

Technology and Language Revitalization in Indonesia: A Literature Review of Digital Tools for Preserving Endangered Languages

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Abstract

This systematic literature review examines specific digital tools such as mobile apps, online dictionaries, and social media platforms, evaluating their implementation and effectiveness in preserving endangered languages in Indonesia. Drawing from an analysis of ten scholarly publications spanning 2019 to 2023, key tools identified include the Android-based Lampung dictionary, "Nusantara in Your Hand" for Javanese and Madurese, and the Muyu-Indonesian-English Dictionary App. These tools engage communities through initiatives like the Balinese Language Digital Dictionary and BASAbali Wiki, utilizing platforms such as WhatsApp, Facebook, and YouTube for cultural preservation. Implementation strategies encompass a variety of mediums: mobile apps tailored for Lampung, Javanese, and Madurese speakers; comprehensive online platforms like the Balinese Language Digital Dictionary and BASAbali Wiki; interactive resources such as LearnJavaneseOnline.com; and dynamic social media engagement on WhatsApp, Facebook, Twitter, and YouTube. Utilizing modern technology, these tools document, teach, and sustain regional languages, enhancing accessibility and fostering community engagement. Their effectiveness lies in promoting community involvement, integrating into educational frameworks, and gaining support from governments and local communities, thus playing a crucial role in safeguarding Indonesia's linguistic heritage and cultural identity. In conclusion, digital tools present significant progress in preserving Indonesia's linguistic diversity, requiring strategies that address socio-cultural and technical challenges, prioritize community involvement, foster collaboration across sectors, improve digital infrastructure, and promote sustainable practices to ensure long-term success in language revitalization efforts.

Keywords: Digital tools, Endangered languages, Indonesia

I. INTRODUCTION

Language revitalization efforts in Indonesia are crucial not only for preserving its diverse languages but also for safeguarding the country's cultural heritage in the face of challenges like urbanization, globalization, and the dominance of Bahasa Indonesia as the national language (Lewis, 2009). Indonesia's linguistic diversity, with over 700 languages, is evidence of its cultural richness. However, many indigenous languages are at risk of disappearing without dedicated preservation efforts (Lewis, 2009).

Digital tools have become essential in these revitalization efforts, playing key roles in documentation, learning, and community engagement (Meighan, 2023; Ross et al., 2021; Brinklow, 2021; Eslit, 2023; Cokorda et al., 2020). Mobile applications, for example, offer accessible resources that empower language learners to practice and develop proficiency in indigenous languages independently. A notable example is the development of an Android-based dictionary for the Lampung language, which has helped in maintaining and promoting the use of the language among the younger generation (Ariyani et al., 2022). Similarly, online dictionaries act as repositories of linguistic knowledge, making crucial language data accessible to both learners and researchers, thereby supporting documentation efforts (Bird, 2021).

Despite the benefits of digital tools, significant challenges remain in using technology for language revitalization. Hadiwijaya et al. (2022) pointed out that the conservation and revitalization of regional languages in Indonesia face obstacles such as limited funding, lack of technical expertise, and low digital literacy among language speakers. Addressing these challenges is crucial to ensure the effectiveness of digital tools in preserving endangered languages.

Several success stories demonstrate the positive impact of digital tools on language revitalization efforts in Indonesia. For instance, Salindri and Susianti (2023) discussed the preservation of the Javanese language and culture in the digital age, highlighting the use of online platforms and social media to engage Javanese speakers and promote language learning. Similarly, Yulianti et al. (2022) shared successful initiatives in activating minority languages in Sulawesi through revitalization programs supported by digital technologies.

To enhance language revitalization efforts, it is essential to implement best practices in utilizing digital tools. Collaborations between language experts, technology developers, and community members are crucial for creating effective and sustainable language preservation initiatives. Additionally, investing in digital infrastructure and providing training on digital literacy can empower language speakers to actively participate in language revitalization activities.

Looking ahead, the integration of digital tools in language revitalization programs holds great potential for preserving endangered languages in Indonesia. By utilizing technological advancements and innovative strategies, stakeholders can work together to ensure the survival and thriving of diverse linguistic heritage in the digital age. Continued research and collaboration are key to maximizing the impact of digital tools in language revitalization efforts.

This study aims to conduct a comprehensive literature review to analyze the various digital tools used in language revitalization efforts across Indonesia. By examining the implementation and effectiveness of online dictionaries, social media platforms, and other technologies, this research seeks to deepen our understanding of how these tools contribute to preserving endangered languages and enhancing community engagement. The analysis will critically evaluate the functions and effectiveness of these tools while considering the socio-cultural contexts in which they operate.

Despite advancements in digital language revitalization tools, significant gaps persist in understanding their comprehensive impact within Indonesian communities. Theoretical gaps highlight the need for more detailed analyses of how these tools interact with the complex socio-cultural dynamics and linguistic diversity across different regions of Indonesia (Lewis, 2009). Furthermore, a critical research gap exists regarding the long-term sustainability and flexibility of digital platforms in community-driven revitalization efforts, requiring further exploration and evaluation to ensure effective cultural preservation and language revitalization strategies (Lewis, 2009).

Moreover, there is a growing demand for studies that explore the integration of digital tools with local educational systems and policies. Such studies can explore how these tools can be effectively incorporated into both formal and informal learning environments to improve language proficiency and foster cultural awareness among younger generations. Bridging the gap between traditional and modern language practices is crucial for developing comprehensive language revitalization strategies that resonate with diverse community needs and aspirations (Bird, 2021).

In essence, this study aims to provide profound insights into how digital tools and platforms contribute to the preservation of endangered languages in Indonesia. By addressing identified gaps and providing critical analyses, it aims to inform policymakers, educators, and practitioners involved in cultural preservation efforts. Through a thorough examination of current research and practices, the study aims to contribute to the discourse on digital language revitalization efforts in Indonesia, highlighting both implementation and effectiveness in leveraging technology for the sustainable preservation of cultural heritage.

II. METHODS

Research Design

This study utilized a Systematic Literature Review (SLR) due to its comprehensive approach in summarizing existing research (Kitchenham, 2004). An SLR involves systematically identifying, evaluating, and synthesizing relevant studies to address specific research questions. This method ensured a thorough examination of how digital tools have been used in language revitalization efforts across Indonesia, offering an unbiased assessment of current knowledge.

The SLR was chosen for its suitability in exploring the diverse applications of digital tools like mobile apps and online dictionaries within Indonesia's varied linguistic and cultural landscapes. By systematically reviewing the literature, this study aimed to uncover the types of tools employed, evaluate their effectiveness, and investigate their role in fostering community engagement. These insights are crucial for enhancing efforts to preserve Indonesia's linguistic diversity and cultural heritage through digital technologies. Overall, this systematic review provided a comprehensive overview of the current use of digital tools in language revitalization across Indonesia, offering valuable guidance for future strategies and interventions in this important field (Kitchenham, 2004).

Literature Search Strategy

The literature search for this study primarily utilized Google Scholar, providing access to a diverse range of academic journals, conference proceedings, and scholarly publications relevant to digital tools and language revitalization. The search strategy employed specific keywords such as "digital tools," "language revitalization," "Indonesia," and "endangered languages" to identify studies focusing on the role of technology in revitalizing endangered languages, particularly within Indonesia. Articles selected for review were published between 2019 and 2023 to ensure recent and pertinent insights. The data sources included 10 literature items: 3 peer-reviewed journal articles indexed in Scopus, 2 articles from international journals, one article from the Sinta 4 database, an international conference proceeding, and 3 publications from national journals.

This approach ensured a systematic retrieval of scholarly contributions that met comprehensive inclusion criteria based on relevance, publication quality, and regional specificity. By synthesizing these diverse sources, the study aims to provide a comprehensive overview of how digital tools are utilized in language revitalization efforts across Indonesia, their implementation and effectiveness. This synthesis informed strategies aimed at preserving Indonesia's linguistic diversity and cultural heritage through technological innovations.

Selection Process

The selection process began by screening article titles and abstracts to assess their relevance. The criteria focused on studies discussing technological strategies for preserving linguistic diversity in Indonesia. Keywords like "digital tools," "language revitalization," "Indonesia," and "endangered languages" guided this initial screening phase. Articles meeting these criteria proceeded to a full-text review.

During the full-text review, selected articles went through a detailed assessment of their methodology, findings on digital tools in language revitalization, and relevance to Indonesia's linguistic diversity. The goal was to select articles offering insights into technological interventions and their impact on community engagement in language preservation efforts. Articles meeting these criteria were chosen for detailed data extraction.

Data extraction involved systematically capturing key details from selected studies: authors' names, publication years, methodologies, main findings, and implications for language revitalization in Indonesia. This structured approach aimed to provide a comprehensive overview of how digital tools contribute to preserving endangered languages and promoting linguistic diversity in Indonesia.

Data Synthesis Approach

Data synthesis involved organizing information into different categories based on types of digital tools (such as mobile apps, online platforms, and multimedia resources) and geographic regions within Indonesia. This helped to explore how different regions use these tools for revitalizing languages and to measure their effectiveness in language skills and community involvement.

Using systematic categorization methods, data segments were grouped into meaningful categories to find recurring themes and patterns in the literature. This methodical approach helped us better understand how digital tools are changing language revitalization efforts in Indonesia. The study drew conclusions from these themes, aligning them with the research goals to offer insights into preserving Indonesia's diverse languages and culture using digital innovations.

By using these methods, the study provided a clearer view of how digital tools can help protect Indonesia's languages and culture. These findings guided future efforts to sustain endangered languages through technology-driven solutions.

III. RESULTS AND DISCUSSION

Results

Overview of Included Studies

This section provides a brief overview and distribution of studies included in the review, highlighting the publication years, authors, and key focus areas.

1. **Riyanto, R. E., Dwisusilo, S. M., Rahman, S. B. A., & Afdholy, N. (2023)**
Published in the *International Journal of Anthropology*, this research explores innovative language preservation efforts among the Tengger communities using text-speak on WhatsApp. It underscores the community's adaptive strategies for safeguarding their linguistic and cultural heritage.
2. **Salindri, O. A., & Susianti, H. W. (2023)**
In "Preserving Javanese Language and Culture in The Digital Age: Challenge and Future Prospects," published in *LACULTOUR: Journal of Language and Cultural Tourism*, the authors discuss the evolving landscape of digital platforms for revitalizing Javanese culture and language. They emphasize the potential of interactive tools in bridging traditional practices with contemporary technology.
3. **Yulianti, S., Fatina, S., & Budiono, S. (2022)**
Presented at the Sixth International Conference on Language, Literature, Culture, and Education (ICOLLITE 2022), this study focuses on revitalizing the Konjo and Totoli languages in Sulawesi through multimedia approaches. It highlights the use of songs and teaching materials to engage younger generations in language preservation efforts.
4. **Ariyani, F., Putrawan, G. E., Riyanda, A. R., Idris, A. R., Mislani, L., & Perdana, R. (2022)**
Published in *Tapuya: Latin American Science, Technology and Society*, this research develops an Android-based dictionary to preserve the Lampung language in Indonesia. It demonstrates the positive impact of technology on maintaining linguistic diversity and cultural heritage.
5. **Hadiwijaya, M., Kinanti, K. P., & Sari, I. D. P. (2022)**
"The Digital Conservation and Revitalization of Regional Languages in Nusantara," published in *Journey: Journal of English Language and Pedagogy*, introduces the "Nusantara in Your Hand" app. This study illustrates how digital tools can support language education and conservation efforts for Javanese and Madurese languages.
6. **Tambaip, B., Wayangkau, I. H., Suwarjono, S., Loupatty, M., Adam, A. F., & Hariyanto, H. (2020)**
Published in the *Emerging Science Journal*, this research focuses on preserving the Muyu indigenous language through an Android-based dictionary. It evaluates the application's functionality in facilitating language preservation among the Muyu community.
7. **Hinton, L. L., & Putra, K. A. (2020)**
"Reclaiming and Learning Indigenous Languages on Social Media with Digital Activists," published in the *Journal of Second Language Acquisition and Teaching*, explores Indigenous language revitalization among Lampung, Mayangna,

and Miskitu youth. The study emphasizes digital activism and translanguaging practices in fostering language sustainability.

8. **Cokorda, C. C., IB Ary Indra Iswara, I. B., & I Komang Ari Mogi, I. (2020)** Published in *Jurnal Sistem Informasi (Journal of Information System)*, this article discusses the collaborative creation of a Balinese language digital dictionary. It underscores the role of community participation and digital humanities in preserving the Balinese language.
9. **Sitokdana, M. N., Tanone, R., & Tanaem, P. F. (2019)** This study, focused on digitalizing local language dictionaries in the Pegunungan Bintang region of Papua, Indonesia, aims to develop an Android-based digital dictionary for multiple indigenous languages. It emphasizes the technological advancement in promoting and sustaining indigenous language use.
10. **Setiya, D., Hapsari, S. A., & Kumalasari, A. (2019)** Published in *Jurnal Ilmu Komunikasi*, this research examines the preservation of the Javanese language as a local identity in the digital era. It explores the role of digital platforms, such as YouTube, in preserving and promoting Javanese cultural identity through multimedia content.

Most of the studies were published in 2022, with four studies (Ariyani et al., Hadiwijaya et al., Yulianti et al., and Setiya et al.) released in that year. The remaining studies by Sitokdana et al., Hinton and Putra, Cokorda et al., and Tambaip et al. were published between 2019 and 2020. Additionally, the studies by Salindri and Susianti, and Riyanto et al. were published in 2023. This recent focus on digital tools for language preservation reflects a growing awareness and effort to leverage technology for cultural conservation.

The studies employed various digital tools to achieve their goals. Three studies centered around Android-based applications: Ariyani et al. (2022) developed a dictionary for the Lampung language, Hadiwijaya et al. (2022) created the "Nusantara in Your Hand" app for Javanese and Madurese languages, and Tambaip et al. (2020) focused on an Android-based dictionary for the Muyu indigenous language. Salindri and Susianti (2023) examined the use of online platforms and interactive resources for preserving Javanese language and culture. Yulianti et al. (2022) used multimedia, such as songs and teaching materials, to rejuvenate the Konjo and Totoli languages.

Geographically, all studies were conducted in Indonesia, highlighting different regions: Lampung (Ariyani et al., 2022), Java (Salindri & Susianti, 2023; Hadiwijaya et al., 2022), Sulawesi (Yulianti et al., 2022), Papua (Sitokdana et al., 2019), and the Muyu region (Tambaip et al., 2020). This variety illustrates the diverse linguistic landscape of Indonesia and the tailored approaches required to address the unique challenges of language preservation across different areas.

In summary, these studies span various regions of Indonesia and utilize diverse digital tools to tackle the challenges of language preservation and revitalization. Each study contributes valuable insights into how technology can be harnessed to support and maintain linguistic diversity, offering promising solutions that can be adapted and scaled in similar contexts around the world.

Specific Digital Tools for Language Revitalization in Indonesia

Recent literature emphasizes a diverse range of digital tools tailored to the specific needs of minority languages in Indonesia and beyond, encompassing mobile applications, online dictionaries, social media platforms, and interactive resources. These tools have proven highly effective in the preservation and revitalization of endangered languages.

1. Mobile Applications

Mobile applications represent innovative technology in language maintenance and revitalization, providing structured learning experiences tailored to diverse linguistic contexts:

- a. **Android-based Digital Dictionary Application (Sitokdana, 2019):** This application is designed to document and support the learning of the local languages of the Ngalum, Ketengban, Murop, Lepki, and Arimtap tribes. It includes vocabulary data collected directly from native speakers for the Murop, Lepki, and Arimtap languages, which had never been documented before. For the Ketengban language, existing written documents were digitized and included. The Ngalum language, which already had both physical and electronic dictionaries using three dialects, focused on the Ngalum dialect of the Okbibab language in this study.
- b. **Muyu-Indonesian-English Dictionary Application (Tambaip et al., 2020):** This application, developed using the Waterfall Classic Life Cycle method, focuses on preserving the Muyu language and culture. It enhances vocabulary and local language skills among Muyu students, leveraging the widespread use of Android devices to ensure accessibility.
- c. **Android-based Dictionary for Lampung Language (Ariyani et al., 2022):** Designed to maintain and preserve the Lampung language, this app offers comprehensive resources including definitions, translations, and pronunciation guides. It underwent rigorous development and evaluation processes, incorporating literature reviews, surveys, interviews, and expert reviews to ensure its effectiveness and usability.
- d. **"Nusantara in Your Hand" Application (Hadiwijaya et al., 2022):** Inspired by Duolingo, this Android-based app focuses on documenting and teaching regional languages like Javanese and Madurese. It features structured language learning levels covering listening, speaking, reading, and writing skills. The app integrates interactive elements such as quizzes and games to enhance engagement and effectiveness, developed using a modified Borg and Gall research model to ensure user-friendly accessibility and effectiveness.

2. Online Dictionaries

Online dictionaries play a pivotal role in language revitalization by providing extensive repositories of vocabulary and linguistic resources accessible globally:

- a. Balinese Language Digital Dictionary (Cokorda et al., 2020): Accessible through <http://www.basabali.org>, this knowledge-based system is designed to preserve and revitalize the Balinese language. It serves as a comprehensive resource for students, community members, and younger generations, accessible across various digital platforms.
- b. BASAbali Wiki Digital Dictionary (Cokorda et al., 2020): Utilizing community crowdsourcing, this platform encourages contributions to a wiki dictionary of Balinese sentences, fostering language creativity and preservation through collaborative efforts.

3. Web Technology for Digital Resources

Transitioning from mobile applications and online dictionaries, websites also play a crucial role in revitalizing languages. These platforms offer diverse resources for learning and preserving cultural heritage:

- a. The Blackfoot Language Resources project (Cokorda et al., 2020): utilizing web technology to effectively capture and store digital resources. This initiative actively engages community members, empowering them to contribute to and improve the resources, thereby demonstrating tangible progress in language revitalization.
- b. LearnJavaneseOnline.com (Salindri & Susianti, 2023): offering a comprehensive platform for learning Javanese, providing free lessons that include fundamental vocabulary, pronunciation guides, and cultural insights. Developed to enhance accessibility and understanding of the language, this website supports learners in acquiring and preserving Javanese linguistic and cultural heritage

4. Social Media Platforms

Moving on to social media platforms, these spaces are essential for revitalizing and preserving endangered languages, enabling dynamic cultural expression and community connection.

- a. WhatsApp (Riyanto et al., 2023): WhatsApp is widely embraced within the Tengger community as a tool for preserving their language. Through private chat rooms, users engage in creative expression and communication, thereby enriching the relevance and usage of the Tengger language. The platform facilitates text-speak, employing orthographic and phonological abbreviations that mirror oral pronunciations commonly heard in daily conversations.
- b. General Social Media : Social media platforms play a central role in revitalizing and preserving endangered languages such as Tengger (Riyanto et al., 2023). These platforms provide essential forums for open discussion, connectivity, and language practice, facilitating engagement among speakers. Platforms like Facebook, YouTube, Twitter, and Instagram serve as multimedia hubs for Indigenous youth, actively promoting language and cultural reclamation through diverse content creation (Hinton & Putra, 2020; Setiya & Kumalasari, 2019). They also showcase the cultural richness of languages like Tengger, significantly contributing to their preservation efforts (Riyanto et al., 2023). In South Sulawesi, digital tools such as video and music sharing platforms have played a pivotal role in revitalizing the Konjo language. Yulianti et al., (2022) highlights how these platforms facilitate the sharing of Konjo songs, aiming to increase the language's visibility and everyday usage through modern technology.

To summarize, these digital tools represent innovative approaches to language revitalization efforts in Indonesia. Mobile applications like the Android-based Lampung dictionary (Ariyani et al., 2022), the "Nusantara in Your Hand" app for Javanese and Madurese (Hadiwijaya et al., 2022), and the Muyu-Indonesian-English Dictionary App (Tambaip et al., 2020) provide specialized learning experiences. Online resources such as the Balinese Language Digital Dictionary and BASAbali Wiki encourage community involvement in preserving languages like Balinese (Cokorda et al., 2020). Social media platforms like WhatsApp and mainstream sites such as Facebook and YouTube are crucial in promoting language and cultural preservation (Riyanto et al., 2023; Hinton & Putra, 2020). Interactive tools like LearnJavaneseOnline.com offer accessible resources to explore linguistic heritage (Salindri & Susianti, 2023). By utilizing technology, these tools ensure that minority languages remain accessible and vibrant, supporting their preservation and continued relevance in today's digital age.

Implementation of Digital Tools for Language Revitalization in Indonesia

Based on the literature reviewed, detailed explanations regarding the implementation of digital tools for language revitalization in Indonesia are provided below:

1. Mobile Applications

- a. Android-based Digital Dictionary Application (Sitokdana et al., 2019)
Implementing the Android-based digital dictionary application involved a careful and organized process. For the Murop, Lepki, and Arimtap languages, researchers gathered vocabulary data directly from native speakers since these languages had never been documented before. This data was then carefully entered into the application to ensure it was accurate.
For the Ketengban language, which had written records but no digital version, the existing information was digitized and added to the application. This made the linguistic data more accessible and preserved it.
With the Ngalum language, which already had physical and electronic dictionaries in three dialects, the focus was on the Ngalum dialect of the Okbibab language. This approach ensured the app met the specific needs of the Ngalum-speaking community.

The application was developed for Android devices to ensure it was easy to use and widely accessible, especially for younger users. The design used Unified Modelling Language (UML) to create a visual layout of the menus and user interactions. Built with Java, the application underwent thorough testing to ensure it worked well and provided a good user experience.

Overall, this approach made the digital dictionary comprehensive, user-friendly, and effective in preserving the linguistic heritage of these indigenous languages.

b. *Muyu-Indonesian-English Dictionary Application* (Tambaip et al., 2020)

Implementing tools for language revitalization, especially Android-based dictionary applications, involves several well-structured stages and methods. It starts with designing the database using flowcharts, context diagrams, and case diagrams to clarify project requirements.

In the development phase, various software tools like Eclipse IDE, Android SDK, ADT, and Java JDK are used to create the system. The SQLite Database stores data, and BlueStacks App Player tests the app on different devices.

Testing is done through device testing to ensure smooth operation and black-box testing to verify that the app's functions meet specifications. Results are carefully recorded to fix any issues found.

Maintenance includes ongoing updates to keep the app running well after deployment, addressing any post-deployment issues and improving performance. The Waterfall methodology guides the project in phases, ensuring organized development but limiting flexibility for changes later on.

To ensure user acceptance and usability, the apps are designed to be user-friendly, using the Technology Acceptance Model (TAM) to predict user adoption. These steps ensure that digital tools effectively support language revitalization efforts, making them accessible and beneficial for communities.

c. *Android-based Dictionary for Lampung Language* (Ariyani et al., 2022)

The implementation of digital tools for language revitalization, specifically through an Android-based dictionary application for the Lampung language, followed a carefully structured process across multiple phases. This included initial analysis, product design and development, and a thorough evaluation phase.

In the analysis phase, a literature review provided insights into the current state of Lampung language preservation and the role of technology in this field. Interviews with 40 native speakers helped gather essential vocabulary data, validating 286 commonly used words crucial for the application.

Moving to product design and development, these insights guided the creation of the application's initial design and content. Expert input from linguists, cultural experts, and IT professionals ensured the application was culturally relevant and technically sound.

During the evaluation phase, the application underwent pilot testing with diverse participants over two weeks. Feedback from students, young adults, and traditional Lampung elders helped refine the application's design and functionality. This iterative process aimed to enhance user experience and effectiveness in language learning and preservation. Throughout the project, various research methods such as literature reviews, surveys, interviews, and expert evaluations were employed to ensure a comprehensive understanding and refinement of the application's features.

In summary, the systematic approach taken in developing the Android-based dictionary for the Lampung language underscores its role in supporting language revitalization efforts. By integrating user insights and expert feedback, the application aims to be a valuable tool in preserving and promoting the Lampung language and culture.

d. *"Nusantara in Your Hand" Application* (Hadiwijaya et al., 2022)

The digital tool implementation for language revitalization unfolds in two main stages: Firstly, in the Development Stage, the focus is on creating a user-friendly language learning app for smartphones. This app aims to support the learning of regional languages throughout Indonesia, aiming eventually to document all regional languages comprehensively. Secondly, in the Socialization, Education, and Promotion Stage, efforts target various community levels. This includes forming academic groups dedicated to preserving regional languages, raising awareness among students about their importance, and integrating the app into educational settings to aid language teaching. These efforts aim to encourage widespread use of the app. Overall, the goal is to combat the decline of regional languages by providing accessible learning resources for both formal and informal settings. This approach aligns with UNESCO's criteria for preserving language vitality. In essence, the digital tool is a mobile app designed for language learning and documentation, combining structured development with community engagement to preserve Indonesia's regional languages effectively.

2. Online Dictionaries

a. *Balinese Language Digital Dictionary*: (Cokorda et al., 2020).

The Balinese Language Digital Dictionary, found at www.basabali.org, is a knowledge-based system accessible via mobile devices or computers connected to the Internet. It serves students, the community, and younger generations, enabling them to learn and contribute to Balinese language heritage content. Through crowdsourcing, users can add, refine, and share information collaboratively, emphasizing community involvement in preserving Balinese linguistic and cultural heritage.

- b. **BASAbali Wiki Digital Dictionary** (Cokorda et al., 2020).
It is an online platform available at www.basabali.org, designed as a resource for the Balinese language. It relies on community contributions, allowing registered users to add, edit, and delete content independently, though experts oversee accuracy as needed.
Using a community-driven approach, the platform hosts competitions where participants, including students and locals, contribute Balinese sentences. In a recent study, 96 participants in 24 teams added 2,686 new sentences within 24 hours, showcasing its active growth. Users find the system easy to use and valuable.
The BASAbali Wiki is actively promoted in schools and communities across Bali to encourage both usage and ongoing contributions, enhancing its role as a dynamic repository of Balinese language and culture.

3. **Web Technology for Digital Resources**

- a. **The Blackfoot Language Resources** (Cokorda et al., 2020).
The project uses web technology to capture, store, and make accessible digital resources vital for revitalizing the Blackfoot language. It features an easy-to-use online platform hosting a comprehensive digital dictionary, allowing seamless interaction with materials in the Blackfoot language. A key factor in its success is the active involvement of the community. Community members are encouraged to contribute by adding new content and refining existing resources. This collaborative effort ensures the digital dictionary grows naturally, reflecting the living essence of the Blackfoot language and fostering a sense of ownership within the community. The project shows real progress in language revitalization by increasing community engagement and promoting the use of the Blackfoot language. By digitally documenting and archiving linguistic knowledge, it ensures these resources are preserved and available for future generations. This holistic approach not only preserves the rich heritage of the Blackfoot language but also encourages its active use. Through modern digital tools and community-driven efforts, the project plays a vital role in revitalizing and sustaining the Blackfoot language.
- b. **LearnJavaneseOnline.com** (Salindri & Susianti, 2023)
It is implemented as a website that provides free lessons and resources for learning Javanese. It includes basic vocabulary, pronunciation guides, and cultural insight.

4. **Social Media Platforms**

- a. **WhatsApp**
WhatsApp is widely embraced within the Tengger community as a tool for preserving their language. Through private chat rooms, users engage in creative expression and communication, thereby enriching the relevance and usage of the Tengger language (Riyanto et al., 2023). The platform facilitates text-speak, employing orthographic and phonological abbreviations that mirror oral pronunciations commonly heard in daily conversations.
- b. **General Social Media**
Social media platforms play a pivotal role in revitalizing and preserving endangered languages such as Tengger (Riyanto et al., 2023). These platforms provide essential forums for open discussion, connectivity, and language practice, facilitating engagement among speakers. Platforms like Facebook, YouTube, Twitter, and Instagram serve as multimedia hubs for Indigenous youth, actively promoting language and cultural reclamation through diverse content creation (Hinton & Putra, 2020; Setiya & Kumalasari, 2019). They also showcase the cultural richness of languages like Tengger, significantly contributing to their preservation efforts (Riyanto et al., 2023). In South Sulawesi, digital tools such as video and music sharing platforms have played a pivotal role in revitalizing the Konjo language. Yulianti et al., (2022) highlights how these platforms facilitate the sharing of Konjo songs,

In summary, the implementation of digital tools for language revitalization in Indonesia encompasses a diverse range of strategies, including mobile applications, online platforms, interactive resources, and social media engagement. These tools leverage modern technology to document, teach, and preserve regional languages, making language learning accessible, engaging, and sustainable. The cited examples underscore the transformative impact of digital innovation in safeguarding linguistic diversity and cultural heritage across Indonesia.

Effectiveness of Digital Tools in Preserving and Revitalizing Endangered Languages in Indonesia

Digital tools have played a crucial role in preserving and revitalizing endangered languages in Indonesia. Various initiatives have demonstrated their impact through significant outcomes and strategic approaches.

1. Empowering Language Use and Community Engagement

Digital platforms, particularly video and music sharing channels, have played a vital role in revitalization efforts. For example, initiatives promoting the Konjo language have successfully utilized online platforms to disseminate native songs, effectively encouraging increased usage among younger. This approach not only enhances the visibility and cultural relevance of the language but also fosters active community involvement and appreciation for linguistic heritage.

2. Integration into Education Systems

In regions like Tolitoli, the integration of regional languages into formal education curricula has been crucial. This institutional support ensures that future generations learn and actively use their heritage languages, thereby significantly contributing to their

long-term preservation and vitality. By embedding language learning within educational frameworks, these initiatives enhance language proficiency among students and promote a deeper understanding and respect for linguistic diversity.

3. Strong Government and Community Backing

The effectiveness of digital tools in language revitalization is further strengthened by strong support from both governmental bodies and local communities. Positive community feedback, coupled with governmental initiatives to include indigenous languages in formal education policies, highlights a collaborative approach essential for sustaining language. This collective effort not only ensures broader societal acceptance and appreciation of regional languages but also secures necessary resources and policy frameworks for their preservation.

4. Documentation and Educational Resources

Effective language revitalization begins with comprehensive documentation and codification of languages. This foundational step ensures the accurate development of educational materials and resources tailored to the linguistic needs of communities. Digital platforms play a crucial role in facilitating the creation, distribution, and accessibility of these educational resources, thereby supporting continuous learning and proficiency in endangered languages.

5. Holistic Conservation Approach

Aligned with UNESCO's language vitality indicators, successful digital tools emphasize the creation of comprehensive educational materials and the preservation of high-quality language documentation. This holistic approach aims not only to prevent the extinction of regional languages but also to promote their intergenerational transmission and usage. By addressing various elements of language revitalization—from educational integration to community engagement and documentation—these initiatives create a sustainable framework for preserving Indonesia's linguistic heritage.

The use of digital tools for preserving and revitalizing endangered languages in Indonesia has proven highly effective. These tools provide platforms for sharing language and culture, engaging younger generations, and increasing visibility. Initiatives using digital platforms to share native songs and stories have renewed interest in endangered languages. Additionally, integrating these tools into school curricula ensures that future generations learn and use their heritage languages, fostering a deep appreciation for linguistic diversity. Government policies that promote indigenous languages in education and positive community involvement are crucial for long-term support. Furthermore, digital tools document and preserve languages by creating and sharing educational resources tailored to community needs. Overall, digital tools effectively engage communities, integrate languages into education, secure strong support, and document languages, ensuring the preservation of Indonesia's linguistic heritage.

Discussion

The systematic review illustrates the critical role of digital tools in advancing language revitalization efforts across Indonesia, showcasing how technology supports the preservation of cultural heritage and linguistic diversity. Mobile applications, such as Android-based dictionaries for languages like Lampung and regional dialects, exemplify this trend by not only documenting languages but also enhancing accessibility through intuitive interfaces. For instance, the "Nusantara in Your Hand" app facilitates interactive learning of Javanese and Madurese, demonstrating a practical approach to language revitalization.

Online dictionaries and dedicated websites, such as BASAbali Wiki and platforms for learning Javanese, serve as vital repositories of language resources. They encourage community engagement by allowing local contributions and providing access to cultural materials, thereby ensuring the continued transmission of linguistic knowledge.

Social media platforms like WhatsApp and Facebook also play dynamic roles in language revitalization by promoting language use through multimedia content and fostering community interactions. These platforms contribute not only to language preservation but also to the amplification of cultural narratives, strengthening community pride and identity.

However, alongside their transformative impact, digital tools face significant challenges. Sustainability, securing adequate funding, and promoting digital literacy are paramount issues. Long-term support from governmental bodies and sustained community involvement are essential for the continuity and success of these initiatives. Moreover, ethical considerations surrounding digital preservation and cultural representation necessitate ongoing dialogue and sensitivity within the field.

Ultimately, while digital tools are revolutionizing language revitalization efforts in Indonesia through mobile apps, online resources, and social media platforms, their effectiveness is tempered by various challenges. Overcoming these challenges, including ensuring sustainability and addressing ethical concerns, will be crucial in achieving meaningful and sustainable outcomes in language revitalization across Indonesia.

IV. CONCLUSIONS

In conclusion, the diverse range of digital tools discussed highlights their critical role in revitalizing endangered languages across Indonesia. From innovative mobile applications such as the Android-based dictionaries for Lampung, Muyu, and regional dialects to comprehensive online resources like the Balinese Language Digital Dictionary and BASAbali Wiki, these tools facilitate not only language documentation but also community engagement and cultural preservation. Social media platforms such as WhatsApp, Facebook, Twitter, and YouTube further expand these efforts by providing dynamic spaces for language use and cultural expression. Together, these digital tools ensure that Indonesia's diverse languages not only survive but succeed in the digital age. They foster a renewed sense of pride and continuity among communities dedicated to preserving their unique linguistic heritage and cultures.

The implementation of digital tools for language revitalization in Indonesia showcases a comprehensive approach to preserving and promoting linguistic diversity. Through innovative mobile applications, community-driven online dictionaries, and dynamic social media platforms, these tools facilitate the documentation and revitalization of endangered languages. By integrating modern technology with cultural preservation efforts, these initiatives empower communities to actively engage in language preservation, ensuring that Indonesia's rich linguistic heritage remains vibrant and accessible for future generations.

Digital tools have proven highly effective in revitalizing endangered languages across Indonesia. By integrating languages into education, using online platforms for cultural expression, and garnering strong support from both government and communities, these initiatives have significantly boosted language preservation efforts. Through comprehensive language documentation and customized educational resources, digital tools ensure Indonesia's linguistic diversity succeeds despite modern challenges. Ultimately, these efforts protect endangered languages and empower communities to value and celebrate their linguistic heritage, ensuring a bright future for Indonesia's cultural richness.

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