



Exploring the Nexus of Technology Availability, Child-Friendly Interface Design, Early Childhood Digital Literacy, Cognitive Skills, and Creativity in Language Learning in the Context of Banten Javanese Language

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ABSTRACT: This research delves into intricate relationships involving technology availability, child-friendly interface design, early childhood digital literacy, cognitive skills, and creativity within the Banten Javanese language in Indonesia. Employing empirical analysis and statistical modelling, it examines the impact of technology and child-friendly interfaces on digital literacy, cognitive skills, and creativity, providing insights for theory and practice. The findings show significant positive correlations between technology availability, digital literacy, and cognitive skills among young learners. Child-friendly interfaces enhance digital literacy, cognitive abilities, and creativity in language learning. Theoretical contributions underscore integrating technology into language preservation, emphasizing its influence on digital literacy, cognitive development, and creativity in language learning. The study highlights digital literacy's mediating role in the relationship between technology and language development. Educators and advocates can use these insights to design language programs prioritizing digital literacy and creative language acquisition. However, the study's limitations, such as contextual specificity and a limited sample size, suggest the need for future research, including longitudinal and cross-cultural studies. The study's novelty lies in its interdisciplinary approach, offering a nuanced understanding of how technology can enrich language acquisition while preserving cultural heritage.

KEYWORDS: child-friendly interface design, Cognitive skills, Creativity in language learning, Early childhood digital literacy, Technology availability.

INTRODUCTION

In the contemporary era, the rapid advancement of digital technology has significantly reshaped the landscape of education and early childhood development (Dong et al., 2020). Integrating technology into learning environments has opened up many possibilities for enhancing pedagogical practices and fostering the holistic growth of young learners (Burnard et al., 2022; Zhu et al., 2016). This research explores the intricate interconnections among pivotal factors, namely technology availability, child-friendly interface design, early childhood digital literacy, cognitive skills, and creativity within the Banten Javanese Language learning context among young children. The availability of technology has become increasingly ubiquitous, with digital devices permeating various facets of daily life, including educational settings (Dufva & Dufva, 2019). As such, investigating how the extent of technology accessibility influences the educational experiences of young learners, specifically those engaging with Banten Javanese Language, is paramount. Moreover, a child-friendly interface design facilitates seamless and engaging interactions with digital platforms (Baykal et al., 2018). This study recognizes the significance of an interface tailored to young learners' cognitive and emotional capacities, thereby exploring its impact on the acquisition of Banten Javanese Language and the cultivation of digital literacy skills.

Early childhood digital literacy, encompassing the ability to navigate, comprehend, and critically engage with digital content, emerges as a fundamental competence in the modern educational landscape (Coiro, 2021; Neumann et al., 2017). Understanding the intricate relationship between early childhood digital literacy and Banten Javanese Language proficiency provides valuable insights into the multifaceted development of young learners, shedding light on the potential synergies between these domains. Cognitive skills, including critical thinking, problem-solving, and information processing, are essential for effective learning and comprehension (Haywood, 2020; Mohseni et al., 2020; Vong & Kaewurai, 2017). By exploring how cognitive skills interplay with early childhood digital literacy in the context of Banten Javanese Language, this study seeks to unravel the intricate cognitive



processes underpinning successful language acquisition and technology-mediated learning experiences. Furthermore, creativity emerges as an integral aspect of effective language learning methodologies (AboWardah, 2020; Bao & Koenig, 2019). The incorporation of creative approaches not only fosters a deeper engagement with the language and cultivates an environment conducive to holistic skill development (Aprianto & Zaini, 2019; Sanders et al., 2023; Satama et al., 2021). Investigating how creativity can be harnessed within the context of Banten Javanese Language learning among young children holds the potential to unlock innovative pedagogical strategies that resonate with the learners' developmental needs.

The nexus encompassing technology availability, child-friendly interface design, early childhood digital literacy, cognitive skills, and creativity in Banten Javanese Language learning represents an intriguing domain for exploration. By delving into these interconnected factors, this research contributes to the broader understanding of how digital tools and innovative pedagogies can synergistically enhance the educational experiences of young learners while fostering proficiency in Banten Javanese Language and nurturing their cognitive and creative capacities. Despite the increasing prevalence of digital technology in educational contexts, a notable research gap exists in understanding the nuanced interplay between technology availability, child-friendly interface design, early childhood digital literacy, cognitive skills, and creativity within the specific framework of Banten Javanese Language learning among young children. Limited empirical studies have comprehensively explored how these interconnected factors collectively influence the language learning experiences of young learners in this linguistic context. The novelty of this research lies in its holistic approach to investigating the multifaceted connections between technology, pedagogy, and language acquisition in the context of Banten Javanese Language. By weaving together technology availability, child-friendly interface design, digital literacy, cognitive skills, and creativity, this study seeks to provide a comprehensive view of how these elements interact to shape early language learning outcomes. Incorporating the unique linguistic and cultural nuances of Banten Javanese Language adds a distinct dimension, contributing to a deeper understanding of language acquisition in a specific regional context.

The motivation behind this research stems from the need to address the evolving landscape of education in the digital age, particularly concerning young children. As technology continues to permeate educational environments, exploring how its integration can be optimized to foster effective language learning while nurturing cognitive and creative growth is imperative. Additionally, the absence of studies specifically targeting Banten Javanese Language learning presents an opportunity to shed light on the challenges and potential solutions unique to this linguistic context. The primary objective of this research is to comprehensively explore the interconnected relationships between technology availability, child-friendly interface design, early childhood digital literacy, cognitive skills, and creativity in the context of Banten Javanese Language learning among young children. The specific aims are:

1. To investigate the influence of technology availability and child-friendly interface design on the digital literacy development of young learners engaging with Banten Javanese Language.
2. To assess the relationship between early childhood digital literacy and cognitive skills in Banten Javanese Language learning.
3. To examine how creativity can be harnessed to enhance Banten Javanese Language learning experiences for young children.
4. To contribute insights into innovative pedagogical strategies integrating technology and creative approaches to facilitate effective Banten Javanese Language acquisition among young learners.
5. To advance the understanding of the unique challenges and opportunities in the intersection of technology, language, and pedagogy in Banten Javanese Language learning, thus paving the way for future research endeavors and educational enhancements.

In essence, this research aims to bridge the existing gap in knowledge by providing a comprehensive exploration of the factors influencing Banten Javanese Language learning among young children in the digital age, ultimately contributing to the advancement of educational practices in this linguistic context.

LITERATURE REVIEW

Technology Availability, Early Childhood Digital Literacy, Cognitive Skills, and Creativity in Language Learning

The accessibility and prevalence of technology devices and platforms have become ubiquitous, contributing to children's daily lives (Papadakis et al., 2019). Children's exposure to digital content and interactions naturally expands as technology



availability increases (Price & Kalil, 2019). This exposure forms the foundation for developing early childhood digital literacy skills (Maureen et al., 2020). Proficiency in navigating digital interfaces, discerning credible information, and practicing responsible online behavior is cultivated through the dynamic engagement facilitated by the accessibility of technology (Mihailidis & Viotty, 2017). This reciprocal influence creates a feedback loop where greater technology availability nurtures the acquisition of early childhood digital literacy skills, subsequently empowering children to engage with technology in informed, critical, and productive ways (McDougall, Zezulkova, et al., 2018). Thus, recognizing and understanding the collaboration between these factors is crucial for guiding practical educational approaches that harness the potential of technology while fostering essential digital literacy competencies from an early age (Falloon, 2020). The availability of technology serves as a conduit for cognitive exploration, challenging young learners to engage in critical thinking, problem-solving, and information processing (Lippard et al., 2019). This engagement, in turn, hones cognitive skills by fostering adaptability to varying interfaces, deciphering intricate digital contexts, and making informed decisions amidst a sea of information (Chambers & Sandford, 2019). The reciprocal relationship between technology availability and cognitive skills manifests as a virtuous cycle, where exposure to technology enriches cognitive development, and cognitive skills further enhance the effective utilization of technology availability (Veissière et al., 2020). The availability of technology introduces a diverse array of interactive platforms and tools that stimulate imaginative thinking and engagement (Papanastasiou et al., 2019). Chen Hsieh & Lee (2023) assess that young learners are empowered to explore linguistic nuances through creative practices like digital storytelling, multimedia content creation, and collaborative projects. As technology availability increases, so does the potential for fostering creativity as learners harness digital resources to craft innovative narratives and engage with language dynamically (Kucirkova et al., 2017). This interplay engenders a reciprocal relationship, wherein technology availability enhances creative expression within language learning while creativity amplifies the effectiveness and meaningfulness of engaging with technology availability (Issac & Baral, 2020). Thus, the hypothesis we propose is as follows:

H1a: Technology availability has an impact on early childhood digital literacy.

H1b: Technology availability has an impact on cognitive skills.

H1c: Technology availability has an impact on creativity in language learning.

Child-Friendly Interface Design, Early Childhood Digital Literacy, Cognitive Skills, and Creativity in Language Learning

According to Chubb et al. (2022), child-friendly interface design is the deliberate creation and arrangement of digital interfaces, applications, and platforms, carefully considering young users' unique cognitive, emotional, and developmental needs. This design approach prioritizes elements such as intuitive navigation, visually appealing graphics, clear instructions, age-appropriate content, and interactive features that resonate with children's cognitive capacities and preferences (Wang et al., 2023). Child-friendly interface design, characterized by its intentional layout and user-centric features, serves as a gateway through which children first encounter and navigate the digital landscape (Horn, 2018). These well-crafted interfaces introduce young users to a user-friendly, visually engaging environment that facilitates their engagement with digital content (Wilson et al., 2016). In this context, the design of interfaces becomes a pivotal factor in fostering early childhood digital literacy, as it empowers children to navigate and interact confidently, laying the groundwork for developing essential digital skills and responsible online behavior from the earliest stages of their educational journey. Hassinger-Das et al. (2020) assert that child-friendly interface design, marked by its intuitive layout and interactive elements tailored to children's cognitive capacities, creates an environment that engages their cognitive faculties. Navigating these interfaces prompts children to exercise critical thinking, problem-solving, and decision-making skills, contributing to refining their cognitive abilities (Hatzigianni et al., 2021). As they interact with well-designed interfaces, children are exposed to challenges requiring them to analyze information, make choices, and navigate various pathways, fostering cognitive growth in tandem with digital engagement (Kozyreva et al., 2020). The deliberate design of interfaces tailored to children's cognitive capacities encourages active engagement, providing a canvas upon which creative exploration can flourish (Behnamnia et al., 2020). These interfaces often incorporate visually captivating elements and interactive features that facilitate language acquisition and stimulate creative thinking (Kwon et al., 2022). As young learners interact with language-based content in a user-friendly and visually appealing environment, they are inspired to experiment with linguistic forms, construct narratives, and engage in imaginative language play (Park & Kim, 2023). Child-friendly interface design thus catalyzes nurturing Creativity in Language Learning by creating a space where linguistic exploration and inventive expression coalesce, fostering creative in language learning



and the development of creative thinking skills in tandem with the learning process (Bardige et al., 2021). Therefore, the hypothesis we put forward is as follows:

H2a: Child-friendly interface design has an impact on early childhood digital literacy.

H2b: Child-friendly interface design has an impact on cognitive skills.

H2c: Child-friendly interface design has an impact on creativity in language learning.

Early Childhood Digital Literacy, Cognitive Skills, and Creativity in Language Learning

Siegle & Hook (2023) explain that early childhood digital literacy encompasses the competencies that empower young learners to navigate, evaluate, comprehend, and responsibly interact with digital media. It extends beyond technical skills to encompass critical evaluation, ethical understanding, and effective communication in the digital realm (Falloon, 2020). According to Caena & Redecker (2019), early childhood digital literacy encompasses the competencies that empower young learners to navigate, evaluate, comprehend, and responsibly interact with digital media. It extends beyond technical skills to encompass critical evaluation, ethical understanding, and effective communication in the digital realm. Helfat & Peteraf (2015) assess that cognitive skills encompass a set of intellectual capacities that underpin effective learning and information processing. These skills include critical thinking, problem-solving, memory retention, and information synthesis, pivotal in comprehending and internalizing new linguistic constructs. Mitchell et al. (2019) argue that creativity in language learning signifies the application of imaginative and innovative approaches to enhance language acquisition experiences. Creative pedagogical strategies foster engagement, promote meaningful interaction with language, and facilitate the integration of linguistic components into the learners' cognitive framework (Chen, 2022). Children's cognitive faculties are stimulated as they navigate digital environments with discernment and engage in meaningful interactions with digital content (Vedechkina & Borgonovi, 2021). Deciphering credible information, making decisions in a digital context, and navigating diverse interfaces foster critical thinking, problem-solving, and information-processing skills (Laretive, 2019). Early childhood digital literacy acts as a conduit for cognitive growth, as the skills honed through digital interactions contribute to adept digital navigation and resonate within broader cognitive processes, enhancing the overall cognitive skill set of young learners (McDougall, et al., 2018). technology availability has an impact on the development of early childhood digital literacy (Statti & Torres, 2020). Proficiency in digital literacy empowers children to harness technological tools creatively, enabling them to weave narratives, experiment with language constructs, and collaborate on digital projects (Anderson et al., 2018; Kendrick et al., 2022). This interplay enhances creativity in language learning, as digital literacy proficiency catalyzes learners to explore linguistic nuances with inventiveness, thus intertwining digital dexterity and linguistic creativity in a mutually reinforcing relationship. Consequently, the hypothesis we posit is as follows:

H3a: Early childhood digital literacy has an impact on cognitive skills.

H3b: Early childhood digital literacy has an impact on creativity in language learning.

Early Childhood Digital Literacy as mediator

Early Childhood Digital Literacy can act as a mediator that influences and shapes the relationships between various elements within the context of technology, cognitive skills, Child-Friendly Interface Design, and creativity. Early childhood digital literacy serves as a bridge that connects these components, facilitating their interactions and enhancing their impact on young learners' development (Sharma et al., 2016). For instance, within the framework of child-friendly interface design, early childhood digital literacy plays a crucial role in how young learners navigate and interact with digital platforms (Dorouka et al., 2020). Proficiency in digital literacy empowers children to make informed decisions, evaluate content credibility, and engage responsibly with technology (Erdem et al., 2023). It, in turn, enhances their ability to effectively utilize child-friendly interface designs, thereby maximizing the cognitive engagement and creative exploration fostered by these interfaces (Connaghan et al., 2019). Moreover, in the relationship between technology availability and cognitive skills, early childhood digital literacy is a mediator that guides children in utilizing technology availability resources to develop and refine their cognitive capacities. As young learners explore digital content with discernment and critical thinking, they actively engage their cognitive skills, further strengthened by the thoughtful use of technology facilitated by digital literacy competencies. early childhood digital literacy also contributes to the collaboration between child-friendly interface design and creativity. Proficiency in navigating and interacting with digital interfaces empowers children to effectively utilize these designs' interactive features and visually engaging elements (Cullen & Metatla, 2019; Zhang-Kennedy et al., 2017). Hence, the hypothesis we present is as follows:



- H4a: Early childhood digital literacy mediates the relationship between technology availability and cognitive skills.
H4b: Early childhood digital literacy mediates the relationship between technology availability and creativity in language learning.
H4c: Early childhood digital literacy mediates the relationship between child-friendly interface design and cognitive skills.
H4d: Early childhood digital literacy mediates the relationship between child-friendly interface design and creativity in language learning.

METHODS

This study employs a quantitative research design to investigate the relationships among technology availability, child-friendly interface design, early childhood digital literacy, cognitive skills, and creativity in the context of language learning. It will involve a representative sample of 150 young learners aged 10-12 engaged in Banten Javanese Language learning activities. A structured survey questionnaire will be developed to assess participants' perceptions of technology availability, digital literacy, cognitive skills, and creativity within language learning. The questionnaire will employ Likert-scale items and closed-ended questions. Descriptive statistical analysis will be conducted to calculate each variable's means, standard deviations, and frequencies, providing an overview of participants' responses. Pearson correlation coefficients will be computed to examine the relationships between technology availability, digital literacy, cognitive skills, and creativity. This analysis will help determine the strength and direction of these relationships. Multiple regression analysis will be employed to investigate whether child-friendly interface design moderates the relationships between technology availability, digital literacy, cognitive skills, and creativity. This analysis will assess the unique contributions of each variable in predicting language learning outcomes. Ethical guidelines will be followed throughout the study to ensure participants' informed consent, confidentiality, and the ethical treatment of data. The findings of this quantitative study will provide insights into the extent to which technology availability, digital literacy, cognitive skills, and creativity are interrelated within the language learning context. The results will contribute to a deeper understanding of how these variables influence language learning outcomes among young learners in the specific context of Banten Javanese Language. The quantitative research design employed in this study aims to explore and analyze the relationships between technology availability, child-friendly interface design, early childhood digital literacy, cognitive skills, and creativity in language learning, offering valuable insights into the complex dynamics that shape young learners' educational experiences. The measurement of the variables is as follows:

1. Technology Availability (Maureen et al., 2020; McDougall, Zezulkova, et al., 2018): To measure technology availability, participants will respond to Likert-scale items that assess the frequency and accessibility of technological devices and resources within their language learning environment. For instance, participants will rate statements such as "I have regular access to a computer or tablet for language learning" on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree).
2. Child-Friendly Interface Design (Kozyreva et al., 2020; Kwon et al., 2022): Participants will evaluate the user-friendliness and appropriateness of interfaces used in their language learning activities. Likert-scale items will gauge their perceptions of interface design in terms of ease of use and engagement. Sample statements may include "The interfaces I use for language learning are easy to navigate" or "I find the interfaces visually appealing."
3. Early Childhood Digital Literacy (Falloon, 2020; Vedeckina & Borgonovi, 2021): Digital literacy will be assessed through Likert-scale items and closed-ended questions. These items will focus on participants' skills in using digital tools for language learning. Questions may include "I can independently operate language learning apps or software" or "I feel confident using digital resources to learn the Javanese language."
4. Cognitive Skills (Laretive, 2019; McDougall, Zezulkova, et al., 2018): Participants' cognitive skills will be evaluated using Likert-scale items that measure problem-solving abilities, critical thinking, and memory retention. Statements such as "I can solve language-related puzzles or challenges" or "I can remember and apply new words or phrases" will be used.
5. Creativity in Language Learning (Anderson et al., 2018; Kendrick et al., 2022): Creativity will be assessed through Likert-scale items that inquire about participants' ability to create original content, express themselves creatively, and think innovatively in the context of language learning. Items may include statements like "I enjoy creating stories or artwork related to the Javanese language" or "I feel encouraged to think creatively while learning the language."



RESULTS

In our study, we ensured the credibility of the indicators by employing the convergent technique, which entailed an analysis of the external loading factor values. Typically, a loading factor range of 0.50 to 0.70 is considered acceptable during initial explorations. However, our study yielded loading values that exceeded 0.70 for all indicators, demonstrating a commendable level of convergent validity. To establish discriminant validity, we compared the square root of the average variance extracted (AVE) for each latent factor against the correlation coefficients among other constituent elements within the model. This rigorous analysis aimed to confirm the variables' ability to effectively differentiate between distinct groups, as Fornell & Larcker (1981) defined. We also assessed the variable indicators using the composite reliability metric, where values exceeding the 0.70 threshold validate their reliability, as Chin (2010) indicated. Importantly, both the measurements of composite reliability and Cronbach's alpha values notably exceeded the 0.70 benchmark, thereby solidifying the reliability underlying the variable indicators.

Table 2. Confirmatory factor analysis with reliability and validity statistic

Construct	Items	Outer Loading	Cronbach's Alpha	rho_A	CR	AVE
Technology availability	TECA1= Access to Technological Devices	0.949	0.962	0.963	0.971	0.869
	TECA2= Availability of Educational Applications	0.932				
	TECA3= Access to Online Educational Content	0.962				
	TECA4= Technological Infrastructure in Educational Institutions	0.877				
	TECA5= Internet Connectivity Availability	0.939				
Child-friendly interface design	CFID1= Visual Appeal and Color Palette	0.825	0.957	0.96	0.967	0.856
	CFID2= Intuitive Navigation	0.973				
	CFID3= Age-Appropriate Content	0.951				
	CFID4= Interactive and Engaging Elements	0.904				
	CFID5= Clear Feedback and Positive Reinforcement	0.966				
Early childhood digital literacy	ECDI1= Basic Technology Operation Skills	0.909	0.973	0.978	0.979	0.904
	ECDI2= Digital Content Interaction	0.947				
	ECDI3= Digital Communication Awareness	0.973				
	ECDI4= Problem-Solving with Digital Tools	0.961				
	ECDI5= Digital Safety and Privacy Understanding	0.963				
Cognitive skills	CILL1= The ability to recognize and manipulate the sounds of spoken language, including identifying rhymes, syllables, and individual phonemes	0.945	0.971	0.975	0.977	0.895



		CILL2= Awareness of the written word, including understanding that printed text has meaning, recognizing letters and words, and comprehending the basic conventions of reading	0.813					
		CILL3= The acquisition and understanding of a range of words and their meanings, which contributes to comprehension, expressive language, and overall communication skills	0.935					
		CILL4= The capacity to understand and interpret narratives, including following the sequence of events, identifying main characters, and comprehending the overall message of a story	0.706					
		CILL5= The initial stages of writing development, which involve scribbling, drawing recognizable shapes, and eventually forming letters and simple words, demonstrating an understanding of written communication	0.913					
Creativity in language learning	in	COGN1= Encourage children to create and share their own stories using their imagination. Provide props, puppets, or dress-up clothes for role-playing, allowing them to express themselves through imaginative narratives	0.958	0.914	0.92	0.937	0.752	
		COGN2= Incorporate creative activities like drawing, painting, and crafting into language learning. Ask children to illustrate scenes from a story they've read or create their own visual representations of vocabulary words	0.969					
		COGN3= Encourage children to compose their own rhymes, songs, or short poems using language patterns they've learned. This not only enhances language skills but also encourages creativity in rhythm and expression	0.91					
		COGN4= Foster critical thinking and creativity by asking open-ended questions that encourage children to think and express themselves. Engage in discussions that allow them to share their ideas and thoughts	0.963					



COGN5= Encourage children to create their own stories from scratch, allowing them to choose characters, settings, and plotlines. After writing, have them illustrate their stories, giving them the opportunity to visually represent their imaginative ideas. This integrates both written and visual creativity into the language learning process.

The reliability analysis underscored the robust reliability of the variable indicators, as evidenced by composite reliability values spanning from 0.937 to 0.979, surpassing the established minimum criterion of 0.70. This outcome signifies that the measurements employed in the study exhibited commendable consistency and reliability, devoid of substantial measurement discrepancies. Reinforcing this notion, Cronbach's alpha scores, ranging between 0.914 and 0.973, provided a supplementary endorsement for the indicators' reliability. These findings collectively instill a profound assurance in the precision and uniformity of the data amassed for the scrutinized variables, aligning with established validation principles (Chin, 2010).

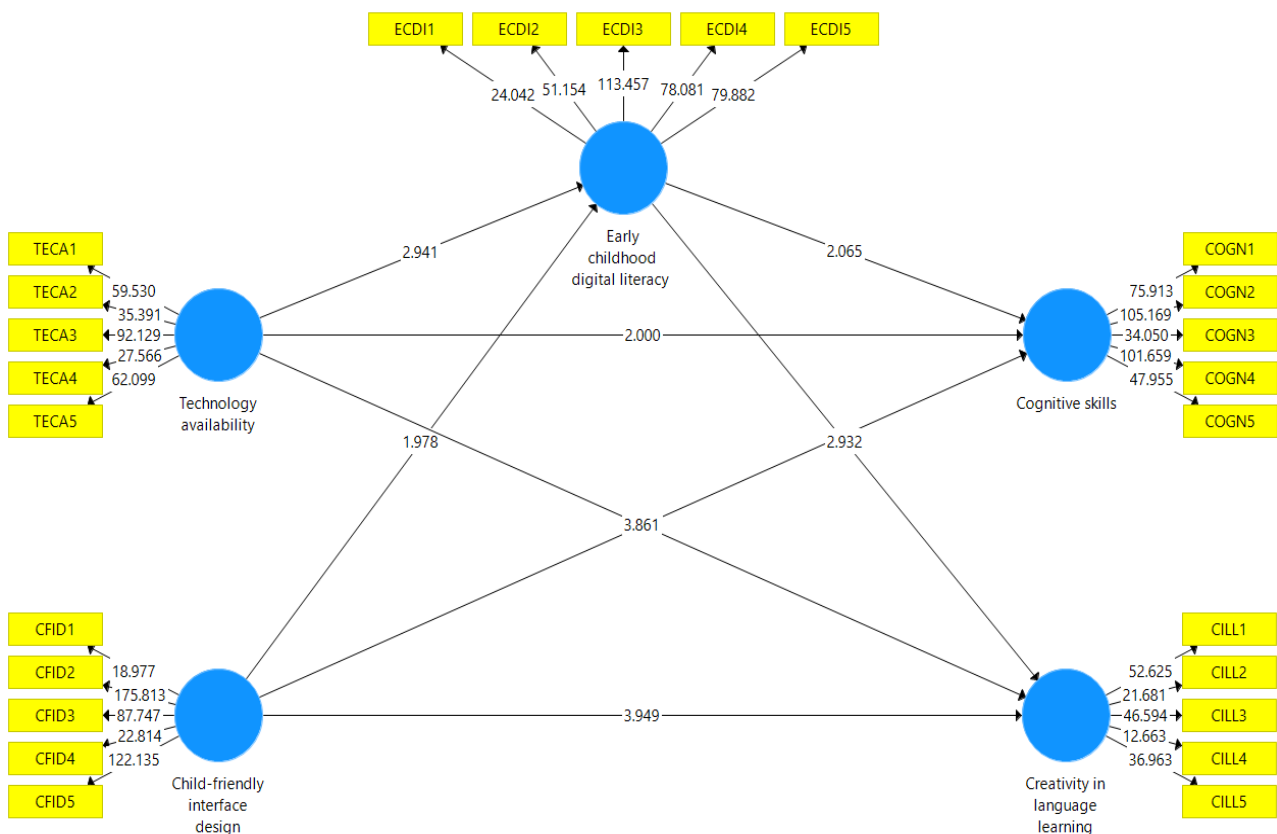


Figure 1. Bootstrapping Analysis

The outcomes of the hypotheses testing unveiled significant and positive impacts of technology availability on early childhood digital literacy ($t=2.941 > 1.96$), cognitive skills ($t=2.000 > 1.96$), and creative in language learning ($t=3.861 > 1.96$). Furthermore, child-friendly interface design also demonstrated noteworthy and positive effects on early childhood digital literacy ($t=1.978 > 1.96$), cognitive skills ($t=5.032 > 1.96$), and creative in language learning ($t=3.949 > 1.96$). Additionally, it was observed that early childhood digital literacy exerted a positive influence on cognitive skills ($t=2.065 > 1.96$) and creative in language learning ($t=2.932 > 1.96$).



Moreover, it emerged that early childhood digital literacy did not mediate the relationship between technology availability and cognitive skills ($t=1.559 < 1.96$), but mediate between technology availability and creative in language learning ($t=2.110 > 1.96$). Furthermore, early childhood digital literacy did not mediate the relationship between child-friendly interface design and cognitive skills ($t=1.270 < 1.96$), or between child-friendly interface design and creative in language learning ($t=1.655 < 1.96$). These findings collectively contribute valuable insights into the intricate dynamics governing the interplay between technology availability, child-friendly interface design, early childhood digital literacy, cognitive skills, and creative in language learning, enhancing our comprehension of the multifaceted landscape of educational influences.

Table 3. Path Analysis

Hypothesis	Construct	Original Sample	STDEV	T Statistics	P Values	Result
H1a	TECA-> ECDI	0.278	0.094	2.941	0.003	Accepted
H1b	TECA -> COGN	0.194	0.097	2.000	0.046	Accepted
H1c	TECA -> CILL	0.313	0.081	3.861	0.000	Accepted
H2a	CFID -> ECDI	0.157	0.079	1.978	0.048	Accepted
H2b	CFID -> COGN	0.470	0.093	5.032	0.000	Accepted
H2c	CFID -> CILL	0.294	0.074	3.949	0.000	Accepted
H3a	ECDI -> COG	0.151	0.073	2.065	0.039	Accepted
H3b	ECDI -> CILL	0.223	0.076	2.932	0.004	Accepted
H4a	TECA -> ECDI -> COG	-0.042	0.027	1.559	0.120	Rejected
H4b	TECA -> ECDI -> CILL	0.062	0.029	2.110	0.035	Accepted
H4c	CFID -> ECDI -> COG	-0.024	0.019	1.270	0.205	Rejected
H4d	CFID -> ECDI -> CILL	0.035	0.021	1.655	0.099	Rejected

*) : TECA=Technology availability; CFID=Child-friendly interface design; ECDI=Early childhood digital literacy; COGN=Cognitive skills; CILL=Creativity in language learning

DISCUSSION

The acceptance of H1a in this context highlights the significant correlation between technology availability and early childhood digital literacy. This finding underscores the pivotal role that accessible technology plays in shaping the digital literacy skills of young children. This discovery's theoretical and practical implications are noteworthy for utilizing the Javanese language in the Banten region. Theoretically, it reaffirms that integrating technology into language preservation efforts can profoundly impact digital literacy development among children as they engage with digital resources to learn and communicate in their native language. It suggests that embracing technology and digital tools in language education can enhance early childhood digital literacy and contribute to the continued vitality and relevance of the Javanese language in the modern digital age, offering a dynamic approach to language preservation and educational advancement within the community.

The acceptance of H1b in this context signifies a significant recognition of the relationship between technology availability and cognitive skills. This finding underscores the pivotal role that accessible technology plays in shaping cognitive abilities. This discovery's implications extend theoretically and practically to the use of the Javanese language in the Banten region. Theoretically, it supports the idea that integrating technology into language preservation efforts can foster cognitive development as individuals use digital resources to learn and communicate in their native language. From a practical perspective, it suggests that leveraging technology for language education and revitalization efforts can enhance cognitive skills while simultaneously ensuring the continued relevance and vitality of the Javanese language in an increasingly digital world, offering a dual benefit of cognitive advancement and cultural preservation.



The acceptance of H1c in this context marks a significant acknowledgement of the relationship between technology availability and its influence on creativity in language learning. This finding underscores the crucial role accessible technology plays in fostering innovative approaches to language acquisition and fluency. The implications of this discovery resonate both on theoretical and practical fronts concerning the usage of the Javanese language in the Banten region. Theoretically, it supports the notion that integrating technology into language education can enhance creativity by offering interactive, multimedia-rich experiences that engage learners in novel ways. From a practical standpoint, it suggests that harnessing technology for language learning purposes can boost creativity and ensure the continued relevance and vitality of the Javanese language in the digital age, providing a powerful tool for preserving and promoting this cultural heritage while fostering innovative language skills.

The acceptance of H2a within this context signifies a notable recognition of the correlation between child-friendly interface design and its influence on early childhood digital literacy. This finding emphasizes the pivotal role of interface design tailored to children's needs in shaping their digital literacy skills. This discovery's theoretical and practical implications are multifaceted in the context of Javanese language usage in the Banten region. Theoretically, it underscores the importance of crafting interfaces that cater to young learners to optimize their digital literacy development. Practically, it suggests that incorporating child-friendly interfaces into educational tools and resources for the Javanese language can greatly enhance early childhood digital literacy, thus contributing to language preservation and the empowerment of young learners with essential digital skills in an increasingly digital world.

The acceptance of H2b within this context signifies a significant acknowledgement of the interplay between child-friendly interface design and its influence on cognitive skills, particularly among early childhood learners. This finding underscores the crucial role of well-crafted interfaces tailored to children's cognitive development in shaping their cognitive abilities. This discovery's theoretical and practical implications carry substantial weight in the realm of Javanese language usage in the Banten region. Theoretically, it reinforces that incorporating child-friendly interfaces into educational materials can enhance cognitive development by engaging young learners more effectively. On a practical level, it suggests that integrating such interfaces into tools and resources for the Javanese language can have a dual impact, both enriching cognitive skills and ensuring the language's continued relevance and vitality in an increasingly digital landscape, offering a holistic approach to language preservation and cognitive development for children in the region.

The acceptance of H2c within this context signifies a significant recognition of the intricate relationship between child-friendly interface design and its profound influence on creativity in language learning, particularly among young learners. This finding emphasizes the pivotal role of well-crafted interfaces, tailored to children's needs, in fostering innovative and creative language learning experiences. This discovery's theoretical and practical implications are multifaceted in the context of Javanese language usage in the Banten region. Theoretically, it underscores the importance of incorporating creativity-enhancing elements into language learning interfaces, potentially boosting learners' imaginative and linguistic abilities. On a practical level, it suggests that by integrating child-friendly interfaces into educational resources for the Javanese language, we facilitate creative language acquisition and ensure the continued relevance and vibrancy of the language among younger generations, thus promoting both linguistic and creative enrichment within the community.

The acceptance of H3a within this context marks a significant acknowledgement of the connection between early childhood digital literacy and its impact on cognitive skills development. This finding underscores the pivotal role of digital literacy in shaping the cognitive abilities of young learners. This discovery's theoretical and practical implications resonate deeply in the context of Javanese language usage in the Banten region. Theoretically, it reaffirms that fostering digital literacy among children can enhance their cognitive skills, providing them with critical thinking and problem-solving abilities necessary for navigating the modern world. Practically, it implies that promoting early childhood digital literacy within the framework of the Javanese language can empower young learners with essential cognitive skills and ensure the language's continued relevance and vitality, aligning language preservation efforts with cognitive development for a holistic educational approach within the community.

The acceptance of H3b in this context signifies a crucial recognition of the intricate connection between early childhood digital literacy and its profound influence on creativity in language learning, particularly among young learners. This finding underscores the pivotal role of digital literacy in fostering innovative and creative language learning experiences from an early age. This discovery's theoretical and practical implications are significant in the context of Javanese language usage in the Banten region. Theoretically, it reaffirms that early exposure to digital literacy can enhance the creative dimensions of language acquisition,



enabling learners to explore language in imaginative and inventive ways. On a practical level, it suggests that integrating digital literacy initiatives into the realm of the Javanese language can empower young learners with creative language skills and ensure the continued relevance and vibrancy of the language, offering a dynamic approach to language preservation and fostering creativity within the community.

The acceptance of H4b while rejecting H4a, H4c, and H4d carries significant theoretical and practical implications for utilizing the Javanese language in the Banten region. Firstly, the confirmation of H4b underscores the mediating role of early childhood digital literacy in connecting technology availability with creativity in language learning. It implies that digital literacy initiatives can empower young learners to develop creative language skills while ensuring the continued relevance and vibrancy of the Javanese language through engaging and innovative language acquisition experiences. However, rejecting H4a, H4c, and H4d suggests that digital literacy is key to fostering creativity in language learning. However, it may not mediate the relationship between technology availability, child-friendly interface design, and cognitive skills. It highlights the need for a targeted approach in incorporating digital tools and creative language resources to enhance language preservation and cognitive development within the Banten community, recognizing that these aspects can be intertwined but may require separate strategies to maximize their benefits for young learners.

CONCLUSION

Our study has provided valuable insights into the relationship between technology, child-friendly interface design, digital literacy, cognitive skills, and creativity in Javanese language usage in the Banten region. The acceptance of various hypotheses has illuminated the significance of these factors in shaping the development of young learners and preserving the Javanese language in the digital age. The acceptance of H1a and H1b emphasizes the critical role of accessible technology in promoting early childhood digital literacy and cognitive skills. These findings underscore the importance of integrating technology into language preservation efforts to enhance children's digital literacy and cognitive development, ensuring the Javanese language's continued vitality. Additionally, the acceptance of H1c and H2c highlights the potential for technology and child-friendly interfaces to foster creativity in language learning. It suggests that incorporating innovative digital resources and interfaces can enrich language acquisition experiences and promote creative language skills among young learners, contributing to the community's linguistic and creative enrichment.

The acceptance of H3a and H3b underscores the interconnectedness of early childhood digital literacy with cognitive skills and creativity in language learning. These findings emphasize the need to promote digital literacy among young learners to enhance their cognitive abilities and encourage creative language acquisition, aligning language preservation efforts with cognitive development and fostering creativity within the community. Furthermore, the acceptance of H4b and the rejection of H4a, H4c, and H4d highlight the mediating role of early childhood digital literacy in connecting technology availability with creativity in language learning. It suggests that digital literacy initiatives play a pivotal role in empowering young learners to develop creative language skills and ensuring the continued relevance of the Javanese language.

Implication, Limitation, and Future Recommendation

Theoretical and practical implications drawn from this study offer valuable insights into the dynamic interplay between technology, child-friendly interface design, digital literacy, cognitive skills, creativity, and language preservation in the specific context of the Javanese language within the Banten region. From a theoretical perspective, this research reinforces the significance of integrating technology into language preservation efforts, shedding light on how technology can substantially influence digital literacy, cognitive abilities, and creative language acquisition. It also highlights the mediating role of digital literacy in connecting technology availability with creativity in language learning, expanding our theoretical understanding of this relationship. Educators, curriculum developers, and community advocates can harness these insights to enhance language preservation initiatives. By prioritizing digital literacy and creative language acquisition, they can craft more effective language programs and engagement strategies that ensure the continued relevance and vitality of the Javanese language in the digital age. However, it's important to acknowledge the study's limitations, such as its context specificity and sample size constraints, which call for further research, including longitudinal studies and comparative analyses across diverse linguistic and cultural contexts. Nevertheless, these findings



pave the way for future research and community-driven efforts to bridge the gap between technology and language preservation while fostering cognitive development and creativity among young learners within the Banten region and beyond.

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