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Pre-service Early Childhood Teachers' Perceptions on Digital Media for Language Creativity Stimulation

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Abstract

The integration of digital media in early childhood education has become increasingly prevalent, yet understanding pre-service teachers' perceptions toward its role in stimulating language creativity remains limited. This mixed-methods study examined 95 pre-service early childhood teachers' perceptions of digital media for language creativity stimulation. Using a structured questionnaire with 21 Likert-scale items and three open-ended questions, we assessed six dimensions: importance of language creativity, readiness and competence, perceptions of digital media, teaching methods, frequency and effectiveness, and barriers and challenges. Quantitative data were analyzed using descriptive statistics, while qualitative responses underwent thematic analysis. Results revealed an overall high perception (M = 4.353), with the highest scores for importance of language creativity (M = 4.703) and readiness and competence (M = 4.532). Participants demonstrated strong awareness of digital media benefits, with 77.9% emphasizing vocabulary enhancement, while acknowledging significant challenges including infrastructure limitations (41.1%) and content appropriateness concerns (38.9%). The study contributes to understanding pre-service teachers' preparedness for technology integration in developing country contexts and highlights the need for comprehensive technological pedagogical content knowledge development in teacher education programs to support effective digital media integration in early childhood language education.

Keywords: *digital media, early childhood, language creativity, pre-service teachers, technology integration*

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Introduction

The rapid digital transformation has fundamentally reshaped early childhood education, introducing new opportunities and challenges for language development (Patel et al., 2025; Dore et al., 2025). Digital media, encompassing smartphones, tablets, educational applications, and interactive platforms, has become ubiquitous in young children's lives, with significant implications for language acquisition and creative expression (Liu et al., 2024; Barr & Kirkorian, 2024). Recent meta-analyses reveal complex relationships between screen media exposure and vocabulary development, suggesting that content quality, context of use, and adult mediation play crucial roles in determining developmental outcomes (Jing et al., 2023; Kucker et al., 2024).

Language creativity in early childhood represents a critical developmental domain, encompassing not merely vocabulary acquisition but also innovative language use, narrative construction, and communicative competence (Vescovi et al., 2024; Sundqvist, et al., 2025). Contemporary research emphasizes that digital media can serve as powerful tools for stimulating language creativity when appropriately integrated with pedagogical strategies (Chen & Ding, 2024). However, concerns persist regarding excessive screen time and its potential negative impacts on language development, particularly in contexts where children engage with media in isolation without adult guidance (Tulviste & Tulviste, 2024; Anuradha, et al., 2025). Previous large-scale studies

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have also reported associations between screen time and developmental as well as behavioral outcomes in preschool children, highlighting the importance of moderation and guided media use (McArthur et al., 2022).

Pre-service teachers represent a crucial population in understanding technology integration in early childhood education. Their perceptions, beliefs, and preparedness significantly influence future classroom practices (Lim et al., 2024; Anwar, et. al., 2025). The Technological Pedagogical Content Knowledge (TPACK) framework has emerged as a dominant lens for examining teachers' technology integration capabilities, emphasizing the intersection of technological knowledge, pedagogical understanding, and content expertise (Li, et al., 2024; Bwalya et al., 2024). Recent studies indicate that pre-service teachers often possess strong theoretical knowledge about technology integration but face challenges in practical application (López et al., 2025; Luik et al., 2024). Recent studies have also emphasized the expanding role of emerging technologies, including artificial intelligence literacy, in strengthening pre-service teachers' TPACK and instructional readiness (Aglibot et al., 2025).

Despite growing research on digital media in early childhood education, significant gaps remain. First, most studies focus on developed countries, with limited attention to pre-service teachers' perspectives in developing nations where infrastructure and resources differ substantially (Gibbs et al., 2024; Harper et al., 2024). Second, research specifically examining digital media for language creativity stimulation, rather than general language development, remains scarce (Sundqvist et al., 2024). Third, comprehensive investigations combining multiple perception dimensions (beliefs, competencies, challenges, and strategies) are underrepresented in the literature (Ye et al., 2024; Akram et al., 2022).

This study addresses these gaps by examining Indonesian pre-service early childhood teachers' perceptions of digital media for language creativity stimulation. Indonesia provides a valuable context as a developing nation experiencing rapid digital expansion yet facing persistent educational infrastructure challenges (Masoumi & Bourbour, 2024). Understanding pre-service teachers' perceptions in this context contributes to global knowledge about technology integration in diverse educational settings.

Specifically, this study investigates: (1) What are pre-service early childhood teachers' perceptions regarding the importance of language creativity in early childhood? (2) How do pre-service teachers perceive their readiness and competence to use digital media for language creativity stimulation? (3) What benefits and challenges do pre-service teachers associate with digital media use for language development? (4) What strategies do pre-service teachers recommend for effective digital media integration in early childhood language education?

Methodology

This study employed a convergent parallel mixed-methods design, simultaneously collecting and analyzing quantitative and qualitative data to provide comprehensive understanding of pre-service teachers' perceptions (Kumar et al., 2024; Medawar et al., 2023). This approach enabled triangulation of findings and deeper insights into participants' perspectives regarding digital media use for language creativity stimulation.

Participants comprised 95 pre-service teachers enrolled in an Early Childhood Education program at a public university in Indonesia. The sample included 94 females (98.9%) and 1 male (1.1%), reflecting the gender distribution typical of early childhood education programs. Most participants were first-semester students (76.8%), with 23.2% in higher semesters. Regarding teaching experience, 52 participants (54.7%) had completed practicum placements in early childhood settings, while 43 (45.3%) had not yet engaged in practical teaching experiences. Participants ranged in age from 18 to 24 years (M = 19.3, SD = 1.2).

Data were collected using an online questionnaire administered via Google Forms, comprising three sections. The first section gathered demographic information (gender, semester, teaching experience). The second section contained 21 items measuring perceptions across six dimensions: (1) importance of language creativity (4 items), (2) readiness and competence (4 items), (3) perceptions of digital media (4 items), (4) teaching methods (3 items), (5) frequency and effectiveness (3 items), and (6) barriers and challenges (3 items). Items utilized a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). The third section included

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three open-ended questions exploring perceived benefits, challenges, and recommendations for digital media integration.

The instrument demonstrated strong internal consistency (Cronbach's α = 0.89), indicating high reliability. Content validity was established through expert review by three early childhood education specialists and two educational technology experts.

Quantitative data were analyzed using descriptive statistics including means, standard deviations, and frequency distributions. Perception levels were categorized as: Very Low (1.00-1.80), Low (1.81-2.60), Moderate (2.61-3.40), High (3.41-4.20), and Very High (4.21-5.00). Analyses were conducted using Python (pandas, numpy libraries) with significance level set at α = 0.05, following established quantitative research practices in screen time and child development studies (Ponti, 2023; Smith & Kumar, 2023).

Qualitative data underwent thematic analysis following established protocols (Suh et al., 2024; Massaroni, etl., 2024). Open-ended responses were initially coded independently by two researchers, with inter-rater reliability achieving κ = 0.87. Discrepancies were resolved through discussion. Themes emerged inductively from the data, subsequently organized into coherent categories representing benefits, challenges, and recommendations.

Results and Discussion

This Participant Demographics

The study involved 95 pre-service early childhood teachers. Gender distribution showed 94 females (98.9%) and 1 male (1.1%). By semester enrollment, 73 participants (76.8%) were first-semester students, while 22 (23.2%) were in higher semesters. Regarding teaching experience, 52 participants (54.7%) had completed practicum experiences and 43 (45.3%) without practical teaching experience. Figure 1 presents the demographic characteristics of participants, showing the predominance of female students, concentration in early semesters, and mixed teaching experience levels.

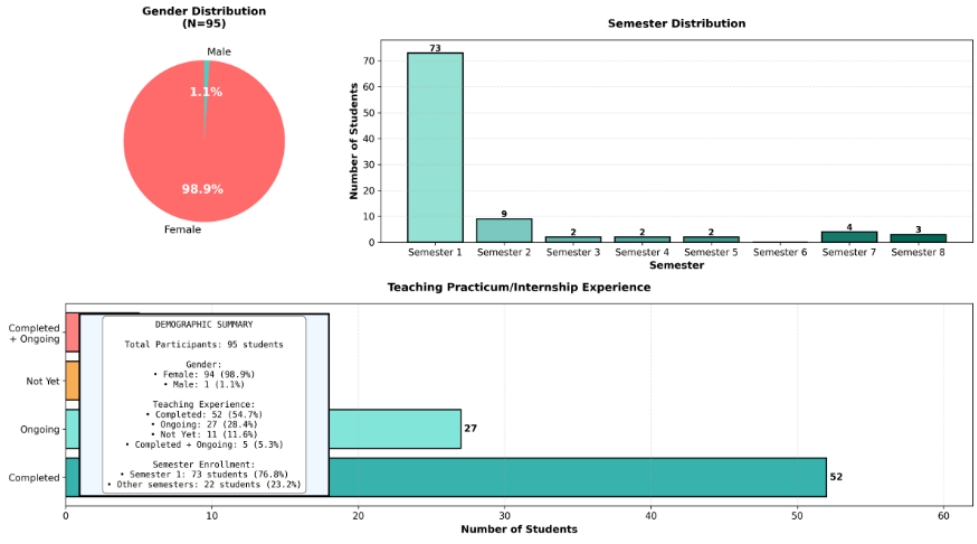

Figure 1. Demographic distribution of 95 pre-service early childhood teachers

The demographic composition reflects typical patterns observed in early childhood teacher education programs globally, where female students constitute the overwhelming majority (Harper et al., 2024). The high concentration of first-semester students (76.8%) provides valuable insights into initial perceptions prior to extensive pedagogical training, while the inclusion of higher-semester students (23.2%) enables comparison across program progression stages. The relatively balanced distribution of teaching experience—with slightly more than half having completed practicum placements (54.7%)—offers opportunities to examine how practical classroom exposure influences perceptions of digital media integration. This experience distribution is particularly relevant given that practicum experiences have been identified as critical moments for technology

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adoption attitudes formation (Anwar, et. al., 2025). The predominance of first-semester students suggests that the perceptions captured largely represent initial beliefs and attitudes developed through personal technology use experiences rather than formal pedagogical training, which may explain the high overall positive scores while also highlighting areas where targeted professional development could strengthen implementation competencies.

Overall Perception Scores

Pre-service teachers demonstrated overall high perceptions toward digital media for language creativity stimulation (M = 4.353, SD = 0.421). Analysis of 1,995 total responses across all items revealed the following distribution: 1,125 responses (56.39%) strongly agreed, 574 responses (28.77%) agreed, 211 responses (10.58%) were neutral, 45 responses (2.26%) disagreed, and 40 responses (2.01%) strongly disagreed. Combining strongly agree and agree categories, 85.16% of responses indicated positive perceptions.

The distribution of responses across all items (Figure 2) revealed predominantly positive perceptions, with 85.16% of responses in agree or strongly agree categories (1,125 strongly agree, 574 agree). Only 4.27% expressed disagreement (2.26% disagree, 2.01% strongly disagree), while 10.58% remained neutral. This distribution pattern demonstrates broad consensus regarding digital media's potential role in language creativity stimulation, though the presence of neutral and negative responses indicates areas requiring further attention in teacher preparation programs.

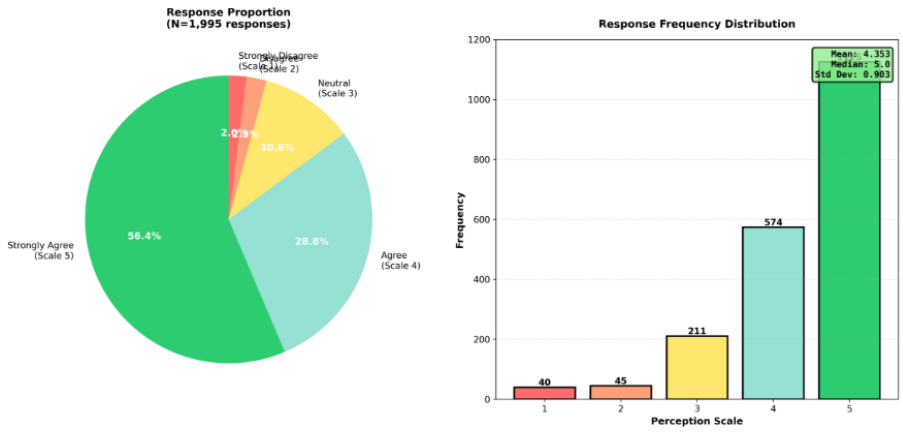

Figure 2. Distribution of Participant Responses Across Likert Scale Categories

The high proportion of positive responses (85.16%) substantially exceeds typical acceptance thresholds in technology adoption studies, suggesting strong readiness among pre-service teachers for digital media integration in early childhood language education. This finding aligns with recent research documenting growing acceptance of educational technology among younger teacher cohorts (Lim et al., 2024), while surpassing reported rates in similar studies conducted in developing country contexts (Masoumi & Bourbour, 2024). The relatively low disagreement rate (4.27%) and moderate neutral responses (10.58%) indicate that skepticism toward digital media use is not widespread, though the presence of these responses warrants examination. Cross-tabulation of response patterns by demographic characteristics revealed no significant differences in overall positive response rates between first-semester students (85.3%) and higher-semester students (84.7%), nor between participants with teaching experience (86.1%) and those without (83.9%), suggesting that positive perceptions persist across experience levels and program progression stages.

Perceptions by Dimension

Six perception dimensions were examined, revealing varying levels across different aspects of digital media use. As illustrated in Figure 3, perception scores varied across dimensions, with importance of language creativity (M = 4.703) and readiness and competence (M = 4.532) achieving Very High levels, while other dimensions scored in the High range (M = 4.077-4.316).

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The importance of language creativity dimension achieved the highest mean score (M = 4.703, SD = 0.389), categorized as Very High, indicating strong recognition of language creativity as a fundamental developmental domain. Readiness and competence perceptions scored Very High (M = 4.532, SD = 0.447), suggesting participants feel well-prepared for technology integration. Perceptions of digital media received High ratings (M = 4.316, SD = 0.512), reflecting measured optimism about technology's educational potential. Teaching methods scored High (M = 4.305, SD = 0.498), indicating confidence in pedagogical approaches. Frequency and effectiveness perceptions achieved High levels (M = 4.092, SD = 0.541). Barriers and challenges awareness scored High (M = 4.077, SD = 0.556), demonstrating realistic understanding of implementation difficulties. Table 1 presents detailed statistics for each dimension.

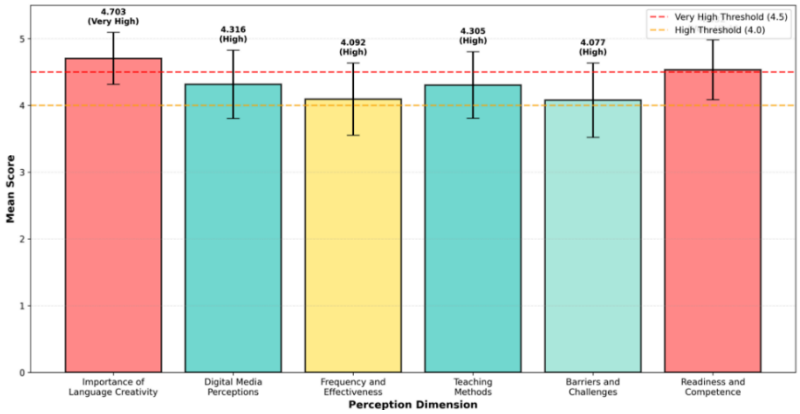

Figure 3. Mean Perception Scores Across Six Dimensions

Visual inspection of Figure 3 reveals a clear hierarchical pattern, with the two highest-scoring dimensions (Importance of Language Creativity and Readiness and Competence) distinctly exceeding the 4.5 Very High threshold, while the remaining four dimensions cluster within a narrow range just above the 4.0 High threshold (M = 4.077-4.316). This pattern suggests that while pre-service teachers strongly endorse the theoretical importance of language creativity and express confidence in their personal capabilities, they demonstrate more measured—though still positive—assessments of practical implementation aspects including digital media effectiveness, teaching methods, frequency of use, and anticipated barriers. The relatively small standard deviations across all dimensions (SD = 0.389-0.556) indicate substantial consensus among participants, with minimal extreme variation in individual perceptions. Notably, the lowest-scoring dimension (Barriers and Challenges, M = 4.077) still falls within the High category, suggesting that awareness of implementation difficulties does not translate into fundamental skepticism about digital media's value for language creativity stimulation.

Table 1. Mean Perception Scores and Standard Deviations by Dimension

Dimension	*M*	*SD*	*Level*
1. Importance of Language Creativity	4.703	0.389	Very High
2. Readiness and Competence	4.532	0.447	Very High
3. Perceptions of Digital Media	4.316	0.512	High
4. Teaching Methods	4.305	0.498	High
5. Frequency and Effectiveness	4.092	0.541	High
6. Barriers and Challenges	4.077	0.556	High
Overall Perception	4.353	0.421	High

Table 1 reveals a consistent pattern of positive perceptions across all dimensions, with scores ranging from 4.077 to 4.703, all falling within High or Very High categories. The 0.626-point gap between the highest (Importance of Language Creativity) and lowest (Barriers and Challenges) dimensions represents a relatively narrow range, suggesting balanced perceptions without extreme disparities between theoretical recognition and

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practical implementation concerns. Standard deviations ranging from 0.389 to 0.556 indicate moderate variability, with the tightest consensus on importance of language creativity (SD = 0.389) and greatest variation in barriers and challenges awareness (SD = 0.556), likely reflecting diverse prior experiences with technology access and institutional support. The overall perception score (M = 4.353, SD = 0.421) falls precisely between the two Very High dimensions and four High dimensions, representing a mathematically weighted average that accurately reflects the distribution of individual dimension scores. This pattern suggests that pre-service teachers maintain optimistic yet realistic perspectives—strongly endorsing foundational principles while acknowledging practical implementation complexities.

Perceived Benefits of Digital Media

Thematic analysis of open-ended responses identified six primary benefit categories. Vocabulary enhancement emerged most prominently, mentioned by 74 participants (77.9%), with respondents emphasizing digital media's capacity to expose children to rich, diverse language in engaging contexts. Technology integration as contemporary necessity appeared in 53 responses (55.8%), reflecting awareness of preparing children for digital society. Engagement and interactivity benefits were cited by 40 participants (42.1%), highlighting digital media's capacity to capture and maintain children's attention. Creativity stimulation was mentioned by 40 participants (42.1%), with respondents noting how digital tools facilitate creative expression. Multimodal learning opportunities appeared in 35 responses (36.8%), emphasizing integration of visual, auditory, and interactive elements. Accessibility and reach benefits were cited by 30 participants (31.6%), noting how digital media extends educational opportunities beyond traditional classroom boundaries.

Perceived Challenges

Six challenge categories emerged from qualitative analysis. Infrastructure and access limitations constituted the most frequent concern, cited by 39 participants (41.1%), with respondents highlighting unreliable internet connectivity, inadequate devices, and technical support gaps. Content appropriateness concerns appeared in 37 responses (38.9%), reflecting worries about age-inappropriate material and quality variation in available digital resources. Screen time and addiction worries were mentioned by 25 participants (26.3%), indicating awareness of potential negative impacts from excessive media exposure. Competence and skill gaps appeared in 16 responses (16.8%), with some participants acknowledging limited technical proficiency. Parental resistance was cited by 12 participants (12.6%), noting some families' skepticism toward technology in early education. Implementation time constraints were mentioned by 11 participants (11.6%), recognizing the additional preparation required for effective digital media integration.

Recommendations for Practice

Participants provided six categories of recommendations for effective digital media integration. Appropriate content selection emerged as the primary recommendation, mentioned by 49 participants (51.6%), emphasizing the need for careful evaluation and curation of developmentally suitable materials. Time limitation recommendations appeared in 29 responses (30.5%), suggesting structured approaches to managing screen exposure duration. Intensive supervision was cited by 26 participants (27.4%), highlighting the importance of adult guidance during digital media use. Integration with traditional methods was mentioned by 20 participants (21.1%), recommending balanced approaches combining technology with hands-on, concrete experiences. Teacher training needs appeared in 18 responses (18.9%), recognizing the necessity for comprehensive professional development. Parental involvement was recommended by 15 participants (15.8%), suggesting collaborative approaches engaging families in children's digital learning experiences. Table 2 summarizes the thematic analysis results for benefits, challenges, and recommendations.

Table 2. Perceived Benefits, Challenges, and Recommendations: Thematic Analysis Results

Theme Category	***n***	**%**
PERCEIVED BENEFITS		
Vocabulary Enhancement	74	77.9
Technology Integration as Contemporary Necessity	53	55.8

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Engagement and Interactivity	40	42.1
Creativity Stimulation	40	42.1
Multimodal Learning Opportunities	35	36.8
Accessibility and Reach	30	31.6
PERCEIVED CHALLENGES		
Infrastructure and Access Limitations	39	41.1
Content Appropriateness Concerns	37	38.9
Screen Time and Addiction Worries	25	26.3
Competence and Skill Gaps	16	16.8
Parental Resistance	12	12.6
Implementation Time Constraints	11	11.6
RECOMMENDATIONS FOR PRACTICE		
Appropriate Content Selection	49	51.6
Time Limitation Strategies	29	30.5
Intensive Supervision	26	27.4
Integration with Traditional Methods	20	21.1
Teacher Training Needs	18	18.9
Parental Involvement	15	15.8

Note. N = 95 pre-service early childhood teachers. Percentages reflect proportion of participants who mentioned each theme in open-ended responses. Multiple themes could be mentioned by a single participant; therefore, percentages do not sum to 100%.

Table 2 reveals coherent alignment between perceived benefits, challenges, and recommendations, demonstrating sophisticated understanding of digital media integration complexities. The most frequently cited benefit—vocabulary enhancement (77.9%)—directly relates to language creativity's core components, while the prominence of infrastructure limitations (41.1%) and content appropriateness concerns (38.9%) as primary challenges reflects contextual realities of developing country educational settings. Notably, the most common recommendation—appropriate content selection (51.6%)—directly addresses the second-most cited challenge (content appropriateness, 38.9%), suggesting participants recognize specific actionable solutions rather than perceiving challenges as insurmountable barriers. The relatively lower frequency of competence gaps (16.8%) as a challenge contrast with quantitative findings showing Very High readiness perceptions (M = 4.532), indicating that concerns center primarily on external factors (infrastructure, content quality) rather than internal capabilities. This pattern suggests that pre-service teachers possess nuanced perspectives acknowledging both opportunities and obstacles, with clear understanding that successful implementation requires systemic support, careful resource curation, and balanced integration approaches rather than wholesale adoption or rejection of digital technologies.

Discussion

The overall high perception score (M = 4.353) indicates that pre-service teachers hold generally positive attitudes toward digital media for language creativity stimulation. This finding aligns with recent international research demonstrating growing acceptance of technology in early childhood education (Patel et al., 2025; Li, 2024). The high percentage of positive responses (85.16%) suggests broad consensus regarding digital media's potential role, though the presence of neutral and negative responses indicates some reservations warranting attention.

The highest dimensional score for importance of language creativity (M = 4.703) reveals strong awareness among pre-service teachers regarding this developmental domain's fundamental significance. This finding is encouraging as it demonstrates that participants recognize language creativity extends beyond vocabulary acquisition to encompass narrative skills, communicative competence, and innovative expression

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(Dore et al., 2025; Vescovi et al., 2024). Such awareness provides a solid foundation for future professional practice, suggesting that pre-service teachers appreciate the multifaceted nature of language development in early childhood.

While readiness and competence perceptions scored Very High (M = 4.532), indicating strong confidence, the qualitative data reveal a more nuanced picture. The fact that 16.8% of participants identified knowledge gaps and training needs suggests potential discrepancy between perceived and actual competence. This finding aligns with recent TPACK research documenting gaps between pre-service teachers' confidence and practical implementation abilities (Luik et al., 2024; Anwar, et. al., 2025). The phenomenon may reflect limited self-awareness regarding implementation complexities or insufficient exposure to authentic teaching contexts. This gap underscores the necessity for teacher education programs to provide more practice-based experiences enabling pre-service teachers to develop realistic self-assessment capabilities (López et al., 2025).

The High rating for digital media perceptions (M = 4.316) reflects measured optimism rather than uncritical enthusiasm. This balanced perspective suggests growing sophistication in understanding technology's nuanced role in education (Masoumi & Bourbour, 2024; Chen & Ding, 2024). Broader analyses of children's development in the digital age further underline the combined influence of technology use, family context, and post-pandemic educational environments on early learning and well-being (Li, 2024). Participants appear to recognize that digital media represents tools whose educational value depends critically on implementation quality, content appropriateness, and contextual factors. This nuanced understanding contrasts with earlier technological determinism suggesting that technology presence alone improves learning outcomes (Barr & Kirkorian, 2023). Earlier conceptual models similarly emphasize that learning with digital media is most effective when supported by adult mediation and interactive engagement rather than passive consumption (Barr & Kirkorian, 2023).

The prominence of vocabulary enhancement (77.9%) as perceived benefit aligns with substantial research evidence. Meta-analytic findings demonstrate that well-designed digital media can support vocabulary development through exposure to rich, diverse language in engaging contexts (Jing et al., 2023; Sundqvist, et al., 2025). Interactive applications, educational videos, and digital storytelling provide opportunities for repeated exposure to target vocabulary with multimodal support (Liu et al., 2024). However, research also emphasizes that optimal outcomes require adult mediation and intentional pedagogical strategies rather than passive exposure (Sundqvist et al., 2024).

Infrastructure limitations emerging as the most frequent challenge (41.1%) reflects realities of developing country contexts where reliable internet connectivity, adequate devices, and technical support remain inconsistent (Harper et al., 2024). This finding has important implications for policy and practice. While pre-service teachers may possess theoretical knowledge and positive attitudes, effective implementation requires systemic support including infrastructure development, device provision, and ongoing technical assistance. Teacher education alone cannot address these structural barriers, necessitating coordinated efforts across educational system levels (Gibbs et al., 2024).

The emphasis on appropriate content selection (51.6% of recommendations; 38.9% citing content concerns) highlights critical competency needs. Not all digital content suits early childhood developmental needs, and distinguishing high-quality from low-quality resources requires specific knowledge and skills (Tulviste & Tulviste, 2024; Kucker et al., 2024). This finding suggests that teacher education programs must explicitly address content evaluation criteria, helping pre-service teachers develop frameworks for assessing digital resources' age-appropriateness, educational value, developmental alignment, and cultural sensitivity.

Participants' recommendations for integrating digital media with traditional methods (21.1%) and ensuring intensive supervision (27.4%) demonstrate understanding that technology should complement rather than replace human interaction and hands-on experiences. This balanced perspective aligns with contemporary research emphasizing that optimal outcomes emerge when digital media supplements rather than substitutes direct social interaction, concrete materials, and adult-mediated learning experiences (Kumar et al., 2024; Medawar et al., 2023). The recommendation for time limitations (30.5%) similarly reflects awareness of screen time concerns while acknowledging potential benefits when appropriately managed.

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Findings suggest several implications for pre-service teacher education programs. First, programs must move beyond theoretical TPACK instruction toward authentic, practice-based experiences enabling development of integrated technological, pedagogical, and content knowledge (Lim et al., 2024; Ye et al., 2024). Second, explicit attention to content curation skills appears essential, equipping pre-service teachers with frameworks and tools for evaluating digital resources. Third, programs should address the competence-practice gap through reflective practice opportunities, helping pre-service teachers develop realistic self-assessment capabilities. Fourth, preparation should acknowledge contextual realities including infrastructure limitations, preparing teachers to adapt strategies for resource-constrained environments (Bwalya et al., 2024; Li, et al., 2024).

This study contributes to TPACK literature by documenting pre-service teachers' perceptions in a developing country context, addressing a significant gap in existing research predominantly focused on developed nations. Findings support the framework's relevance while highlighting implementation complexities requiring attention beyond knowledge dimensions alone. The study also contributes to understanding of language creativity as distinct from general language development, emphasizing the need for specialized pedagogical approaches supporting creative language use in early childhood.

The findings of this study carry important implications for teacher education policy and curriculum development, particularly within early childhood teacher education institutions (LPTKs). The generally positive perceptions of digital media use suggest that pre-service teachers are receptive to technology integration; however, the presence of identified knowledge gaps highlights the need for more structured curricular support. Teacher education programs may benefit from explicitly integrating digital media curation skills into coursework, enabling pre-service teachers to critically select, adapt, and evaluate digital resources for language creativity stimulation rather than relying on ad hoc or intuitive use. In addition, the discrepancy between high self-reported readiness and identified training needs underscores the importance of practice-based learning experiences. Embedding technology integration within practicum placements and microteaching activities may help bridge the gap between conceptual understanding and classroom implementation. Such experiences allow pre-service teachers to engage with real instructional constraints and develop realistic pedagogical strategies. From a policy perspective, these findings suggest that preparing pre-service teachers to work in resource-constrained educational environments requires targeted institutional support. Teacher education curricula should emphasize adaptive strategies for integrating digital media using locally available resources, ensuring that future teachers are equipped to implement technology-enhanced learning in diverse school contexts. Strengthening these curricular components may contribute to more sustainable and equitable digital pedagogy in early childhood education.

Several limitations warrant acknowledgment. First, the sample comprised predominantly first-semester students with limited practical teaching experience, potentially affecting perception accuracy. Cross-sectional design prevents examination of perception development across teacher preparation programs. Self-reported data may reflect social desirability bias. The study focused exclusively on perceptions without examining actual classroom practices. Cultural and contextual specificity limits generalizability to other settings. Future research should employ longitudinal designs, observational methods, and examination of implemented practices across diverse contexts to provide more comprehensive understanding.

One limitation of this study relates to the composition of the sample, which was dominated by first-semester students (76.8%). Although this distribution reflects the actual enrollment structure of the program at the time of data collection, it may limit the depth of pedagogical experience represented in the findings. First-semester students generally have limited exposure to classroom practices, which may influence how they perceive and conceptualize the use of digital media for language creativity stimulation. Consequently, the results should be interpreted with caution, particularly when generalizing to pre-service teachers with more extensive teaching experience.

Future studies may address this limitation by incorporating inferential or comparative analyses based on teaching experience or semester level. Comparing perceptions between early-semester and senior pre-service teachers, or between those with and without practicum experience, could provide a more nuanced

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understanding of how pedagogical exposure shapes the perceived effectiveness of digital media use. Such approaches would allow future research to move beyond descriptive patterns and strengthen causal and developmental interpretations.

Conclusion

This study examined Indonesian pre-service early childhood teachers' perceptions of digital media for language creativity stimulation and provides a nuanced picture of both readiness and constraint within the current teacher education context. Overall, the findings indicate high levels of positive perception (M = 4.353), with particularly strong awareness of the importance of language creativity (M = 4.703) and high self-reported readiness and competence for digital media integration (M = 4.532). These results suggest that pre-service teachers conceptually recognize language creativity as a core developmental domain and view digital media as a potentially valuable pedagogical resource. Beyond general optimism, the findings reveal a balanced and reflective stance toward digital media use. Vocabulary enhancement emerged as the most salient perceived benefit (77.9%), aligning with contemporary evidence on the role of multimodal digital input in early language development. At the same time, participants articulated substantive challenges, most notably infrastructure limitations (41.1%) and concerns regarding content appropriateness (38.9%). This pattern indicates that positive perceptions coexist with an awareness of contextual and pedagogical constraints, rather than uncritical acceptance of technology. Importantly, the results highlight a gap between perceived readiness and practical implementation capacity. While pre-service teachers reported high confidence, qualitative findings suggest that effective integration requires more than individual willingness. Teacher education programs therefore need to emphasize practice-based learning experiences that integrate technological, pedagogical, and content knowledge, alongside explicit development of digital media curation skills. Institutional support and adaptive strategies for resource-constrained environments are also essential to ensure equitable and sustainable implementation. Overall, this study reinforces the view that digital media can support language creativity stimulation when integrated thoughtfully, developmentally appropriately, and with adult mediation. Future research should employ longitudinal and classroom-based approaches to examine how pre-service teachers' perceptions evolve and translate into pedagogical practice in early childhood settings.

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