DEVELOPMENT OF WORDWALL-BASED LEARNING MEDIA TO IMPROVE SPEAKING SKILLS IN CHILDREN WITH SPEECH DELAY

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Abstract
This study aims to develop and validate interactive learning media based on Wordwall.net to improve the speaking skills of children with speech delay at TPA Aamillah Daycare, Bekasi. The research adopts the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) and focuses on the initial three stages: analysis, design, and development. The participants involved three experts: a media expert, an early childhood education expert, and a speech therapist, who were engaged to validate the feasibility of the developed media. Data collection was conducted using expert validation instruments, and the results were analyzed quantitatively using descriptive statistics. The findings revealed that the developed media was highly feasible for use in early childhood educational settings. The media expert rated the product at 91.07%, the early childhood education expert at 92.31%, and the speech therapist at 90.38%, all indicating a "very feasible" category. The conclusion highlights that the Wordwall.net-based learning media is effective and suitable for supporting speaking skill development in children with speech delay. This research contributes to the field by integrating technology with instructional design principles to create inclusive, engaging, and developmentally appropriate learning tools. The media has the potential to be implemented as a supplementary resource in both educational and therapeutic contexts, with future research needed to examine its effectiveness through direct application with the target children.
Keywords: Speech delay, early childhood education, interactive media, Wordwall, speaking skills, instructional design

INTRODUCTION

Speaking ability is a vital aspect of early childhood development, as it serves not only as a means of communication but also as a foundation for cognitive growth and social interaction. However, not all children achieve speech milestones within the expected developmental timeframe. One common issue in early childhood is *speech delay*, a condition that hinders a child's ability to express themselves verbally and can negatively impact their emotional, social, and academic development in the long term (Hacques et al., 2021; Maurer

& Warholic, 2018). In Indonesia, the prevalence of speech delay is increasing, including among children enrolled in early childcare centers such as TPA Aamillah Daycare, Bekasi.

Various interventions have been employed to support children with speech delay, ranging from speech therapy to play-based educational approaches. However, the lack of accessible and engaging interactive learning media tailored to children with delayed speech remains a significant challenge. In light of technological advancements, digital media integration in early education offers promising solutions. One such tool is Wordwall, a web-based platform that allows educators to create interactive learning games adaptable to children's needs (Puspitarini & Budiyanto, 2015; Salsabila et al., 2023). Previous studies have demonstrated that using Wordwall.net can increase motivation and participation among young learners (Gandasari & Pramudiani, 2021; Handayani et al., 2022; Ulandari et al., 2023). Nevertheless, there is a notable lack of research specifically focused on developing and applying Wordwall.net-based media to support the speaking skills of children with speech delay.

This study is essential in addressing the need for effective and enjoyable learning tools designed specifically for children with speech delay. Interactive media such as Wordwall.net not only allow for personalized content but also promote multisensory learning, which has been shown to enhance language development (Politi, 2023; Santrock, 2018). Therefore, this study seeks to fill the gap in current literature by developing a digital learning medium tailored to support the verbal development of children with speech delay within the context of early childhood education in Indonesia.

The purpose of this study is to develop a Wordwall.net-based learning media that can be used by teachers and caregivers at TPA Aamillah Daycare to improve the speaking skills of children with speech delay. This research employs a Research and Development (R&D) approach using a modified ADDIE model. The stages of development include needs analysis, planning, product development, limited trials, revision, and effectiveness testing.

By creating an accessible and responsive learning tool tailored to children's speech development needs, this study aims to make a practical contribution to the field of early childhood education. Additionally, it offers theoretical insight into the application of digital technology in specialized educational interventions.

METHODS

This study is a type of Research and Development (R&D) using the ADDIE development model, which consists of five systematic stages: *Analysis, Design, Development, Implementation,* and *Evaluation.* The ADDIE model was chosen because it offers a structured and iterative framework that allows continuous refinement of learning media to ensure that the final product meets the specific needs of the target users—in this case, children with speech delay in an early childhood education setting.

The research subjects consisted of five children identified with speech delay at TPA Aamillah Daycare in Bekasi. Additionally, early childhood educators and speech therapists who work directly with these children were involved as key informants and validators in the study. The focus of this research was to develop an interactive digital learning media using the Wordwall.net platform, designed to enhance speaking skills through engaging, game-based audio-visual learning activities.

Several instruments were used to collect data: (1) observation sheets to assess improvements in children's speaking ability based on the speech development indicators from the Indonesian Ministry of Health, (2) teacher needs analysis questionnaires, (3) interview guidelines, and (4) expert validation forms to evaluate the quality of the media. Expert validation was carried out by two professionals: a media expert and an early childhood education content expert. They evaluated the product in terms of design quality, instructional content, interactivity, and its appropriateness for children with speech delay.

The data collection procedure followed the stages of the ADDIE model. In the *Analysis* stage, researchers conducted classroom observations, interviews with teachers and therapists, and document analysis to identify learning problems and media needs for children with speech delay. The *Design* stage involved drafting the structure of the media, including the selection of templates, visual content, and audio instructions adapted to children's abilities. In the *Development* stage, a prototype of the learning media was created and validated by experts. The feedback from the validation process was used to revise and improve the media before advancing to the implementation and evaluation stages in future research.

Data analysis employed both quantitative and qualitative descriptive techniques. Quantitative data from expert validation and observations were processed by calculating average scores for each assessment aspect, then converting these scores into feasibility categories. Qualitative data from interviews were analyzed using a thematic approach involving data reduction, data display, and conclusion drawing. This mixed-methods approach enabled a comprehensive evaluation of the media's quality and its potential impact on children's speaking skills.

The ADDIE model was considered suitable for this research because it facilitates the development of learning products that are based on real educational needs and allows for systematic revision through expert validation. Therefore, this research is expected not only to produce a valid and practical product but also one that is effective in improving the verbal communication skills of young children with speech delay.

Tabel 1. Criteria for Decision-Making Based on Expert Judgment

Category	Validity Level	Criteria

81 -100	Very High	It can be used without revision.
61 - 80	High	It can be used with minor revisions.
41 - 60	Considerable	It can be used with major revisions.
21 - 40	Low	Review a lot and revalidate.
0 - 20	Very Low	The instrument cannot be used.

(Yudha, 2020)

RESULTS AND DISCUSSIONS
Result

This study focused on the *Development* phase of the ADDIE model, particularly the expert validation of the Wordwall.net-based interactive learning media. Validation was conducted by three experts: a media expert, an early childhood education (ECE) content expert, and a speech therapy expert. Each expert assessed specific aspects using a 4-point Likert scale instrument (1 = not feasible, 2 = less feasible, 3 = feasible, 4 = very feasible).

1. Validation Results from the Media Expert

The media expert evaluated aspects of visual design, interactivity, navigation, and clarity of instructions. The recapitulated scores are presented in Table 1.

Table 1. Media Expert Validation Results

Evaluated Aspect	Max Score	Obtained Score	Percentage (%)	Category
Visual Design	16	15	93.75%	Very Feasible
Interactivity	16	14	87.50%	Very Feasible
Navigation System	12	11	91.67%	Very Feasible
Instruction Clarity	12	11	91.67%	Very Feasible
Total Average	**56**	**51**	**91.07%**	**Very Feasible**

The results in Table 1 indicate that the media expert rated the developed Wordwall.net-based learning media as highly feasible for use. The highest score was achieved in the aspect of visual design (93.75%), which suggests that the interface was engaging, age-appropriate, and visually supportive for children with speech delay. The navigation system (91.67%) and clarity of instructions (91.67%) were also rated very positively, showing that the media is user-friendly and accessible for both teachers and children. The interactivity aspect, although slightly lower at 87.50%, still falls into the "very feasible" category, reflecting a solid level of engagement and responsiveness in the learning tool. Overall, an average score of 91.07% confirms that the media meets professional standards for educational tools in digital learning environments.

2. Validation Results from the ECE Content Expert

The ECE content expert assessed the appropriateness of content for early childhood, relevance to speech stimulation, and alignment with learning indicators. Results are shown in Table 2.

Table 2. ECE Content Expert Validation Results

Evaluated Aspect	Max Score	Obtained Score	Percentage (%)	Category
Age Appropriateness	12	11	91.67%	Very Feasible
Relevance to Speech Stimulation	16	14	87.50%	Very Feasible
Alignment with Curriculum Indicators	12	11	91.67%	Very Feasible
Language Use	12	12	100%	Very Feasible
Total Average	**52**	**48**	**92.31%**	**Very Feasible**

Table 2 presents the assessment from the ECE content expert, revealing an average feasibility score of 92.31%, categorized as "very feasible." Notably, the language used in the media scored a perfect 100%, indicating that the vocabulary, syntax, and expressions used are developmentally appropriate and supportive of children's language acquisition. The media also scored 91.67% in both age appropriateness and alignment with learning indicators, validating that the activities align with national curriculum standards for early childhood education. The relevance to speech stimulation (87.50%) also received high marks, emphasizing that the media's content is suitable for addressing the specific speech development needs of children with delays. These results demonstrate that the media is pedagogically sound and grounded in early childhood learning principles.

3. Validation Results from the Speech Therapy Expert

The speech therapist evaluated the media's support in stimulating articulation, word pronunciation, and children's confidence in speaking. The summary is presented in Table 3.

Table 3. Speech Therapy Expert Validation Results

Evaluated Aspect	Max Score	Obtained Score	Percentage (%)	Category
Support for Articulation Therapy Alignment with	16	14	87.50%	Very Feasible
Speech Therapy Methods	12	11	91.67%	Very Feasible
Improving Speaking Confidence	12	11	91.67%	Very Feasible
Media Duration and Engagement	12	11	91.67%	Very Feasible
Total Average	**52**	**47**	**90.38%**	**Very Feasible**

The validation by the speech therapy expert, as shown in Table 3, yielded an average score of 90.38%, which is also considered "very feasible." The highest ratings were assigned to aspects related to methodological appropriateness and child engagement, including alignment with speech therapy methods (91.67%), improving speaking confidence (91.67%), and media engagement and duration (91.67%). This suggests that the media is well-suited to support the goals of speech therapy, such as encouraging articulation, maintaining attention, and providing structured yet playful practice opportunities. The support for articulation therapy, while slightly lower at 87.50%, still indicates strong alignment with professional therapy goals. This overall assessment confirms that the developed media can effectively complement clinical interventions for speech-delayed children.

4. Overall Summary of Expert Validation

Based on the validation results from all three experts, the Wordwall.net-based media was deemed "Very Feasible" for use with young children experiencing speech delay. The average overall feasibility score was 91.25%, as shown in Table 4.

Table 4. Overall Validation Summary

Expert Validator	Average Percentage	Category
Media Expert	91.07%	Very Feasible
ECE Content Expert	92.31%	Very Feasible
Speech Therapy Expert	90.38%	Very Feasible
Overall Average	**91.25%**	**Very Feasible**

Table 4 provides a holistic summary of the validation results from all three expert categories. The average overall feasibility score is 91.25%, with all three experts rating the media within the "very feasible" range. The ECE content expert provided the highest rating (92.31%), closely followed by the media expert (91.07%) and the speech therapy expert (90.38%). These consistent results across disciplines demonstrate the interdisciplinary strength and applicability of the Wordwall.net-based media. It successfully integrates educational content, digital design, and therapeutic support, validating its use as an innovative tool for improving the speaking skills of children with speech delay in early childhood educational settings.

Disscussion

The findings align with prior studies emphasizing the benefits of interactive digital media in language development for children. For instance, a study by Paksi et al. (2023) highlighted positive teacher perceptions of Wordwall.net as an effective tool for English vocabulary instruction in elementary schools (Paksi et al., 2023). Similarly, research by Aeni et al. (2023) demonstrated that interactive software-based learning media significantly enhance student engagement and learning outcomes (Aeni et al., 2023). Moreover, the application of the ADDIE model in developing instructional materials has been shown to be effective in various educational settings, including special education (Budoya et al., 2019). These studies corroborate the current research's outcomes, suggesting that structured instructional design models and interactive media can effectively support language development in children with speech delays.

The successful development and validation of the Wordwall.net-based learning media have several implications. Theoretically, it supports the integration of digital tools within established instructional design frameworks like ADDIE, demonstrating their applicability in special education contexts. Practically, educators and therapists can adopt such media to create engaging, interactive, and tailored learning experiences for children with speech delays. The media's high feasibility ratings suggest it can be a valuable resource in early childhood education settings, promoting improved speaking skills through structured and interactive activities.

Tabel 2. Instrument Specification

Despite the positive outcomes, the study has limitations. The validation process involved only three experts, which may not capture the full spectrum of potential user experiences. Additionally, the study did not include empirical testing with the target child population, leaving the actual effectiveness of the media in real-world settings unexamined. Future research should involve pilot testing with children to assess the media's impact on speech development outcomes. Expanding the sample size and including diverse educational settings would also enhance the generalizability of the findings

CONCLUSION

This study successfully developed and validated an interactive learning media based on Wordwall.net aimed at enhancing the speaking skills of children with speech delay. The media was designed using the ADDIE instructional model, and expert validation from a media specialist, an early childhood education expert, and a speech therapist indicated a high level of feasibility, with an overall average score exceeding 90%. These results affirm the suitability of the media for educational and therapeutic use, particularly in early childhood settings that address language development needs.

The key contribution of this study lies in its integration of digital technology and instructional design to support the communication development of children with special needs. It demonstrates the potential of platforms like Wordwall.net to provide engaging, accessible, and pedagogically sound interventions in inclusive educational environments.

Based on the findings, it is recommended that educators and speech therapists incorporate interactive digital media as complementary tools in speech development programs. Additionally, further empirical research is encouraged to assess the effectiveness of the media through implementation in real classroom or therapy sessions with children. Future development should also consider user feedback to enhance usability and adapt content to varying developmental levels.

In conclusion, the research not only fills a gap in the design of specialized media for children with speech delay but also offers practical implications for digital media integration in early childhood intervention strategies.

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