to young children, there is a significant gap in local research examining their actual impact. Without insights from those directly involved—educators and parents—app design and implementation risk being out of alignment with the needs of Malaysian preschoolers.

This study addresses the urgent need to understand the most effective and relevant features of interactive apps for vocabulary development, as perceived by those who guide and support children's learning. By bridging this gap, the research aims to inform future educational technology design and policy tailored to the Malaysian early childhood education landscape.

Research Objectives

1. To identify the key features of interactive apps that effectively support vocabulary learning among preschoolers in educators' and parents' perspectives.

Research Questions

1. What are the most effective key features of interactive apps that support vocabulary learning among preschoolers from the educators' and parents' perspectives?

Review of Literature

Technology in Early Childhood Education

Research suggests that digital tools can help significantly enhance English language learning for young children (Hung, 2021). Studies have shown that technology-enhanced learning can create engaging and multi-modal experiences that enhance vocabulary retention and comprehension (Gençten, & Aydemir, 2023). In the Malaysian context, digital learning resources are increasingly being integrated into preschool curricula to complement traditional teaching methods (Jein et al., 2022). By incorporating technology in early childhood education, it can help preschoolers acquire critical thinking and digital literacy skills that are essential for success in the growing digital society. Therefore, technology can provide opportunities to explore and foster a passion for learning and build a strong foundation for their future academic achievement. Interactive learning apps, educational games, and digital tools can make preschoolers' learning engaging and fun. Apart from that, it is also able to enhance the learning experience of preschool children and meet individual needs (Adewusi et al., 2024).

Interactive Apps and Language Development

Interactive apps have become increasingly influential in early language education, offering a variety of features such as real-time feedback, gamification, and speech recognition that actively support vocabulary acquisition (Procel et al., 2024). These tools create immersive learning environments where children engage with text, visuals, and audio simultaneously, fostering deeper and more meaningful vocabulary exposure (Lee & Aspirant, 2023).

Studies of popular language learning platforms such as Duolingo and Lingokids have shown measurable improvements in word recognition and pronunciation among young learners (Bauer, 2024). Apps that emphasize literacy and reading skills have also been shown to increase phonemic awareness and vocabulary strength, contributing to basic language development (Bright et al., 2023).

Beyond language acquisition, interactive apps serve as valuable instruments for the holistic development of early childhood. They offer structured yet playful activities that foster important cognitive skills, including memory, attention, and problem-solving. Importantly, these apps can be either free or subscription-based, but their educational value depends on careful selection. Choosing apps that align with a preschooler's interests and developmental goals ensure that learning remains engaging, personalized, and pedagogically sound (Ong, Aslam, & Amjad, 2024).

By leveraging the right features, interactive apps can transform vocabulary learning into a dynamic and fun experience, laying the foundation for lifelong literacy and academic success.

Interactive App Features That Support Vocabulary Learning

The interactive app offers a variety of pedagogical features that make it highly effective in supporting English vocabulary development among preschoolers. One of the most effective elements is gamification, which combines rewards, challenges, and a points system to increase motivation and engagement. These playful mechanics transform learning into a fun experience, encouraging participation and sustained effort.

Another powerful feature is storytelling and context-based learning, which presents vocabulary in meaningful narratives rather than isolated lists of words. This approach improves comprehension and memory by embedding new words in relatable scenarios, making it easier for young learners to grasp and retain.

Speech recognition and pronunciation feedback further enrich the learning experience by providing real-time corrections. The tool helps children refine their phonological awareness and spoken language skills, fostering more accurate and confident oral communication. Additionally, personalized and adaptive learning paths ensure that content is tailored to each child's individual progress. By adjusting the difficulty level and pace, the app maintains optimal learning challenge, reinforces vocabulary retention, and supports differentiated instruction.

Collectively, these features create a dynamic, student-centered environment that encourages active engagement, meaningful understanding, and long-term retention. When

carefully designed, interactive apps can play a transformative role in early language education, laying a strong foundation for literacy and academic success.

Theoretical Framework

This study is based on a theory that explains how young children acquire language and how technology can enhance this process. This framework integrates principles from Multimodal Learning Theory, providing a comprehensive lens for examining the effectiveness of interactive app features in vocabulary development. Multimodal learning theory emphasizes the use of multiple sensory modalities visual, auditory, and kinaesthetic to enhance comprehension and retention. Interactive apps often combine text, images, sound, and animation to create rich and engaging environments that support vocabulary acquisition. According to Lee & Aspirant (2023), preschoolers benefit most from environments where multiple input modes work together to reinforce meaning. This theory supports the inclusion of features such as storytelling, gamification, and speech recognition in educational apps.

Conceptual Framework

This study is based on the belief that interactive app features play a significant role in enhancing English vocabulary development among preschool children. The conceptual framework is cantered on three core constructs: interactive app design features, educator and parent perceptions, and resulting language learning outcomes. Features such as gamification, storytelling, speech recognition, and adaptive learning are considered important components that can stimulate engagement, strengthen understanding, and support retention of new vocabulary. These features are not only technologically innovative but also pedagogically aligned with early childhood learning principles.

Equally important are the perceptions of educators and parents, who act as gatekeepers in selecting and implementing these digital tools. Their perceptions of the relevance, usability, and effectiveness of app features influence how these technologies are integrated into preschool settings. In the Malaysian context, cultural norms, curriculum standards, and technological readiness in turn shape these perceptions and determine the extent to which interactive apps are adopted in early childhood education.

The framework argues that when interactive app features are carefully designed and aligned with user expectations, they can create a dynamic, learner-cantered environment that fosters active participation and meaningful vocabulary acquisition. By examining the interactions between app design, stakeholder perceptions, and learning outcomes, this study aims to identify the most effective and contextually appropriate features to support early English language development in Malaysian preschools.

Research Methodology

To investigate the effectiveness of interactive apps in supporting English vocabulary learning among preschool children, this study used a mixed-methods research design. By integrating both qualitative and quantitative approaches, the research captured a comprehensive view of the perspectives of educators and parents. This dual strategy allowed for a deeper understanding of how interactive apps are perceived and used in the Malaysian preschool context, balancing measurable outcomes with rich experiential insights a hallmark of well-established educational research.

Research Design

This study uses a mixed methods framework that combines qualitative depth with quantitative breadth. This approach allows for data triangulation, increasing the validity and richness of findings. It is particularly well suited to exploring complex educational phenomena, where both statistical patterns and personal experiences contribute to meaningful analysis.

Participants and Setting

Participants were selected from preschools and educational institutions across the Klang Valley, Malaysia, a region known for its demographic diversity and relatively high exposure to digital learning environments. A total of 47 individuals participated, including educators, parents, and those fulfilling both roles. Their contributions were essential to understanding the practical realities of app use, as well as expectations and concerns from both teaching and caregiving perspectives.

Qualitative Data Collection

To gather in-depth insights, focus group discussions were conducted with six participants, following the procedure outlined by Akyildiz and Ahmed (2021). The sessions provided a collaborative space for participants to share their experiences, challenges, and suggestions regarding the key features of interactive apps that support vocabulary learning among preschoolers. The qualitative data obtained helped to reveal recurring themes and contextual factors that influenced engagement and perceived effectiveness.

Quantitative Data Collection

A structured questionnaire was administered to a broader group of participants, guided by the framework developed by Mazhar et al. (2021). The survey collected standardized data on effective key features of interactive apps that support vocabulary learning among preschoolers. Quantitative findings allowed for statistical comparisons across participant categories educators, parents, and dual-role individuals—revealing broader trends and correlations.

Supplementary Data and Analysis

To enrich the data set, the study also includes an analysis of user reviews from app platforms, focusing on seven selected educational apps. This method, inspired by Newman et al. (2021), offers external validation and captures broader user sentiment regarding app performance and engagement. All qualitative and quantitative data will be subjected to thematic analysis, identifying patterns related to app effectiveness, user engagement, and educational value. This integrative approach ensures that both narrative insights and numerical data contribute to a holistic understanding of the use of interactive apps in early childhood vocabulary development.

Findings and Discussion

This section presents findings from a survey conducted to identify key features of interactive apps that effectively support vocabulary learning among preschool children from the perspectives of educators and parents. The data collected provides insights into specific design and functional elements that contribute to meaningful language learning experiences for young children. The findings highlight features that are considered most effective, such as

interactive visuals, engaging audio support, gamification, and adaptive learning activities that meet individual learning needs. In addition, the study results also reveal participants' views on limitations in some apps, including issues related to content quality, cultural relevance, and the need for guided adult involvement. Overall, the findings offer a comprehensive understanding of how app design influences vocabulary acquisition and engagement in early childhood settings.

Table 1
Features That Made Apps Effective for Early English Vocabulary Development (N = 46)

Feature	Frequency	Percentage (%)
Clear visual and audio pairing (e.g., images with spoken words)	35	76.1
Vocabulary presented in meaningful contexts (e.g., stories)	27	58.7
Interactive activities that keep children engaged	26	56.5
Age-appropriate design and simple navigation	18	39.1
Repetition and reinforcement across different formats (games, etc.)	17	37.0
Positive feedback and motivation (e.g., rewards, encouraging messages)	7	15.2

The survey findings revealed clear priorities among educators and parents regarding the features that make interactive apps effective for preschool vocabulary learning. The most highly valued feature was clear visual and audio pairing, selected by 76.1% of respondents. This suggests that combining spoken words with corresponding images significantly improves word recognition and comprehension, consistent with the principle of multimodal learning. The second most supported feature was vocabulary presented in a meaningful context, such as through stories, selected by 58.7% of participants. This highlights the importance of narrative-based learning, where new words are embedded in relatable scenarios that aid retention and comprehension. In the back, interactive activities that maintain engagement were selected by 56.5%, emphasizing the role of playful interaction in maintaining attention and motivation. Other features such as age-appropriate design and easy navigation (39.1%) and repetition across formats (37%) were rated moderately, indicating their supporting role in reinforcing learning. Interestingly, positive feedback mechanisms such as rewards and encouragement were selected by only 15.2%, indicating that while motivational elements are valued, they may be considered less critical than content delivery and design. Overall, the data highlights the importance of designing vocabulary apps that are visually rich, contextually meaningful, and engaging—tailored to the developmental needs and learning styles of preschoolers.

Table 2
Features Considered Unnecessary or Distracting in Vocabulary Apps for Preschool Learners (N = 47)

Feature	Frequency	Percentage (%)
Advertisements and pop-up links	42	89.4
Complex navigation menus	25	53.2
Irrelevant games that are not related to learning	24	51.1
Overuse of animations and sound effects	17	36.2
Competitive scoring systems or leaderboards	10	21.3
Ads interrupt the learning flow and may confuse or frustrate learners	1	2.1

The survey results offer valuable insight into app features that educators and parents find counterproductive for preschool vocabulary learning. The most rejected features were ads and pop-up links, with 89.4% of respondents identifying them as intrusive. These elements were seen as interrupting the learning flow and potentially confusing or frustrating for young children. Complex navigation menus were also flagged by 53.2% of participants, indicating that an overly complex interface can hinder independent exploration and usability for young learners. Similarly, unrelated games unrelated to learning were considered intrusive by 51.1%, indicating that entertainment elements must be closely aligned with educational goals. Excessive use of animations and sound effects was cited by 36.2%, reflecting concerns that excessive sensory stimulation may overwhelm rather than engage. Interestingly, competitive scoring systems or leaderboards were seen as unnecessary by 21.3%, implying that preschool learning should prioritize intrinsic motivation over competition. These findings emphasize the importance of designing vocabulary apps that are simple, focused, and developmentally appropriate—free from commercial distractions and aligned with pedagogical intent.*RQ2: What are the most effective key features of interactive apps that support vocabulary learning among preschoolers from the educators' and parents' perspectives?*

The focus group discussions revealed strong consensus among participants regarding the value of interactive apps in early English vocabulary development. One of the most prominent themes was the fun and engaging nature of these apps. Educators and parents noted that the joyful and attractive design of interactive applications helps reduce boredom and increases children's willingness to participate in vocabulary learning activities. This aligns with the broader understanding that engagement is a key factor in successful early childhood education.

Helpful Features of Vocabulary Apps for Preschool Learners
Participants identified several features that enhance the effectiveness of vocabulary apps for preschool children. The discussion revealed four dominant themes: visual and auditory pairing, interactive gameplay, contextual learning, and motivational feedback.

Visual and Auditory Pairing
Clear visuals combined with audio pronunciation were consistently cited as essential for vocabulary retention. P1 emphasized the value of a *"colourful display and feedback,"* while P4 explained, *"When a child taps on an image of an 'apple' and hears the word spoken clearly, they make a strong visual–auditory connection that supports memory."* P5 and P6 also

highlighted *"clear pictures and sounds" and "clear audio pronunciation"* as key elements that make words easier to understand.

Interactive and Game-Based Learning

Participants noted that interactive features such as games and drawing activities help sustain attention and reinforce vocabulary. P2 shared that *"Draw and guess… can help children to think what is this and what is the word."* P3 added, *"Fun visuals, sounds, and simple games help preschoolers stay interested and remember words better."* P4 supported this view, citing *"drag-and-drop matching games"* and *"tap-to-reveal features"* as effective tools for active engagement.

Contextual and Multisensory Experiences

Context-rich animations and stories were seen as valuable for helping children understand word usage. P4 stated, *"Seeing a dog 'bark' in a short animation… makes the meaning more memorable."* This multisensory approach was described as especially beneficial for preschoolers who are still developing connections between words and real-life experiences.

Repetition and Positive Feedback

Repetition embedded in playful activities and immediate feedback were considered important for reinforcing learning. P4 noted that *"repetition built into playful activities… helps solidify learning without making it feel boring,"* while P5 emphasized that *"positive feedback… makes learning fun, engaging, and easy to remember."*

Focus group discussions revealed that educators and parents highly valued interactive app features that made vocabulary learning multisensory, contextual, and engaging for preschoolers. Participants emphasized the importance of clear visual–audio pairings, such as tapping on images and hearing words pronounced aloud, which reinforced memory through dual sensory input. Colorful displays, fun visuals, and simple games were consistently cited as effective in maintaining children's interest and making words easier to understand. Features such as "draw and guess" activities were praised for encouraging active thinking and word association. Additionally, context-rich animations and stories helped children understand the meaning of words in everyday scenarios, increasing comprehension. The group also emphasized the value of immediate and positive feedback, which increased motivation and supported repeated practice. Interactive elements—such as drag-and-drop games and tap-to-reveal features—were seen as important for keeping students actively engaged. Finally, repetition embedded in playful formats, such as varied songs and games, was considered important for reinforcing vocabulary without causing boredom.

Unnecessary or Distracting Features in Vocabulary Apps for Preschool Learners

Participants identified several features in vocabulary apps that they felt hindered effective learning for preschool children. The discussion revealed four key themes: advertisements and pop-ups, excessive animations and sound effects, complex navigation and interface design, and gamified distractions.

Advertisements and Pop-Ups

Ads were the most frequently mentioned distraction. P1 simply stated *"Advertisements,"* while P6 noted that *"too many ads… make children keep waiting."* P5

added that *"too many pop-up ads… can distract children from learning and make it harder to focus on the words."* P4 emphasized that *"some apps include ads or pop-up purchase prompts, which not only disrupt focus but can also be confusing or frustrating for preschoolers."*

Excessive Animations and Sound Effects

Participants expressed concern about flashy visuals and loud sounds that detract from vocabulary learning. P3 observed that *"random animations can confuse or distract kids,"* and P5 described *"loud unrelated music and overly flashy animations"* as disruptive. P4 elaborated that *"constant flashing lights, loud music, or unrelated characters dancing can pull the child's focus away from the actual vocabulary."*

Complex Navigation and Interface Design

Overly complicated layouts were seen as barriers to engagement. P3 mentioned *"too many buttons,"* and P4 explained that *"complex navigation menus or too many buttons on one screen can overwhelm young learners,"* leading to random tapping rather than meaningful interaction.

Gamified Distractions

Some participants felt that excessive game-like rewards shifted focus away from learning. P4 noted that *"coins, stickers, or unrelated mini games… can shift the child's motivation from learning words to simply 'winning' the game."*

Participants expressed strong concerns about several app features that hindered effective vocabulary learning for young children. The most frequently cited issue was the presence of ads and pop-up purchase prompts, which were seen as intrusive and confusing, often causing delays and frustration for preschoolers. Overly flashy animations, loud, unrelated music, and random visual effects were also criticized for distracting from the actual learning content. While some visual stimuli can increase engagement, excessive or irrelevant sensory input is seen as counterproductive. Additionally, participants noted that complex navigation menus and too many buttons on a single screen can overwhelm young learners, leading to random tapping rather than purposeful interaction. Another concern was the use of game-like rewards, such as coins, stickers, or unrelated mini-games, which may divert children's attention from learning vocabulary to simply "winning" the game. Overall, the feedback emphasized the need for vocabulary apps to maintain simplicity, clarity, and an educational focus—ensuring that each feature supports rather than distracts from meaningful language acquisition.

Children's Interaction with Vocabulary App Features During Guided and Independent Learning Sessions

Participants described distinct patterns in how preschool children engage with vocabulary app features depending on whether the session is guided by an adult or conducted independently. The discussion revealed three key themes: focused engagement during guided sessions, exploratory behaviour during independent use, and motivational elements that influence interaction.

Focused Engagement During Guided Sessions

Participants consistently observed that children interact more purposefully when guided by an adult. P3 explained that *"their interaction tends to be more purposeful and focused because an adult is there to scaffold the experience,"* noting that teachers often prompt children to *"tap on a picture, repeat the word aloud, and use it in a sentence."* P4 added that children *"follow an adult's instructions—tapping pictures, repeating words aloud, and asking questions when unsure."* P5 similarly stated, *"When the teacher guides them, the children will follow instructions."*

Exploratory and Entertainment-Focused Behavior During Independent Use

In contrast, children tend to explore apps more freely during independent sessions. P2 noted that *"alone, they repeat fun parts or just explore,"* while P3 observed that children *"repeatedly tap on animations they find funny, replay favourite games, or skip challenging sections."* P5 described this as a form of *"problem solving,"* where children navigate features on their own.

Motivational Features and Feedback

Features such as scoring systems, animations, and instant feedback were seen as influential in sustaining interest. P1 noted that children *"seem interested especially if there is score or grading involved."* P3 emphasized that even without adult guidance, children *"still benefit from features like instant feedback, repetition, and touch-based matching games,"* which help reinforce vocabulary learning.

participants highlighted distinct differences in how preschoolers interacted with English vocabulary apps during guided learning sessions versus independent exploration. When supported by adults—such as teachers or parents—children tended to engage more purposefully with the app. Adults enriched the experience by prompting children to tap images, repeat words out loud, ask questions, and relate vocabulary to real-life objects or classroom contexts. This guided approach encouraged deeper engagement with features like pronunciation drills, drag-and-drop games, and interactive stories, helping children make meaningful connections between digital content and their everyday experiences.

In contrast, during independent learning, children often explored apps more freely and intuitively. They might be drawn to entertaining elements like animations, sound effects, or character reactions, sometimes replaying favorite parts or avoiding more challenging tasks. While their focus might shift toward fun rather than learning, features like instant feedback, repetition, and touch-based matching games still provide natural reinforcement for vocabulary. Interestingly, participants noted that children showed increased interest when scores or grading systems were included, suggesting that simple performance indicators can increase motivation.

Overall, the feedback emphasized the importance of adult involvement in maximizing the educational value of vocabulary apps, while recognizing the potential of well-designed features to support learning even in self-directed settings.

How Interactive App Features Support Different Learning Styles in Young Children

Participants described how various features in vocabulary apps—such as gamification, feedback, and visuals—cater to diverse learning styles among preschool children. The discussion revealed four key themes: support for visual, auditory, and kinesthetic learners; motivational and reflective benefits; accessibility and creativity; and responsiveness to child and parent needs.

Support for Visual, Auditory, and Kinesthetics Learners

Participants consistently emphasized that interactive features align well with different sensory-based learning preferences. P1 noted that apps *"support auditory and visual learners."* P4 elaborated that *"rich images, colour-coded words, and short animations make abstract vocabulary concrete"* for visual learners, while *"clear voice narration, sound effects, and repetition"* aid auditory learners. Kinesthetics learners benefit from *"touch-based interaction, like dragging letters into place or tapping objects to hear their names."* P5 summarized this by stating, *"Visuals help children who learn by seeing, sounds help those who learn by hearing, and games help those who learn by doing."*

Motivational and Reflective Benefits

Gamification and feedback were seen as powerful tools for motivation and self-monitoring. P3 explained, *"Games motivate, feedback builds confidence,"* and P4 added that *"point systems or character rewards can motivate competitive or goal-driven learners,"* while *"cheerful sounds for correct answers and gentle cues for mistakes"* support reflective learners.

Accessibility and Creativity

P1 highlighted that apps are *"accessible from anywhere and anytime,"* making them convenient for families. P6 noted that interactive features *"make children become creative,"* suggesting that open-ended play and visual exploration foster imaginative thinking.

Responsiveness to Child and Parent Needs

P2 emphasized the importance of feedback loops and user input, stating that *apps "help children to more clearly understand the vocabulary"* and that *"from different comments we can know what the children need and what the parent wants."*

Participants emphasized that interactive app features are particularly effective in catering to the diverse learning styles of preschoolers. For visual learners, elements such as rich imagery, color-coded words, and short animations help make abstract vocabulary more concrete and memorable. For example, pairing the word "happy" with an animated dog wagging its tail allows children to associate the term with a visual concept. Auditory learners benefit from clear voice-over narration, sound effects, and repetition, which support accurate pronunciation and listening comprehension—such as hearing the word "splash" along with the sound of water to reinforce meaning and phonological patterns.

Kinesthetic learners are supported through tactile interactions, including drag-and-drop activities and tap-to-reveal features, which add a physical dimension to learning and increase engagement through movement. Additionally, gamification elements such as points systems and character rewards are observed to motivate goal-oriented learners, while

immediate feedback—such as a cheerful sound for a correct answer or a gentle cue for an error—is seen as beneficial for reflective learners who thrive on tracking progress.

Participants also emphasized the value of accessibility, noting that the ability to use the app anytime, anywhere makes vocabulary learning more flexible and convenient for families. Additionally, the creative potential of the app was recognized, as children often explored features independently, expressed curiosity, and engaged in problem-solving. Feedback indicated that when carefully designed, interactive apps can support a variety of cognitive and sensory options, making vocabulary acquisition inclusive and enjoyable.

Analysis of Users Reviews from Apps Platform

Table 3

Comparison of Educational Apps for Early Vocabulary Development

App	Strengths	Limitations	Sources
Lineopolis	Fun & engaging; curriculum-based (Oxford)	Expensive subscription; limited free version; billing/tech issues	App Store & Google Play reviews; NYPost; Reddit
Endless Alphabet	Creative animations & puzzles; appealing characters & sounds	Only uppercase letters; limited word options; phonics concerns	Macworld; ComplaintsBoard.com
TeachMe (All apps)	Teacher-recommended; themed interactive games	Updates caused bugs; limited offline access	Chrome Stats; Firefox in 3 Months; App Store reviews
Khan Academy Kids	Free; ad-free; broad learning content; child-friendly	Limited depth; needs parental guidance	App Store & Google Play reviews; Common Sense Media
ABC Kids	Simple; free; child-friendly; no ads; good speech recognition	Limited phonics depth; less suitable for older preschoolers	Common Sense Media
Dueling ABC	Playful mini-games; supports special needs	Tricky navigation; flashcard-style; limited flexibility	Common Sense Media
Starfall ABCs	Widely used in schools; strong phonics & vocabulary foundation	Outdated interface; subscription needed	Common Sense Media; App Store reviews

A key insight that emerged from the analysis is the importance of curriculum alignment in vocabulary learning apps. Apps that follow a structured learning path or are intentionally designed to complement the early childhood education curriculum tend to show greater effectiveness. Such alignment ensures that content remains age-appropriate and vocabulary acquisition occurs in a logical, gradual progression. This not only reinforces classroom instruction but also promotes continuity between school and home learning environments.

The review data also highlights practical concerns about cost and value. While many apps offer free versions, apps with comprehensive features and a strong pedagogical foundation often require a paid subscription. This creates a dilemma for parents and

educators who must weigh financial limitations against the need for high-quality educational tools. The findings emphasize the importance of transparent pricing models and support for developers to provide meaningful free trials or tiered access options.

Furthermore, the analysis revealed that while many apps incorporate vocabulary into broader literacy domains—such as phonics, alphabet recognition, and early reading—apps that focus on vocabulary development tend to produce more effective outcomes for targeted language learning. This suggests that specificity in design enhances an app's impact on vocabulary acquisition.

Overall, the analysis of user reviews confirms that successful vocabulary apps must be engaging, pedagogically sound, accessible, and purpose driven. These insights offer valuable guidance for developers looking to refine their products and for educators aiming to select tools that best support early language development in preschool settings.

Discussion and Suggestions

The findings of this study confirm that interactive applications can play a significant role in enhancing English vocabulary acquisition among Malaysian preschoolers. Educators and parents consistently highlighted features such as clear visual-audio pairing, contextual storytelling, interactive games and positive feedback as highly effective. These features align with the principles of multimodal learning and cater to diverse learning styles visual, auditory and kinaesthetic making vocabulary learning more engaging and memorable.

However, the data also revealed some key concerns. The most prominent issue was the presence of advertisements and pop-up links, which 89.4% of survey respondents found to be distracting. Excessive use of animations, complex navigation menus and unrelated game elements were also flagged as barriers to focused learning. The findings suggest that while digital tools offer significant benefits, their design must prioritize simplicity, clarity and educational purpose.

To optimize vocabulary learning in preschoolers, app developers and educators should prioritize features that are pedagogically and developmentally appropriate. Clear visual–audio pairings, such as images accompanying spoken words, are essential to reinforce word recognition and support dual-channel learning. Contextual narration and animation help children understand word meanings in real-life scenarios, making vocabulary more memorable. Interactive elements such as drag-and-drop games, tap-to-reveal activities, and drawing-based guessing tasks encourage active engagement and cognitive processing. Repetition and reinforcement across multiple formats such as songs, stories, and games strengthen retention without causing fatigue. Additionally, positive feedback mechanisms, including cheerful sounds or visual rewards, build confidence and encourage continued practice. Features such as voice recognition and native speaker pronunciation support phonological awareness and accurate speech modelling. To ensure accessibility and relevance, apps should also include offline access, progress tracking, and local cultural themes. Importantly, distracting features such as excessive animations, pop-up ads, and complex navigation should be avoided to maintain focus and usability for young learners.

Conclusion

This study concludes that the effectiveness of interactive apps in enhancing English vocabulary acquisition among Malaysian preschoolers is strongly tied to the quality and relevance of their features. Features such as clear visual–audio pairing, context-rich animations, and interactive games consistently support engagement and retention, especially when aligned with children's developmental needs and learning styles. Repetition, positive feedback, and tactile activities further reinforce vocabulary through multi-sensory experiences. In addition, features such as voice recognition, native speaker pronunciation, and progress tracking contribute to accurate language modelling and personalized learning. Importantly, the inclusion of local cultural themes, offline access, and parental controls enhance accessibility and contextual relevance. Conversely, distracting elements such as advertisements, excessive animation, and complex navigation can detract from learning outcomes. Therefore, careful feature selection and thoughtful design are essential to ensure that interactive apps serve as effective, engaging, and developmentally appropriate tools for early language education.

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