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IbanagLingo: An Online Ibanag–English Dictionary Platform for the Preservation and Promotion of the Ibanag Language

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ABSTRACT

Ibanag is a prominent language spoken in the northern part of Isabela and various areas of Cagayan. However, it is currently classified as endangered due to the growing dominance of Tagalog and English in homes, schools, and media. The absence of technological tools, such as mobile applications or software, further accelerates its decline. In response to this linguistic threat, the IbanagLingo, as a web-based application, was developed to aid in the preservation and revitalization of the Ibanag language. The platform functions as a digital Ibanag-English dictionary, offering a comprehensive word database, intuitive search capabilities, audio pronunciation guides, mobile browser compatibility, as well as user-friendly features like bookmarks and search history. It serves as a vital digital repository, accessible anytime and anywhere, helping bridge communication gaps between native and non-native speakers. The project adopted a descriptive research methodology, involving interviews with 50 native speakers and five Ibanag language experts, along with user surveys to assess the system's performance. The application was evaluated using the ISO/IEC 25010:2011 standards, focusing on functional suitability and usability. Field testing in Cabagan, Isabela ensured cultural and linguistic relevance. Results revealed high user satisfaction, particularly in terms of functionality and usability, affirming the system's effectiveness, efficiency, and potential as a tool for preserving and promoting the Ibanag language.

Keywords: *Ibanag-English Dictionary, translation language, Ibanag language, web-based translation*

Introduction

Filipino is the national language of the Philippines, but the country is home to a rich tapestry of regional languages. One such language is Ibanag (also spelled *Ybanag* or *Ibanak*), a native minority language belonging to the Austronesian family. It is predominantly spoken in the northeastern parts of Isabela and Cagayan provinces, particularly in municipalities such as Tuguegarao, Solana, Abulug, Camalaniugan, Lal-lo, Cabagan, Tumauini, San Pablo, Sto. Tomas, Sta. Maria, Ilagan, and other towns along the Cagayan River.

Historically, Ibanag has played a vital role in the region's cultural identity, deeply embedded in local rituals, oral traditions, folk literature, and everyday conversation. However, in recent decades, the use of Ibanag has declined significantly. The increasing dominance of English and Tagalog—particularly in education, government, media, and even household communication—has contributed to a shift away from the native tongue.

Vincencio (2022) stated that many parents discourage their children from speaking their native tongue with the belief that they cannot easily adjust in their new setting if they continue to cling to their mother tongue and identity. In places like Cabagan, even native Ibanag speakers often converse in Tagalog, both in public and private settings. Masses, television, radio broadcasts, and written materials are rarely delivered in Ibanag. Aside from the Ibanag Bible, there is a noticeable scarcity of printed resources available in the language.

UNESCO has classified Ibanag as a vulnerable language, reflecting its gradual decline and the urgent need for preservation. The limited availability of comprehensive linguistic resources, formal education programs, and modern tools for learning and communication has widened the gap between the older and younger generations of speakers. As a result, the intergenerational transmission of Ibanag is at risk, threatening the survival of a language that holds deep historical and cultural significance.

In light of these challenges, recent literature emphasizes the potential of technology as a powerful tool in supporting language preservation and revitalization efforts (Little, 2020; Palviainen, 2020; Villa, 2002). While there has been significant progress in the use of digital platforms to support endangered languages worldwide, there is no evident technological system or platform currently dedicated to the revival or preservation of the Ibanag language. Consequently, Ibanag lacks a centralized digital repository for its lexicon, phonetic recordings, and culturally embedded learning materials, underscoring the need for a web-based platform to support its preservation and use (Buraga, 2019).

To address this critical gap, this study developed IbanagLingo—a web-based dictionary application specifically designed for the Ibanag language. The platform aimed to serve as an accessible, interactive, and educational tool that not only documents the language but also encourages its use among both native speakers and new learners. By integrating features such as an extensive Ibanag-English word database, audio pronunciation guides, and mobile browser accessibility, the application provides a digital space where the Ibanag language can be stored, explored, preserved, and promoted. This also contributes to the broader movement of digital language preservation by demonstrating how technology can bridge generational gaps, foster linguistic awareness, and support sustainable revitalization of endangered languages like Ibanag (Bosch & Griesel, 2020; Stahlberg, 2021; Wamalwa & Oluoch, 2013).

Generally, this study aimed to develop a Web-Based Dictionary Application specifically for the Ibanag language. Specifically, it aimed to:

1. Design a Web-based system with the following key components:
    a. A Homepage Featuring the Ibanag Dictionary;

b. System Statistics Page;
c. User's Review Section;
d. "Word of the Day" Feature;
e. Guess the Word Game;
f. User Engagement and Feedback Mechanism;
g. Word Suggestion Page;
h. Admin Configuration Panel; and
i. Ibanag Word Collection with Translations; and

2. Determine the extent of performance of the developed application as assessed by the respondents based on the following ISO 25010:2011 software criteria:
   a. Functional Suitability
   b. Usability

Methods

Research Design

This study employed a descriptive research design utilizing a quantitative approach to evaluate the development and usability of a web-based dictionary application for the Ibanag language. The Agile development model was implemented to enable iterative planning, design, testing, and enhancement based on ongoing user feedback throughout the system development lifecycle.

Participants

The study involved 50 elders aged 60- 80 during the time this study was conducted, five Ibanag language experts, and IT faculty experts, all selected from the Municipality of Cabagan, Sta. Maria and San Pablo, Isabela, where the Ibanag dialect remains in use. The native speakers were interviewed to verify whether the Ibanag words listed in Buraga's (2018) study are still commonly used in daily communication.

The selected elders were residents or members of the Ibanag community in Cabagan, San Pablo, and Sta. Maria. The selection of the language experts was based on the following inclusion criteria: 1) preferably a native speaker/linguist of the Ibanag language and one who is educated in it; 2) must know how to read, write and understand the terms in Ibanag, Filipino, and English; 2) must be knowledgeable in the Ibanag cultural practices; 3) must be born in a particular place or municipality raised to speak the Ibanag language or being born and immersed in the language during youth, in a family in which the adults shared a similar language or if not, a resident of the Ibanag community for 45 to 50 years with deep knowledge on the language and cultural practices; 5) must possess a basic knowledge in manipulating Android phones and computer, and in browsing the web; and 5) must be willing to participate. In the related literature and studies, the researcher mentioned Lee (n. d.) to describe and identify the native speakers. Hence, the researcher took specific information from Lee's (n.d.) study to serve as a guide to identify native Ibanag speakers.

Data Collection

Data were collected through interviews with native speakers and language experts to confirm current language use and validate vocabulary. The Ibanag words, along with their translations and audio recordings, were sourced from Buraga's (2024) *Bridging Cultures: Ibanag–Tagalog–English Translation Guide*. A survey questionnaire was administered to the participants, including native speakers, language learners, experts, and IT faculty, to evaluate the application's usability and

functional suitability. The survey utilized a Likert scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree") to capture the participants' perceptions. Feedback gathered was used to refine and improve the system's features.

Data Analysis

Survey data were organized, analyzed, and interpreted using a weighted mean to quantify user satisfaction and system performance. The Likert scale responses provided measurable insights into the application's usability, effectiveness, and acceptance by both native and non-native users.

System Development Process

The development followed the Agile methodology. In the meet phase, the project team conducted a series of meetings and interviews with the key stakeholders, including senior citizens, Ibanag language experts, and IT professionals, to gather valuable insights and firsthand knowledge essential to the system's development. Senior citizens, who are considered native and fluent speakers, were interviewed to help identify commonly used Ibanag words, phrases, and expressions still relevant in everyday communication. Their contributions were crucial in understanding the current state of the language and which terms should be prioritized for inclusion in the system.

At the same time, language experts were consulted to validate linguistic accuracy, translation consistency, and correct pronunciation of Ibanag words, ensuring cultural and grammatical authenticity. Additionally, IT experts were involved in the planning discussions to determine the technical requirements, appropriate tools, and design features needed to create a user-friendly, responsive, and scalable web-based application. These collaborative engagements allowed the team to identify existing Ibanag word resources, define the core functionalities of the system, and align the project's direction with both linguistic preservation and modern technological standards.

The design phase centered on establishing a solid technical foundation for the application, focusing on database architecture, user interface (UI), and user experience (UX) design. To ensure that the system would be intuitive and accessible to a wide range of users—including native speakers, learners, and educators—human-computer interaction (HCI) principles were applied. These principles guided the layout, navigation, and interaction flow of the platform, aiming to enhance usability, accessibility, and overall user satisfaction.

For the front-end development, technologies such as HTML, CSS, Bootstrap, and JavaScript were utilized to build a responsive, mobile-friendly interface. These tools provided a clean, modern design while maintaining simplicity to suit users with varying levels of digital literacy. The back-end services were developed using Node.js and Express.js, which allowed for efficient server-side logic and seamless communication between the database and the user interface.

To manage the word database, PostgreSQL was chosen due to its robustness, scalability, and ability to handle complex queries—ensuring that the system could store, retrieve, and manage a growing library of Ibanag words and their corresponding English translations and audio recordings.

In the development phase, all components were coded and integrated to transform the system into a fully functional web-based dictionary. This phase ensured that the application met the study's primary objectives of documenting, preserving, and promoting the Ibanag language by providing a reliable and engaging

digital platform accessible to both native and non-native users. Continuous feedback cycles were conducted during and after development, involving Ibanag speakers, language experts, and IT professionals. Their insights were instrumental in identifying bugs, improving features, and refining the user experience. Based on their feedback, multiple iterations were performed to enhance system performance, usability, and accuracy. This process of ongoing refinement ensured that the final version of the application was well-aligned with user needs and the study's overarching objectives of documenting, preserving, and promoting the Ibanag language.

Ethical Considerations

The developed system was subjected to certain ethical issues. Upon approval, an informed consent letter was prepared and provided to all participants, including native Ibanag speakers, language experts, and IT professionals. Participation in the study was entirely voluntary, and respondents were clearly informed that they had the right to withdraw at any point, for any reason, without consequence.

Participants were thoroughly briefed on the objectives and purpose of the study, which aimed to preserve and promote the Ibanag language through a web-based dictionary system. This transparency helped establish trust and alignment between the research methods and its goals, ensuring that all participants understood the value of their contributions in relation to the broader objective of language preservation.

Confidentiality was strictly observed. Survey questionnaires were designed to protect participants' identities—names were optional, and only the researchers had access to the collected data. All responses were treated with strict confidentiality and were used solely for academic purposes within the scope of this research. Furthermore, participants were assured that no physical, psychological, or emotional harm would come to them throughout the study. By upholding these ethical standards, the study maintained both the integrity of its methodology and the well-being of its participants.

Results and Discussion

This section presents a detailed analysis and interpretation of the data gathered through survey questionnaires and user evaluations. The primary focus was to assess the functionality and usability of the developed IbanagLingo web-based dictionary, as experienced by native Ibanag speakers, language experts, and IT professionals. The findings are directly aligned with the study's objectives—to document, preserve, and promote the Ibanag language through the integration of technology.

The data collected through validated instruments provide insights into how effectively the system meets user needs and supports the overarching goal of language revitalization. The results reflect respondents' perceptions of the system's ease of use and functional suitability measured using the ISO/IEC 25010:2011 software quality standards.

Furthermore, this section outlines the core features of the developed platform, including its Ibanag-English word database, search functionality, audio pronunciation guides, and mobile accessibility. The system can be accessed via a standard web browser at https://ibanagdictionary.onrender.com/, offering users a convenient and user-friendly tool for learning and preserving the Ibanag language.

Web-Based System Design

The IbangLinggo Main Page

The main page of the web-based Ibanag Dictionary application, which includes menu options such as Home, About Us, and Download, is shown in Figure 1. The About Us section provides information about the application, including details about the author and developers, while the Download section allows users to access and download the list of available Ibanag words.

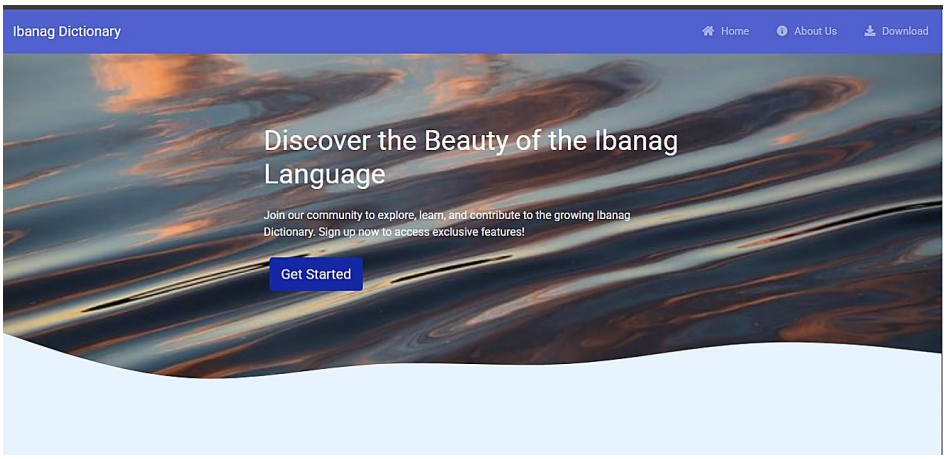

Figure 1. *IbanagLinggo Main Page*

The Home Page

Figure 2 presents the home page interface of the IbanagLingo application, which serves as the central access point for users. From this page, users can search for Ibanag words, view their English translations, phonetic transcriptions, and definitions. The platform also includes audio pronunciation guides, enabling learners to hear the correct articulation of each word. Additionally, the bookmark feature allows users to save frequently used or important terms for future reference. These functionalities collectively support the preservation, learning, and practical use of the Ibanag dialect, making it more accessible to both native speakers and new learners in a modern, digital format.

Figure 2. *Home Page*

The Overview of System Statistics Page

The overview of the system statistics, displaying the visitor count, total users, and total words, is shown in Figure 3. The developed web application tracks the number of visitors who open or access the website. The total users represent the number of registered users who are granted access to the list of words stored in the database. The total words indicate the number of Ibanag words available, along with their translations and descriptions. Meanwhile, the total words indicate the number of Ibanag entries currently available in the dictionary, each accompanied by its English translation, phonetic transcription, definition, and audio pronunciation. These statistics provide valuable feedback on system usage and content coverage, reflecting the application's role in promoting and preserving the Ibanag language.

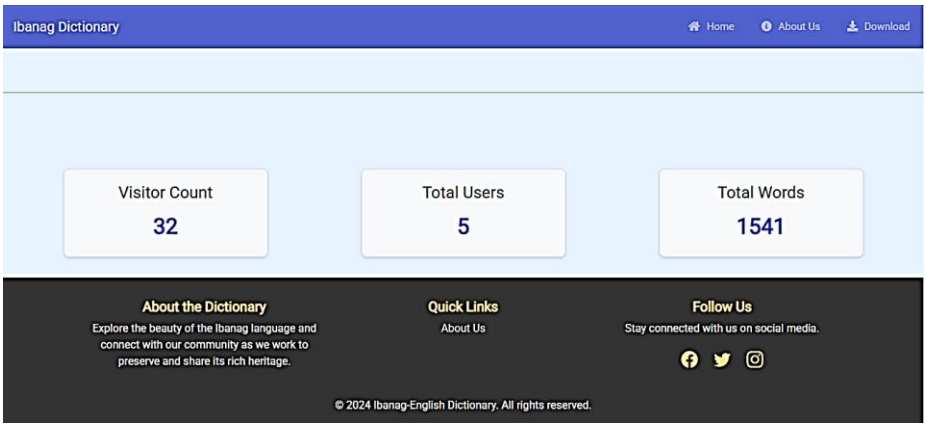

Figure 3. *Overview of System Statistics*

The User's Review Page

Figure 4 displays the User Reviews Page, where visitors and users can share comments or testimonials based on their personal experiences, which can also be viewed by other site visitors. This feature fosters community engagement, encourages user feedback, and contributes to the continuous improvement of the application in support of Ibanag language preservation.

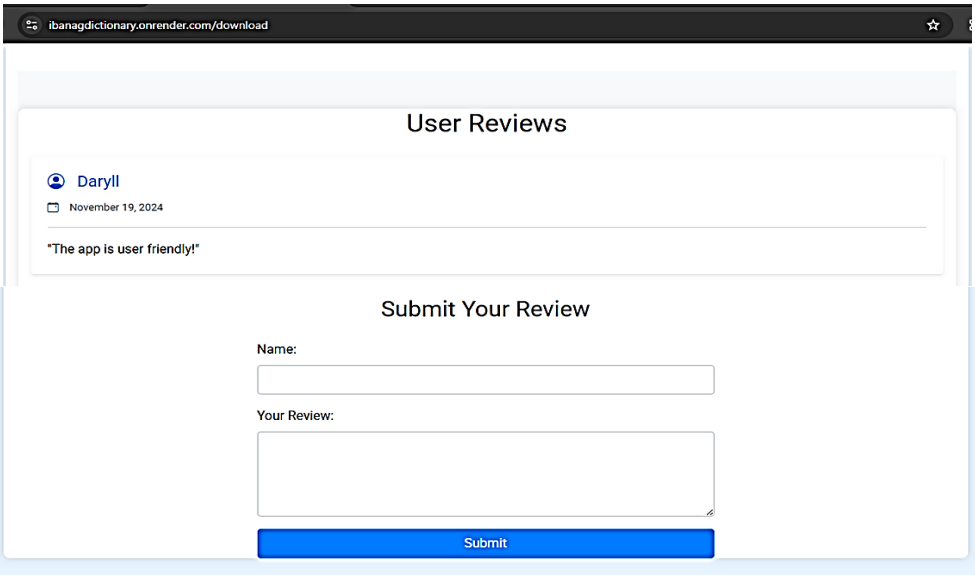

Figure 4. *The User's Review Page*

The Word of the Day Page

The Word of the Day feature, which automatically retrieves and displays a featured word from the database each day, is shown in Figure 5. This dynamic function promotes daily engagement with the language by encouraging users to learn new vocabulary regularly. It also helps reinforce consistent exposure to Ibanag words, supporting the broader goal of language preservation and learning in an interactive and accessible way.

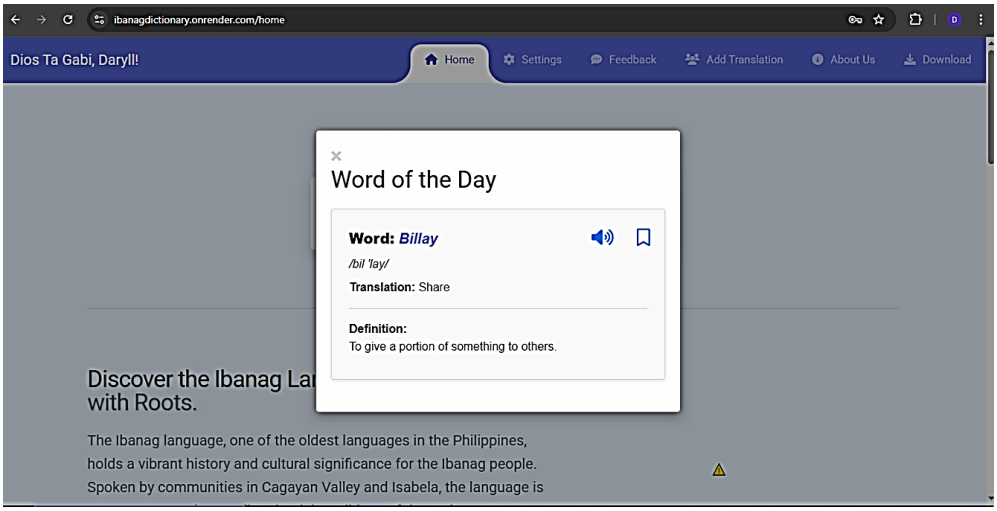

Figure 5. *The Word of the Day*

The Guessing Word Page

Figure 6 presents the Guessing Word Page, a simple interactive game where visitors or users can guess Ibanag words—either those they have recently encountered or other terms from the Ibanag language. This gamified approach not only enhances user engagement but also reinforces learning and retention, making the language acquisition process more enjoyable and effective.

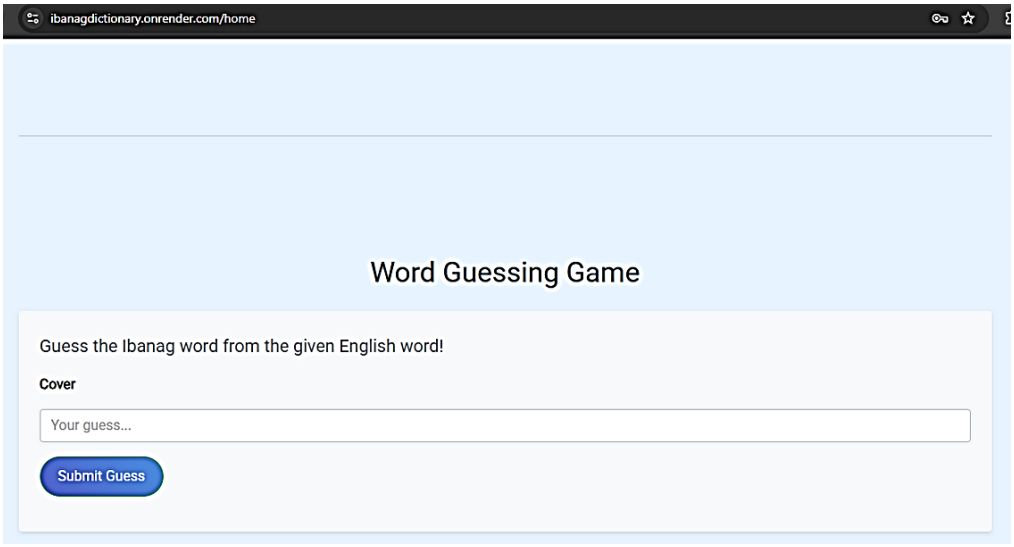

Figure 6. *The Guessing Word Page*

The Feedback Page

The Feedback Page allows users to send direct suggestions and report issues related to the system for improvement, as shown in Figure 7. They may also provide feedback on the Ibanag words and their translations. Submitted feedback is accessible only to the admin and is not visible to the public. This feature fosters active user participation and supports the refinement of the application to better serve its community.

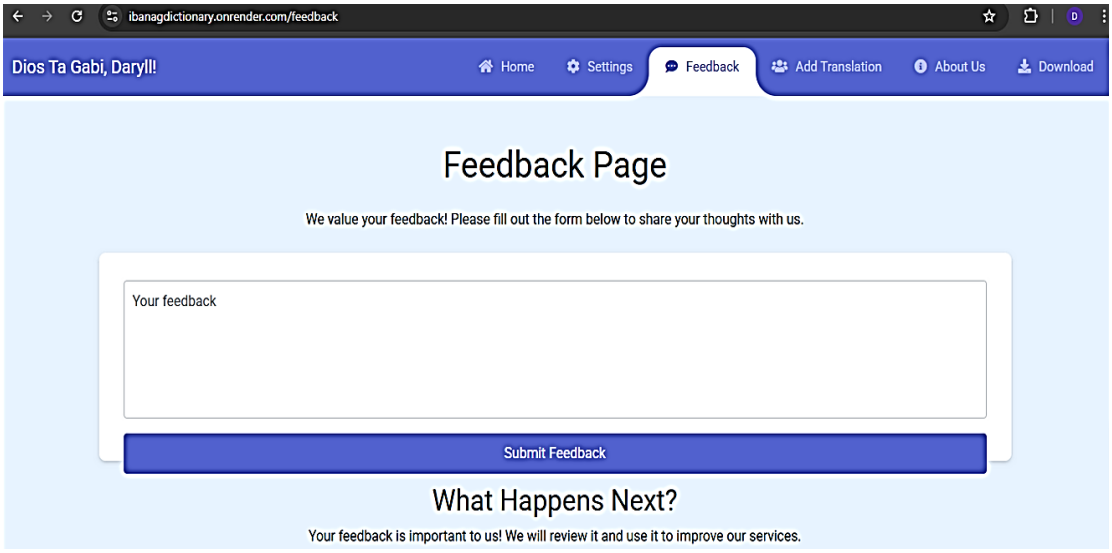

Figure 7. *The Feedback Page*

The Suggestion Page for Submitting Ibanag Words

The Suggestion Page, where users or visitors can propose new words that are not currently stored in the system's database, is shown in Figure 8. This functionality encourages community involvement by allowing users to contribute directly to the expansion of the dictionary. Submitted words are collected in a list of suggested entries and subsequently reviewed by Ibanag language experts for validation, ensuring the accuracy and authenticity of the additions before they become part of the official database.

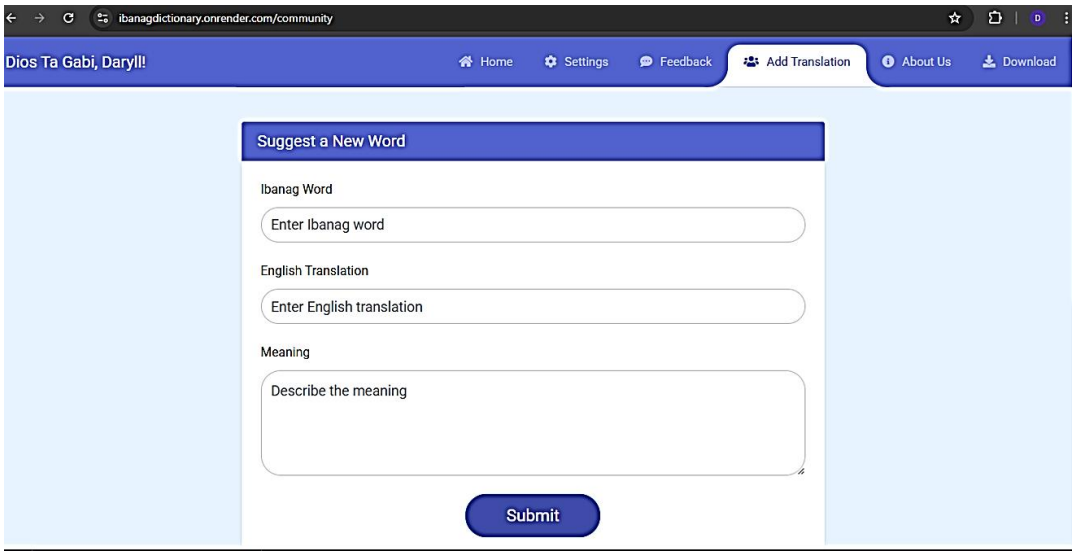

Figure 8. *Suggestion Page for Submitting Ibanag Words*

The System Configuration in the Admin Panel

Figure 9 shows the list of Ibanag words, along with their corresponding English translations, phonetic transcriptions, meanings, and audio. On this page, the admin can manage the system by adding, updating, or deleting words (see Figures 9.1 and 9.2). It also features a search functionality for easy word retrieval and serves as the management interface for user accounts.

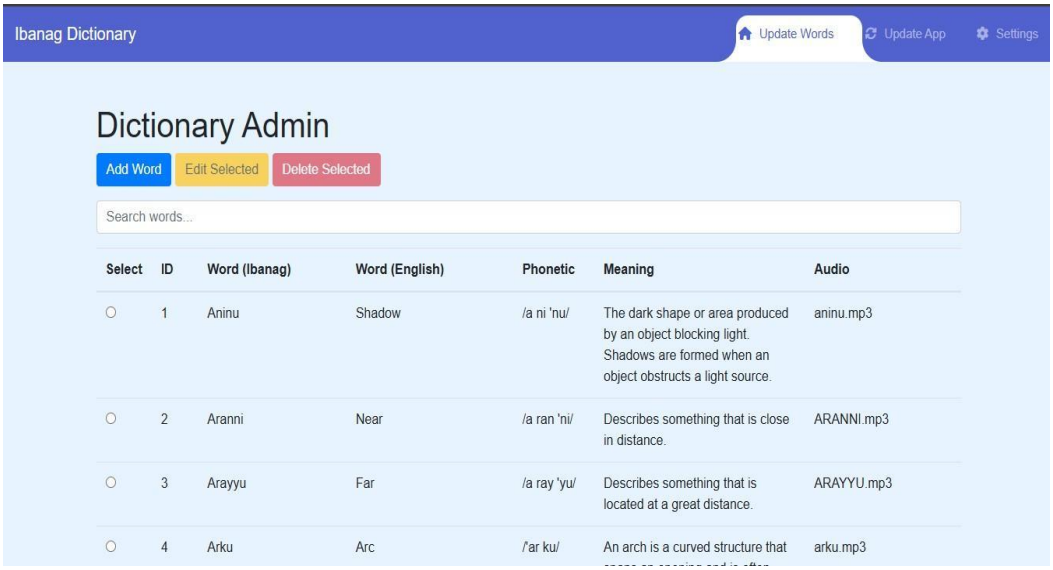

Figure 9. *The Admin Page*

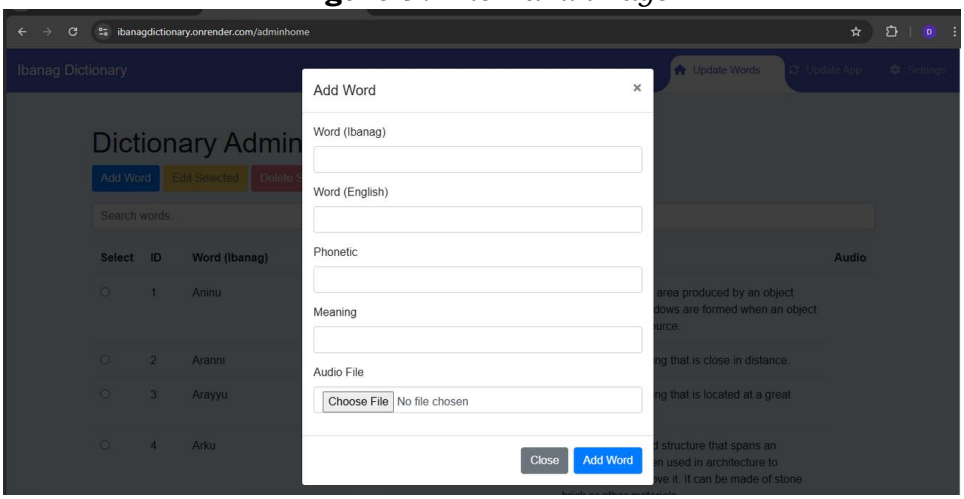

Figure 9.1. *The Admin Page – Adding Words*

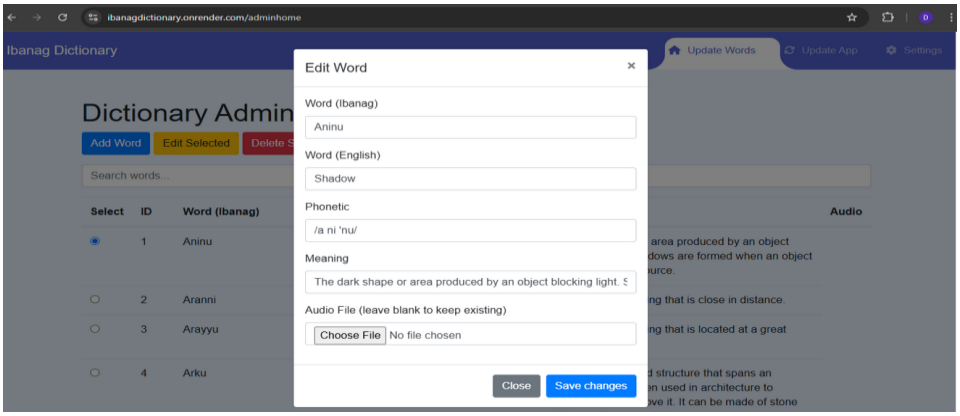

Figure 9.2. *The Admin Page – Updating Words*

The Ibanag Word Collection with Translations

Figure 10 presents the list of Ibanag words stored in the system's database. This section displays the words arranged alphabetically, along with their English translations, pronunciation guides, and corresponding audio playback for proper pronunciation. This organized display enhances user accessibility and facilitates effective language learning by providing comprehensive linguistic information in a clear and user-friendly format.

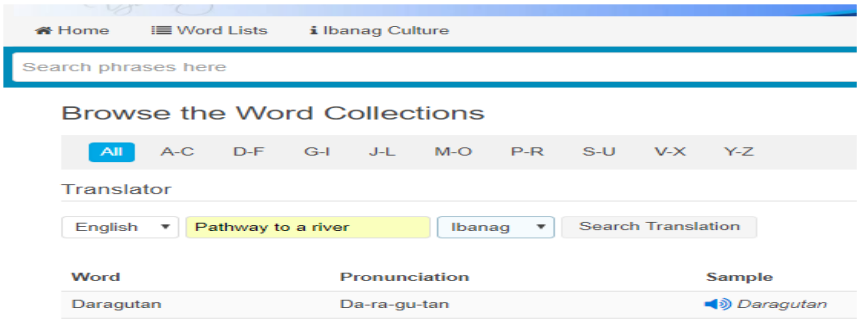

Figure 10. *Ibanag Word Collection*

System Evaluation

An evaluation was conducted using a survey questionnaire to determine the respondents' perception of the functional suitability and usability of the developed system. The data presented in Table 1 reveals the weighted mean scores reflecting users' perceptions of the system's functional suitability. Notably, items 4, 5, and 6 received the highest weighted means, demonstrating strong user agreement that the system effectively performs its intended functions. The overall weighted mean of 4.63 falls within the "Strongly Agree" range (4.21–5.00), indicating high satisfaction with the system's operational capabilities.

Table 1. Respondent's Rating on the Functional Suitability of the System

Functional Suitability	Mean Rating	Description
1. The web platform enables users to access dictionary entries seamlessly.	4.65	Strongly Agree
2. The search functionality is efficient and provides accurate results.	4.65	Strongly Agree
3. The Ibanag audio feature provides guidance and correct pronunciation of words.	4.5	Strongly Agree
4. The web-based platform is user-friendly and compatible with various devices.	4.9	Strongly Agree
5. The user feedback, suggested words, and user review features are easy to access and use.	4.7	Strongly Agree
6. The platform is accessible on multiple devices, including desktop, tablet, and mobile.	4.8	Strongly Agree
7. Its performance remains consistent across different operating systems and browsers.	4.55	Strongly Agree
8. The platform operates reliably without frequent errors or crashes.	4.25	Strongly Agree
9. It consistently delivers dictionary updates without issues or delays.	4.65	Strongly Agree
Overall Weighted Mean	**4.63**	**Strongly Agree**

Functional suitability is especially critical in the context of language revitalization and preservation, as a reliable and efficient system ensures that users can easily access, learn, and engage with the Ibanag language resources. By meeting the core functional requirements, the system supports consistent use and learning, which are essential for maintaining and revitalizing endangered languages like Ibanag.

Table 2 summarizes the results of user feedback on the system's usability. Based on the data, the respondents rated the system very positively, with an overall weighted mean of 4.89. This high score indicates that the majority of users strongly agree that the system meets—or even exceeds—usability standards. The results reflect a strong consensus among users regarding the system's ease of use, efficiency, and effectiveness in meeting their needs.

The high usability rating indicates that the system effectively encourages consistent user engagement and facilitates learning for both native speakers and new learners. By providing a user-friendly interface, the platform lowers barriers to access and motivates continued use, which is essential for the successful revitalization and preservation of the Ibanag language. These findings suggest that the system has strong potential to positively impact efforts to sustain and promote Ibanag through digital means.

Table 2. Respondent's Rating on the Usability of the System

Usability	Weighted Mean	Description
1. The system is easy to manage, learn, and helpful to users.	4.93	Strongly Agree
2. The system search button gives a response immediately after the click is made.	4.93	Strongly Agree
3. Users can navigate the system through web or Android devices without difficulty.	4.86	Strongly Agree
4. The system has effective constraints that prevent users from accidentally clicking or performing unintended actions.	4.90	Strongly Agree
5. The features of the system are easy to explore.	4.90	Strongly Agree
6. The system has no broken links.	4.90	Strongly Agree
7. The system provides helpful tooltips, guidance, and a clear layout.	4.90	Strongly Agree
8. The system provides a seamless user experience on various devices, including smartphones and tablets.	4.86	Strongly Agree
9. The authorized personnel can quickly add, edit, and delete information.	4.83	Strongly Agree
Overall Weighted Mean	**4.89**	**Strongly Agree**

Conclusion and Future Works

Based on the findings of this study, the researchers conclude that the study has successfully met its functional and usability objectives. By providing accurate Ibanag–English translations, clear audio pronunciations, and a user-friendly interface with features such as word search and bookmarking, the platform effectively supports both language learning and preservation. This developed web-based dictionary contributes significantly to the preservation of the Ibanag language by digitally documenting vocabulary, standardizing pronunciations, and making linguistic resources widely accessible anytime and anywhere. Importantly, the web application serves as a vital digital resource that bridges generational and

geographical gaps, fostering greater access to the Ibanag dialect. Its positive reception by users underscores its potential as a powerful tool in the broader effort to revitalize and sustain the Ibanag language, ensuring its continued relevance and use in modern contexts for future generations.

Based on the results of the study, the following recommendations are proposed for enhancing the Ibanag dictionary and translation platforms. Beyond offering dictionary and translation features, continuous updates and improvements should be made based on user feedback to enhance the learning experience. This includes adding more Ibanag words, phrases, and interactive content. Incorporating images that visually represent Ibanag words is also recommended to help users better understand the terms and their usage. Collaboration with academic institutions, cultural organizations, Ibanag language experts, and local communities is encouraged to ensure the accuracy and authenticity of the content, as well as to expand the scope of the dictionary. Promoting the application across various platforms will help reach a wider audience and foster its use as a tool for learning and preserving the Ibanag language. Moreover, the development of a mobile application that can be downloaded and accessed offline on Android devices is highly recommended to enable users to access the platform anytime and anywhere.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Artificial Intelligence (AI) Declaration Statement

This is to formally declare that Artificial Intelligence (AI) tools such as ChatGPT and QuillBot were utilized in a limited, supportive, and ethical manner during the completion of the study entitled *IbanagLingo: An Online Ibanag–English Dictionary Platform for the Preservation and Promotion of the Ibanag Language*. These AI tools were employed specifically for grammar enhancement, sentence refinement, and editorial suggestions aimed at improving the clarity, coherence, and readability of certain sections. All content, ideas, and statements were originally and personally written by the researchers; the AI tools were solely used for language polishing to ensure accuracy and precision in writing.

Moreover, no AI tools were used to generate original content, arguments, conceptual frameworks, or the overall structure of the study. All research design, analysis, interpretations, and conclusions are the results of the independent scholarly work of the authors. The role of AI tools was strictly confined to technical language assistance. The authors assume full responsibility for the originality, accuracy, and academic integrity of this research work.