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Artificial Intelligence (AI): An Innovative Tool for the Revitalisation of the Ikwerre Language

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Abstract
This study explores the role of Artificial Intelligence (AI) as an innovative tool for the revitalization of the Ikwerre language. As a vital marker of the Ikwerre people's linguistic and cultural identity, the language is increasingly at risk as younger generations shift toward dominant languages like English due to its global significance and socio-economic advantages. This study adopts a theoretical evaluation approach, guided by Crystal's (2000) theory of language revitalization. The research systematically analyzes the potential of AI in revitalizing and preserving the Ikwerre language through AI-powered technologies such as Natural Language Processing (NLP), and machine learning tools for speech-to-text conversion and vice versa, generative AI tools for creating visual materials and animations, conversational AI tools like chatbots and AI virtual assistants, amongst others. Findings suggest that integrating these tools into Ikwerre language learning can enhance accessibility, stimulate the interest of younger speakers, and contribute to culture preservation. For example, if the Ikwerre language is incorporated into a conversational AI chatbot such as DUOLINGO or a machine learning tool for speech-to-text conversion like Google Cloud Speech-to-text, they will enable widespread accessibility to the language while ensuring ease of pronunciation and spelling of the vocabulary of the language. However, the study identifies that one of the key challenges of revitalizing the Ikwerre language using AI tools is the limited availability of digital resources and online content in Ikwerre, restricting the AI models' ability to process and teach the language effectively. The study, therefore, recommends that increased efforts should be channeled toward creating digital resources using the Ikwerre language to support AI-driven language revitalization.

Keywords: Artificial Intelligence, Language Revitalization, Ikwerre, Ethnic Groups, English Language

Introduction

The Ikwerre language is a mark of the rich linguistic and cultural identity of the Iwhuruonha people. The language is of the Igboid family of languages, spoken by one of the major ethnic groups (Iwhuruonha people) in Rivers State, the South-South region of Nigeria. The Ikwerre language is not just a means of communication for the Iwhuruonha people; it functions as a vessel that bears the history, value system, culture, and identity of the people, and as such, is passed down from one generation to the other. Over the years, the language has been held high as a monument of pride to its speakers, as it served as the primary means of communication within the speech community until the advent of colonialism, which introduced English as the Language of Education and generally the official language of Nigeria, thereby leading to the decline and marginalization of the language. In recent times, due to the prevalence of globalization and urbanization, the language faces a precarious state of endangerment as it is being eroded by the most dominant language in the country, the English language. The domination of the English language over indigenous languages in Nigeria has resulted in the decline of speakers and, as such, threatens the long-term existence of these languages. According to Ezi-Nlerum and Ken-Maduako (2023), the English Language in Nigeria has become so successful in relegating other languages and enthroning itself as the only language actively used throughout the country, especially in Rivers State. They further noted that it has become crystal clear that nothing can be done to change the status and the intimidating power of English because of the multilingual nature of Nigeria. This, therefore, contributes to the death of the Nigerian indigenous languages, for example, the Ikwerre language, where the younger generation of speakers leans towards learning only the English language, thereby resulting in a loss of our cultural identity and value system. UNESCO (2003, cited in Senayon 2021) estimates that approximately 90% of the world's languages are in danger of extinction as speakers of minority languages continue to shift, for numerous reasons, to more languages of wider communication to the detriment of their languages. The assertion above shows that fighting the supremacy of the

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English language in Nigeria is a lost battle already; therefore, our focus should be on revitalizing our indigenous languages through every means possible, mainly by cultivating the use of digital technology such as Artificial Intelligence (AI), which has become a global phenomenon.

AI performs a pivotal role in the preservation of indigenous languages. In reference to the Igbo language, for example, Orji & Korie (2024) noted that AI has the potential to revolutionize the way we interact with the Igbo language, preserving the language and making it more accessible and easier to learn. Therefore, in an era where globalization and technological advancement have both endangered and provided new means to safeguard linguistic diversity, the intersection of artificial intelligence (AI) and indigenous languages offers a promising frontier for exploration and action (Jafari,2023). To foster the continuity of the Ikwerre language, the fusion of AI into the process of language revitalization is of utmost importance and as such, should be considered with a sense of urgency. With our attention focused on the younger generation of speakers, their areas of interest (i.e., the use of digital technology, particularly AI) must be maximized in the preservation of our cultural identity and legacy. By preserving our indigenous languages, the younger and even future generations can access and connect with their cultural roots, fostering a sense of pride and belongingness within the community. This work, therefore, focuses on the use of Artificial Intelligence as an innovative tool for the revitalization of Ikwerre language.

Language Revitalization

Language revitalization, also known as language revival or reclamation, involves restoring a dying language. A language is endangered or may die or even go extinct when a more dominant language prevails over it. According to Campbell (2020), 10 percent of the Nigerian population speaks English as their first language, or some 20 million Nigerians. This means that there are more Nigerian speakers of English as a first language than there are in Ireland, New Zealand, or Scotland, and about the same number as in Australia. This brings us to the fact that Nigerian indigenous languages are endangered, and as young parents who speak English as their first language procreate, our indigenous languages are faced with the possibility of extinction. Therefore, the solution to such a scenario is the adaptation of innovative tools in language revitalization. This is due to that fact that, our traditional methods of language preservation may not be potent enough due to the advent of digital technology which is deep seated in the interests of this present and even future generations, such that, their first action in search of the meaning of an unknown concept is to consult search engines or interact with modern digital technologies such as AI. Unlike in previous times, when curiosity towards any new or strange concept drives us towards consulting our elders or reading books.

Language revitalization refers to the process of restoring vitality and functional richness to a language that is endangered or experiencing attrition. It often entails not only the expansion of its speaker base but also the reintegration of the language into intergenerational transmission, particularly by fostering its acquisition among infants, children, and youth who may come to adopt it as their native tongue.. This implies that language revitalization aims at reviving a dying language or halting the weakening of a language by ensuring that the younger generation, including babies, become native speakers of this language. According to Hinton (2003); Grenoble and Whaley (2006, cited in Ezi-Nlerum and Ken-Maduako, 2023), language revitalization is a language planning practice intended to increase the use and transmission of languages that are socially, political and economically marginalized, and that have discussed as likely to disappear entirely within, at best, a few generations. The Nigerian indigenous languages fall within the category of languages that need revitalization as described in the definition by Hinton (2003) Grenoble and Whaley (2006). The English language was declared the official language of Nigeria due to the multilingual nature of the country which has resulted in the marginalization of our indigenous languages and in the same vein, exposed these languages to the threat of extinction. The Ikwerre language, for instance, has become an endangered language as in recent times, the younger generation barely speak the language due to the influence of the English language. Research conducted by Ezi-Nlerum and Ken-Maduako in 2023 to ascertain the level of proficiency in the use of the native language amongst the Ikwerre parents and children in Port Harcourt metropolis reveals that the level of proficiency in the use of the native language amongst Ikwerre parents was 20%, while that of children was 5%. This indicates that the language is being engendered by the English language, and if immediate action is not taken, the Ikwerre language may become extinct in decades to come.

Akujobi and Samuel-Enogwe (2024) outlined some factors that contribute to the endangerment of indigenous languages in Nigeria. They include: Socioeconomic Pressures, Urbanization and Migration, Lack of Institutional Support, Cultural Assimilation and Globalization. These factors are interlinked and collectively contribute to the erosion of linguistic diversity in Nigeria.

Challenges in Revitalizing the Ikwerre Language

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Revitalizing the Ikwerre language presents several challenges that must be tackled to guarantee its sustenance and development. These challenges stem from literacy-related issues, generational shifts, digital accessibility, and broader societal factors.

Low Literacy and Documentation of Ikwerre

One of the major challenges in revitalizing the Ikwerre language is the lack of widespread literacy in the language. The majority of adult speakers are only able to speak Ikwerre in daily conversations, with limited proficiency in reading and writing it. Additionally, there is insufficient documentation or orthography of the language, including comprehensive dictionaries, grammar guides, and instructional materials for teaching the language. The absence of well-documented linguistic resources makes it difficult for both native speakers and language learners to study and teach Ikwerre effectively.

Lack of a Central and Standardized Ikwerre Language

Unlike the Igbo language, Ikwerre does not have a central standardized language that is mutually intelligible by speakers of the various dialects. According to Alerechi (2017), the Ikwerre language has twenty-four dialects that are spoken across the four local government areas in Rivers State. These dialects are: Rumuekpe, Rundele, Odeegnu, Emohua, Ogbakiri, Akpo, Obio, Aluu, Igwuruta, Omagwa, Isiokpo, Ibaa/Obele, Ipo, Ozuaha, Omuanwa, Ubima, Akpabu, Egbeda, Omadeeme, Elele, Omudioga, Ubimini, Omerelu, and Apani. This causes a grave disadvantage in terms of language learning using modern digital technologies like AI, in that programming AI models with multiple dialects of the same language may be confusing to users or learners, particularly non-Ikwerre indigenes who may decide to learn the language using AI.

Generational Gap and Declining Interest in Learning the Language

Another challenge is the generational gap in language transmission. Older generations of Ikwerre speakers often communicate fluently in the language, but younger generations are more inclined towards dominant languages such as English or Pidgin. Parents do not actively teach their children the Ikwerre language by using the language as the L1 of the home; instead, they prioritize English due to its perceived economic and social advantages. Consequently, younger Ikwerre indigenes may have only a passive knowledge of the language or may not speak it at all, leading to a steady decline in fluency over time.

Limited Digital Resources and Online Content

In today's digital age, the availability of digital materials is critical in the preservation and learning of languages. Unfortunately, there are not many digital materials in Ikwerre, including e-books, mobile apps, language-learning platforms, and online dictionaries. Social media, which is a powerful tool for language promotion, has minimal records of Ikwerre-language representation. The scarcity of digital resources makes it harder for individuals, especially young people, to engage with and learn the language in a modern context.

Societal and Economic Factors Affecting Language Transmission

Several societal and economic factors contribute to the decline of the Ikwerre language. Urbanization and migration have resulted in increased exposure to speakers of other dominant languages, reducing the necessity of using Ikwerre in daily life as the primary language of communication. Economic factors also influence language choices, as fluency in dominant and global languages like English is often associated with better education and job opportunities. Also, cultural perceptions sometimes stereotype indigenous languages as weaker or less prestigious compared to foreign languages, thus discouraging individuals from utilizing and passing them on to the younger generations.

Addressing these challenges requires an all-inclusive approach that includes increased literacy campaigns, intergenerational language transmission that begins with making the language the primary language of communication in the home, digital content development, and awareness campaigns for social consciousness. Without deliberate intervention, the Ikwerre language may continue to decline, but with concerted efforts, it can be revitalized and preserved for future generations.

Artificial Intelligence (AI) Technologies in Language Revitalization

Artificial intelligence (AI) refers to the capability of computer systems or machines to perform complex tasks typically and historically associated with human intelligence. The emergence of AI such as ChatGPT, DUOLINGO, among others, has made language learning much easier and accessible just with the internet, and as such, has contributed immensely to language learning and preservation. According to Viannis (2024), AI has introduced innovative methods for preserving and revitalizing endangered languages, offering tools that were

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unimaginable in traditional linguistic research. Although most AI models and datasets are trained primarily on dominant languages such as English, French, Chinese, and Spanish (Orji & Korie, 2024), due to the availability of their data online, other languages with less available data online can build a rich database using the innovative technological solutions provided by AI. Nwankwegu (2021) noted that these AI-powered language tools provide instant translation, language practice, and personalized learning experiences for users. For example, the Natural Language Processing (NLP) and Machine Learning tools which enable AI systems to process, analyze, and generate human language effectively through text and voice. Orji & Korie (2024) affirm that in respect to the Igbo language, AI-powered translation and natural language processing tools have made it easier to create digital content in Igbo, facilitating communication, education, and cultural preservation. They further noted that these tools enable automatic translation, speech recognition, and text-to-speech synthesis, which can enhance the availability and accessibility of Igbo language resources. NightOwlGPT is an example of an AI-driven application that is built to provide real-time translation to indigenous languages. Another example is Google's "Woolaroo" AI project, which allows users to take photos of objects and receive translations in their indigenous languages, such as Yiddish and Louisiana Creole. Also, there is the AI Pirinka project, which is being used to revive and preserve the Ainu language, spoken by the indigenous people of Hokkaido in northeastern Japan. This implies that leveraging AI-powered translation models can help bridge communication gaps by translating texts between endangered languages and widely spoken languages. Such models can be used in creating bilingual resources such as storybooks, newsletters, or social media content, which will be instrumental in language learning, documentation, and preservation.

Also, Generative AI models like DALL-E or MidJourney can be used to develop illustrations that can highlight culturally unique expressions and aspects of the native language (Nanduri & Bonsignore, 2023). For example; visual illustrations that depicts the unique cultural heritage of the Ikwerre group can be generated from a storybook or even traditional folktales which can as well be made bilingual by translating it from the indigenous language to the English language, thereby making it easier for young learners to acquire the language because it has been placed side-by-side a familiar language.

Also, Conversational AI tools such as Chatbots and Virtual Assistants create interactive language learning experiences, making the language learning process more engaging and immersive. According to Aremu (2024), Chatbots can assist in language preservation by serving as language learning and practice tools, maintaining and promoting language use through features like text, audio input and output, and visual aids. He further explains that in chatbots, multimedia resources are incorporated in language learning, which results in bringing the language and its culture to life. The audio recordings featuring native speakers allow learners to hear the language being naturally spoken, enabling them to develop listening comprehension skills and acquire pronunciation and intonation patterns appropriately, whereas videos depict visual representations of cultural practices, traditions, and societal norms. An example of a language learning App that fits this description is the Memrise language learning app, which incorporates video clips of native speakers where learners observe how native speakers articulate utterances, their intonation, and the emotion associated with each word (Kyung, 2019, cited in Aremu, 2024). AI plays a significant role in processing and preserving linguistic data, ensuring that endangered languages such as the Ikwerre language remain accessible for future generations. It aids in digitizing historical texts, manuscripts, and oral traditions, creating comprehensive language corpora that researchers and communities can use for analysis and learning. For example, the Automated Transcription Tools convert spoken language into written text, thereby reducing the time and effort required for such a linguistic documentation process. These tools are invaluable resources for languages that lack a standardized script.

Theoretical Framework

The theoretical framework for this study is the theory of language revitalization propounded by David Crystal in 2000. Language revitalization focuses on reviving a dying or endangered language. Crystal (2000) asserted that the process of language decline happens in three stages. The first is when pressure from political, social, or economic sources forces people to adopt a dominant language. This pressure can come from top-down measures like government laws, incentives, and recommendations or bottom-up influences like social trends (Aremu, 2024). The second stage is termed "emerging bilingualism". It happens due to the immense pressure as stated in the first stage, as a result, the people become increasingly proficient in the dominant language. According to Crystal (2000), during the third and last stage, this bilingualism starts to decline as the younger generation increasingly identifies with the new language and may often be ashamed to use the old language outside their homes.

Crystal (2000) further noted that efforts at revitalizing an endangered language should be focused on the second stage, where emergent bilingualism offers a genuine opportunity for progress. This is due to the fact that it is impossible to influence the factors responsible for the first stage of language decline, and intervening in the third stage is considered too late for most languages. He sees the emerging bilingualism of Stage 2 as an option for

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peaceful co-existence and a state in which both languages (dominant and indigenous languages) are seen as complementary. Aremu (2024) categorized Nigerian youths who are bilingual in English in the stage of emergent bilingualism. Azuonye, 2002; Adeniyi & Olaogun, 2020; Onyemelukwe, 2019 (cited in Aremu, 2024) observed that the Nigerian youths have become increasingly proficient in English while retaining competence or a moderate ability in their native languages. Crystal (2000) outlined six key factors necessary for revitalizing endangered languages and one of them states that "An endangered language will progress if its speakers can make use of electronic technology." This emphasizes the importance of the use of advanced technology in language revitalization, of which AI counts as one.

Methodology

This study employs a theoretical evaluation approach, drawing on Crystal's (2000) theory of language revitalization as its guiding framework. Instead of collecting primary data, the research systematically explores how Artificial Intelligence (AI) technologies can be applied to the revitalization of the Ikwerre language. This design is appropriate because AI-driven indigenous language revitalization remains a relatively new field, requiring a solid conceptual foundation to inform future empirical studies. The analysis relied on secondary sources, including recent peer-reviewed journal articles and reports on AI applications in language learning and preservation. Limiting the review to contemporary publications ensured that the discussion reflected current technological advances. Rather than pursuing a quantitative synthesis, the study adopted a qualitative, conceptual analysis, using Crystal's six factors for language revitalization as the evaluative lens. Within this framework, AI tools were examined in terms of their potential to expand accessibility, engage younger learners, and strengthen the preservation of linguistic and cultural identity. The analysis also considered the practical limitations that may hinder implementation, such as infrastructural gaps and the scarcity of digital resources in Ikwerre. By integrating opportunities with challenges, the methodology provides a balanced theoretical evaluation of how AI technologies could contribute to the revitalization of the Ikwerre language.

Current Status of Ikwerre Language in AI Technologies

The Ikwerre language is one of the minority languages in Nigeria. Just like many other African languages, the language is considered a "low resource" language, which implies that there is not much digitalized data available for training AI models to recognize the language. Michael Running Wolf (cited in Ravidran, 2023), a software engineer and AI ethicist who founded Indigenous in AI, stated that "Google has basically scanned virtually every piece of human literature in the world, and so they have this huge data set," She added that "For high-resource languages such as English, those data can come in large part from web crawler programs that vacuum up all the text on the internet. African languages, however, are virtually absent from the internet." This is why AI models do not recognize most African minority languages, including the Ikwerre language. However, the Ikwerre language is not absent from the internet, as there are materials such as "Tẹsitamenti Ikne n'Ọnu Ikwere," the New Testament of the bible published by The Nigeria Bible Translation Trust and Wycliffe Bible Translators, Incorporated in 2010, ABC Primer entitled "Munya Ikwerre" published in July 2001 by S. A. Ekwulo, and other scholarly materials written on the orthography and other aspects of the language. Still, the fact remains that the language is nonexistent on many AI platforms. Many times, AI gives Igbo translation in place of Ikwerre due to the availability of data on the Igbo language and the similarities between both languages.

AI-Powered Strategies for Ikwerre Language Revitalization

Grounded in Crystal's (2000) six factors for language revitalization, AI technologies offer a range of opportunities for strengthening the use and visibility of the Ikwerre language. The following strategies illustrate how AI tools can be aligned with these factors to promote sustainable language revitalization.

1. Natural Language Processing (NLP) for Text and Speech Recognition *(Factors: Literary Development; Adaptation to Modern Media)*

Developing AI models that accurately process Ikwerre speech and text has the potential to significantly enhance both accessibility and literacy in the language. Through Natural Language Processing (NLP), Speech-to-Text and Text-to-Speech functionalities can be tailored for Ikwerre, supporting learners with pronunciation, spelling, and comprehension. In addition, automated translation tools such as Google Translate and Microsoft Translator could be adapted to bridge Ikwerre with English and other dominant languages, thereby facilitating documentation, research, and cross-cultural exchange. A useful precedent can be found in the AmericasNLP initiative**,** a component of the NeurIPS conference, which demonstrates how state-of-the-art NLP and automatic speech recognition (ASR) technologies are being applied to Indigenous languages across the Americas, including Quechua, Guarani, Bribri, Kotiria, and Wa'ikhana (Romero et al., 2024). These projects fine-tune large pre-trained speech models with transcribed oral data, amounting to about 36.65 hours to create effective systems for speech recognition and transcription in low-resource languages. For Ikwerre, while tools such as NLP, Speech-to-Text,

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and Text-to-Speech functionalities could greatly enhance literacy and visibility, their success depends on building a sufficiently large and representative transcribed corpus. At present, Ikwerre has limited digital linguistic resources, meaning significant investment in data collection, annotation, and community participation would be needed before advanced NLP systems can be fully functional.

2. AI-Powered Language Learning Applications *(Factors: Transmission to Children; Community Support)*

Interactive mobile applications and chatbots can provide gamified learning experiences for Ikwerre, including vocabulary building, pronunciation practice, and conversational simulations. By engaging children and younger speakers through play and interactivity, AI learning apps help ensure intergenerational transmission while fostering a sense of community ownership in language use. Duolingo, for example, is a popular language learning app known to employ adaptive AI algorithms to personalize lessons for learners, adjusting the difficulty of vocabulary, grammar, and pronunciation exercises based on user performance, which in turn enhances motivation and engagement, especially among younger learners. Before its Irish language course was launched in 2014, Irish, like Ikwerre, had faced a significant decline due to the dominance of a global language (English). In recent times, the course has been credited with sparking a resurgence of interest in Irish worldwide. In 2020, RTE News reported that more than one million active learners were using Duolingo to study Irish, many of them outside Ireland. This surge illustrates the potential of gamified, AI-driven platforms to expand accessibility and foster community support for endangered or minority languages. For Ikwerre, a similar model could be adapted to include culturally relevant vocabulary, oral traditions, and conversational practice, thereby supporting intergenerational transmission and strengthening community ownership of the language.

It is also important to note that, a Duolingo-style course could be transformative for Ikwerre, but its effectiveness would depend on localized cultural adaptation, inclusion of oral traditions, and collaboration with native speakers. Unlike Irish, Ikwerre currently lacks institutional backing or large-scale government support, which could slow adoption unless strong community-led initiatives emerge.

3. Digital Documentation and Archiving *(Factors: Literary Development; Government/Institutional Support)*

One way to create a massive digital archive of the cultures and traditions of the Ikwerre people is by employing AI-assisted transcription applications that can be used to document the oral histories, tales, and folklore of the people. This way, we can create the Ikwerre language databases and corpora, which will provide structured datasets for linguistic research, learning resources, and further development of AI tools. In other words, these AI-assisted transcription tools can automatically transcribe and annotate spoken narratives, preserving Ikwerre oral traditions for future generations. An example is the Māori (Te Reo Māori) language revitalization efforts by Te Hiku Media, led by Peter-Lucas Jones in New Zealand. According to Chow (2024), the Te Hiku Media team gathered over 300 hours of annotated Māori audio, sourced from archived radio broadcasts and community contributions. Afterwards, they then developed an automatic speech recognition (ASR) system tailored specifically to Te Reo Māori, achieving an impressive 92% accuracy rate, outperforming similar attempts by major international tech companies. For Ikwerre, a similar initiative could focus on digitizing community radio programs, oral storytelling, and songs. However, unlike Māori, Ikwerre lacks established media institutions with large audio archives, which means such efforts would require grassroots mobilization and significant financial investment to build the initial datasets.

4. Social Media and AI-Driven Content Creation *(Factors: Prestige; Adaptation to Modern Media)*

AI-generated content, such as stories, songs, and videos in Ikwerre, can raise the visibility and prestige of the language in digital spaces. Social media initiatives, such as virtual influencers or challenges (e.g., *#IntroduceYourselfInIkwerre* - a one-minute video introducing oneself in the Ikwerre language), can engage younger generations, normalize the use of the language online, and enhance its cultural value. These activities demonstrate that Ikwerre is not only a heritage language but also relevant in contemporary digital culture. However, even though social media provides a cost-effective avenue for Ikwerre promotion, a significant challenge that may likely arise is the risk of trivializing cultural heritage. Therefore, ensuring authenticity and community ownership of the content will be crucial for success.

5. Integration into Voice Assistants and Smart Devices *(Factors: Adaptation to Modern Media; Community Support)*

Training AI-powered voice assistants (e.g., Google Assistant, Siri, Alexa) to recognize and use Ikwerre enables speakers to interact with technology in their native language. This integration enhances daily use and accessibility, reinforcing the presence of Ikwerre in both private and public communication spaces. Such visibility strengthens

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community support and affirms the language's role in the modern technological landscape. Truly, integrating Ikwerre into smart devices would raise its prestige and visibility globally, but it requires substantial linguistic data and collaboration with major tech firms, which may not prioritize low-resource African languages. As such, advocacy, partnerships, and community-driven datasets would be essential to make this goal achievable.

AI Tools and Their Potential Applications for Ikwerre Language Revitalization

The following are examples of AI tools and their potential and relevance to the revitalization of the Ikwerre language.

S/N	AI Tool	Potential Application	Relevance to Ikwerre Language
1	Automated Speech Recognition (ASR)	Converts spoken Ikwerre into text for documentation and transcription.	Supports oral history preservation and language teaching resources.
2	Machine Translation	Translates Ikwerre into English (and vice versa).	Facilitates bilingual education and wider communication.
3	AI-Powered Chatbots	Provides conversational practice in Ikwerre through interactive dialogue.	Enhances everyday language use among younger generations.
4	Text-to-Speech	Produces natural-sounding Ikwerre audio from written text.	Assists learners in mastering pronunciation and fluency.
5	Digital Archiving Systems	Stores and organizes Ikwerre texts, stories, and recordings in accessible formats.	Safeguards cultural heritage and provides future access.
6	Learning Apps with Gamification	Engages users through quizzes, stories, and games in Ikwerre.	Motivates learners and supports informal language acquisition.

Ethical Considerations

In utilizing AI tools for language learning, several ethical concerns must be addressed. One major challenge is the risk of bias in AI language models and the possibility of misrepresentation. Since AI systems are trained on vast datasets that may lack adequate representation of minority languages and cultural contexts, they can inadvertently perpetuate stereotypes or fail to capture the nuances of the Ikwerre language and culture. This risk can be reduced by actively involving Ikwerre native speakers and experts in the design and development of AI models, ensuring that training datasets are community-informed and culturally accurate. Regular testing and refinement of AI algorithms are also necessary to improve fairness, accuracy, and effectiveness.

Community involvement is essential not only for ensuring accuracy but also for guaranteeing ownership and sustainability of revitalization efforts. Ethical use of AI requires that indigenous communities be active partners rather than passive beneficiaries, with their voices shaping how technologies are designed, deployed, and governed.

Data privacy is another critical consideration. The collection of voice recordings, text samples, and other cultural materials must be managed with informed consent, secure storage, and transparency about how the data will be used. Protecting speakers' identities and respecting community rights over their linguistic heritage are central to responsible AI use.

Finally, inclusivity and accessibility must remain priorities. AI applications for language revitalization should be designed to accommodate varying literacy levels and be made available to different age groups, genders, and socio-economic classes. By addressing bias, ensuring privacy, and centering community involvement, the use of AI for Ikwerre and other endangered languages can align with ethical standards while promoting both linguistic and cultural sustainability.

Conclusion

AI technologies offer invaluable support in revitalizing endangered languages, from automated speech recognition and machine translation to digital archiving and AI-assisted learning. Findings reveal that the Ikwerre language faces the challenge of declining use due to generational gaps, limited documentation, low digitalized datasets to aid language recognition by AI models and reduced transmission in both formal and informal settings. However, AI presents opportunities for reversing this trend by providing accessible platforms for learning, preserving oral traditions, and connecting younger speakers with their linguistic heritage. Beyond Ikwerre, these insights highlight the broader role of AI in safeguarding other Nigerian and African languages that are similarly at risk. By digitizing and standardizing endangered languages, AI not only supports linguistic preservation but also reinforces cultural

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identity, ensuring that languages remain living carriers of tradition, worldview, and knowledge. In this way, AI-driven revitalization contributes to cultural sustainability alongside technological advancement. Future research should focus on empirically testing the effectiveness of AI tools in real-world language learning and revitalization contexts, particularly within indigenous communities. Studies could examine learner engagement, retention outcomes, and community acceptance of AI-assisted language resources. Furthermore, interdisciplinary studies on the use of AI in language learning are recommended. For example. combining linguistics, computer science, and cultural studies would deepen understanding of how to balance technological innovation with respect for cultural values and local realities. Ultimately, the integration of AI into language preservation is not just a technical intervention but a cultural project, offering a pathway to strengthen identity, foster inclusivity, and ensure that endangered languages like Ikwerre are not lost to history but carried forward for future generations.

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