SALIN: A Realtime Translation and Preservation system to Enhance Indigenous Communication and Cultural Heritage in Tupi, South Cotabato

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ABSTRACT

This study introduces real-time translation application SALIN (System for Automated Local Indigenous Navigation) that translates local languages of the indigenous people automatically. The name of the application comes from the Tagalog word "salin," which means "translate." To bridge the communication gap between indigenous Blaan and Tboli, who speak different languages and non-indigenous of Tupi, South Cotabato, SALIN is a system that overcomes the problem of exclusion of society due to language barrier. The app is designed to facilitate the communication of native speakers of different dialects and to let them learn the common regional languages. Meanwhile, non-speakers gain the capability of understanding indigenous languages. The AI powered is installed in the system for context-aware voice, and text translations. The system works even without a connection, but offline capability provides access to limited Internet connections in remote areas. The culturally sensitive and interactive interface is added in SALIN to enable the community to contribute to an indigenous language dictionary by making entries that the system can use for the Blaan and Tboli dialects in South Cotabato, which promotes the cultural heritage of the Blaan and Tboli indigenous people. With the participants of 100 individuals, the usability tests carried out with 50 indigenous speakers and 50 non-speakers, and positive results: 85% in the survey that the communication and understanding of both groups improved, 80% of the survey result satisfied with the translation accuracy, and 90% of the result appreciated the importance of SALIN in the preservation of language and culture. The findings of the study serve as proof of SALIN's success in making communication inclusive and respectful of the culture and in maintaining the indigenous linguistic heritage, which makes it a potential necessary tool for the communities that are socially oppressed and have language-related problems. The study shows that systems like SALIN are one of the efficient means to continue language preservation and also to keep the culture alive for the upcoming generations.

***Key Words**: Real-Time Translation, Indigenous Language, Language Preservation, Cultural Heritage, Offline Accessibility, Human-Computer Interaction, AI-powered Translation, B'laan Language, T'boli Language, Inclusive Communication, Interactive System, Community Engagement.*

1.0 INTRODUCTION

1.1 Background and Context

Human-Computer Interaction research is in a rapid development phase, and the research domain has been impacted by various technological advances such as artificial intelligence, machine Learning, and extended reality. This era has been marked by efforts to improve user experiences, to deal with ethical issues, and to create more intuitive and user-friendly systems in all domains (Hasyim & Bakri, 2024). The fields of experience and design have expanded due to the surge in interest in UX design throughout this time (Li et al., 2022).

The growing global concern over the rapid loss of linguistic diversity shows how important it is to find new ways to protect endangered indigenous languages (Pinhanez et al., 2024). This decrease, caused by globalization and the rise of major languages, puts about 3,000 languages in risk of going extinct. in the same time, it weakens the cultural identity that is closely tied to these languages (Anik et al., 2025). At this vital point, combining Human-Computer Interaction methods with powerful Natural Language Processing could be an effective method to make strong tools that not only translate but also actively protect indigenous languages (Tonja et al., 2024). These kinds of projects help indigenous language communities that are on the edges by making it easier for people to communicate with regional languages. This makes the language landscape closer (Balouchzahi et al., 2024). HCI approaches can be used to construct interactive translation and communication systems for real-time, offline language translation while preserving indigenous language culture. Participatory systems with interactive features that meet the needs of different language users can bridge the communication gap between indigenous Blaan and Tboli speakers and regional Cebuano speakers.

1.2 Research Problem

This research presents SALIN (System for Automated Local Indigenous Navigation), which stands for a system for real-time translation and preservation of indigenous languages. The main focus of the research is to enhance communication as well as to protect the cultural heritage of the Blaan and Tboli peoples in Tupi, South Cotabato. As a result of the existence of a large number of local languages, many indigenous people cannot communicate with the speakers of the major languages like Cebuano, Tagalog, and English, and therefore, they end up feeling marginalized. Currently, the use of translation apps is not enough to meet the demands

of these kinds of communities, especially those living in areas with poor internet connections. Besides that, a significant number of the systems that are already in existence do not take into account the culture and do not make it easy and fun for the users to engage. This study is aimed at developing a user-friendly and straightforward translation system that can be accessed both online and offline, thereby eliminating language barriers and, at the same time, enabling the indigenous people to be the bearers of the language and the culture in an innovative and engaging way.

1.3 Research Questions and Objectives

1. How does the use of SALIN's real-time translation features improve communication between indigenous language speakers and non-speakers?
2. How does the user-interface design of SALIN affect the engagement and ease of use for indigenous language speakers?
3. How do SALIN's offline capabilities and culturally relevant features impact the adoption and effectiveness of the system in indigenous communities?

1.4 Objectives

1. To design SALIN as a real-time system that bridges communication gaps between indigenous language speakers and non-speakers.
2. To design a user-friendly and culturally considerate interface for SALIN that enhances engagement and usability for indigenous communities.
3. To create offline functionality and interactive features in SALIN, such as localized language support and cultural preservation tools, to ensure its accessibility and effectiveness in areas with limited connectivity.

1.5 Justification and Significance

The research addresses Human–Computer Interaction (HCI) challenges that affect the development of SALIN as a real-time indigenous language translation and preservation system. The system SALIN functions to connect indigenous language users from Tupi, South Cotabato, with Blaan and Tboli communities to speakers of Cebuano, Tagalog, and English through improved engagement and communication methods. The system provides digital learning and communication benefits through its accessible platform design, which motivates users to protect their indigenous languages. The system provides users with both online and offline access to the platform, which enables them to use it at any time without worrying about internet connectivity problems. The research will add value to HCI knowledge by developing methods to create technology systems that are both user-friendly and accessible and culturally appropriate for indigenous language preservation. The research results will help develop platforms that serve indigenous communities through user-oriented design approaches.

1.0 LITERATURE REVIEW

2.1 Real-Time Language Translation and Communication Effectiveness among Indigenous Peoples

Researchers are actively exploring the potential of machine learning and Natural Language Processing technologies to aid in the preservation and revitalization of indigenous languages, particularly those classified as "low-resource" (Cavalin et al., 2024; Martinez et al., 2024). It is deemed essential to create translation tools for these languages in order to improve the accessibility of digital resources for indigenous communities and to encourage language preservation efforts (Prieto et al., 2024). Specific advancements include the development of speech-to-speech translation (S2ST) technologies to overcome language barriers. However, these systems necessitate substantial language resources for machine translation, speech recognition, and synthesis, which are frequently in limited availability in ethnic communities (Novitasari et al., 2020). Some researchers propose an alternative AI development cycle that is based on community engagement and application in order to confront these ethical challenges (Pinhanez et al., 2024). When employing AI to document and revitalize indigenous languages, this methodology emphasizes an appropriate balance between ethical constraints, opportunities, and social impact (Nogima et al., 2023). It is the objective to guarantee that AI-driven translation models prioritize efficiency while also capturing cultural nuances, idiomatic expressions, and historical significance, thereby preventing translations that could potentially marginalize linguistic diversity (Rahman et al., 2025). Lastly, real-time language translation helps revitalize indigenous languages and improve communication. Ethical frameworks, community-led development, and a deep understanding of cultural context are needed to bridge linguistic divides and ensure communication effectiveness without eroding cultural identity (Anik et al., 2025; Mager et al., 2023; Pinhanez et al., 2024).

2.2 Offline Accessibility and Its Impact on Usability and Adoption of SALIN among Indigenous Communities in Low-Connectivity Areas

Indigenous populations frequently face limited access to digital tools, which hinders their ability to utilize technology for language maintenance, growth, and preservation (Taylor & Kochem, 2020). The concept of "offline accessibility" emerges as a crucial design principle for language technologies aimed at indigenous communities. Ensuring that applications function without continuous internet access can significantly improve their usability and foster adoption where online alternatives are impractical or impossible. Research highlights the importance of mobile technology in language revitalization, as it allows community members, educators, and learners to access language resources regardless of time and place (Abingosa et al., 2025). Mobile applications, cloud computing, social media, and AI offer innovative solutions for documentation, revitalization, and dissemination efforts, making language resources more accessible (Olaare, 2024). Critically, optimizing offline modes and data synchronization techniques for literature translation applications on mobile devices is a key challenge to ensure quality and efficiency under unstable or

disconnected network conditions (Wang & Wang, 2024). These results together show the importance of offline access in improving usability and adoption of systems such as S.A.L.I.N.. The ability for indigenous people to access real-time translations and language protection resources without relying on always-on internet, S.A.L.I.N., is a way for designers to acknowledge the infrastructure-level realities of low-connectivity areas and use them as a means that will promote communication, cultural preservation, and digital inclusion.

2.3 The Impact of Interface Design in Digital Platforms: Enhancing User Experience and Cultural Sensitivity in Interactive Technologies

The effectiveness of digital platforms, particularly those aimed at cultural preservation and communication, is profoundly shaped by their interface design. This review synthesizes recent literature on how interface design enhances user experience and incorporates cultural sensitivity, especially in the context of interactive technologies for diverse and indigenous communities. A well-designed user interface is essential for improving the user experience, as it significantly influences user satisfaction, engagement, and the probability of ongoing usage (Liu et al., 2020). Studies consistently indicate that an effective interface promotes better interaction between users and the platform, resulting in increased satisfaction and prolonged engagement (Liang et al., 2020). In contrast, design imperfections can diminish usability and adversely impact the overall user experience (Shao et al., 2020). The impact of cultural context on UI design is a significant area of study. Platforms, especially those in global markets, face pressure to cater to diverse cultural tastes and user behaviors (Yan & Arshad, 2025). Culturally adapted UI designs, incorporating elements like content localization, mobile-first principles, and social commerce features, have been shown to enhance user experience satisfaction (Yan & Arshad, 2025). In conclusion, significant cultural awareness and a thorough understanding of user experience principles are essential for successful interface design in digital platforms, particularly for applications like SALIN. This means going beyond simple localization to incorporate participatory design techniques, indigenous cultural components, and worldviews into the interface's basic structure. A strategy like this guarantees that interactive technology not only improve usability but also actually aid in community empowerment and cultural preservation.

2.0 METHODOLOGY

3.1 Research Design

The research design of this study will use descriptive quantitative methods to evaluate SALIN system user interaction and contentment while studying how its interactive features and cultural sensitivity impact language preservation and communication. The SALIN system design elements serve as independent variables to measure user engagement and satisfaction and perceived usability as dependent variables. The research design enables researchers to assess user perceptions of the system and its operational effectiveness.

3.2 Participants

The research participants will include both native speakers of the Blaan and Tboli languages who live in Tupi, South Cotabato, and people who speak different languages but want to visit or interact with these indigenous communities. The research will select 100 participants through random selection to represent both language groups. The system usability assessment will evaluate both language speakers and non-speakers equally to ensure fair results.

3.3 Data Collection

Data will be collected through structured quantitative questionnaires that are meant to find out how engaged and satisfied users are with the SALIN system. The questions on the questionnaires will be Likert-scale items that ask about how easy it is to use, how well it helps with communication, how culturally appropriate it is, and how satisfied people are. Data collection will take place in community locations that are easy for both indigenous participants and non-indigenous speakers.

3.4 Data Analysis

Descriptive statistics such as means, standard deviations, and frequencies will be employed to identify user engagement trends and satisfaction levels from the quantitative data collected. Comparative analyses may be conducted between the two groups of indigenous speakers and non-speakers to evaluate differences in system usability and effectiveness of the system.

3.5 Ethical Considerations

The ethical principles will be strictly respected, and an emphasis will be placed on the compulsory anonymity and voluntary nature of the participants in this research protocol. After providing them with information, participants have to give consent for participation and an explanation of how they can withdraw from the study at any point without any negative consequences. Anonymity will protect the privacy of data. The study will respect cultural protocols and be in accordance with ethical practices in the involvement of indigenous people, as well as non-indigenous people.

3.0 ADVANCED HCI DESIGN

4.1 System Architecture

The SALIN system's advances HCI design goal is to simplify people's communication in real time and preserve the native languages (B'laan and T'boli) by providing them with an interactive, culturally sensitive translation platform. The system is a solution to the problem of communication between the indigenous speakers and non-speakers as it can be operated both online and offline, has attractive user interfaces, and has efficient language processing. It is designed with a framework consisting of

several major components that ensure its responsiveness, ease of use, and cultural appropriateness.

Key Components Include:

- *Client side (User Interface:* This is the main layer that covers the front-end or user interface which is accessible via mobile devices. The interface is user-friendly and culturally relevant to both the indigenous and non-indigenous individuals currently, at any given time, learning a language, translating in real-time, and enjoying interactive features that are also context-intensive.
- *Translation Engine:* This is the main module that interprets and works with the phrases Blaan, Tboli, Cebuano, and other supported languages. It can function online and offline as well, so people with a bad internet connection can still learn these languages up to a reasonable level.
- *Language Database:* This component contains the full wordlist, typical phrases, stories about culture, and language information from the indigenous communities. The language-based database collaborates with the translation engine and is continually updated to make the indigenous languages manageable and to conserve them.
- *User Management:* This feature is responsible for registering a user, verifying their identification, and controlling their profile. Non-native speakers, users, and language professionals are divided into various categories whose understanding of language and their past communications tailor this feature.
- *Offline Mode Manager:* This is in charge of ensuring that the system works effectively even when there is no internet. When offline, the central database syncs with all the accessible and usable cores of the translation and learning system.
- *Backend Database:* A secure and centralized storage system with all login information, existing language records, tools, and system information protection is all placed.

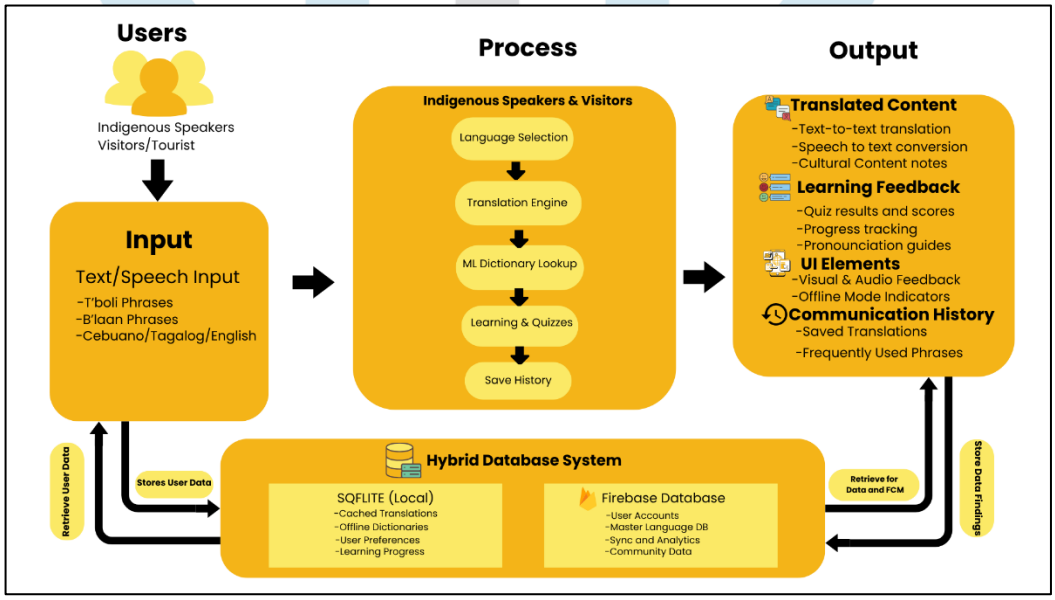


Figure 4.1.1 The diagram illustrates the SALIN System, connecting indigenous and non-indigenous users through translation and language preservation modules. It includes a user interface, offline mode manager, translation engine, language database, and user management, all supported by a secure backend database for data synchronization and usability in low-connectivity areas.

4.2 Features and Functionalities

The Features and functionalities of the SALIN system are as follows:

Real-Time Translation

It offers real-time translation in B'laan, T'boli, Cebuano, and other supported languages to encourage interaction between indigenous users and non-users.

Offline Accessibility

Enables users to perform translation and language preservation without an Internet connection, making the system usable in low-connectivity or remote locations.

Interactive Learning Modules

Features culturally grounded language lessons, common phrases, and vocabulary words, with audio and visual aids to support engagement in the language while also involving users in its preservation.

Easy to Use Interface

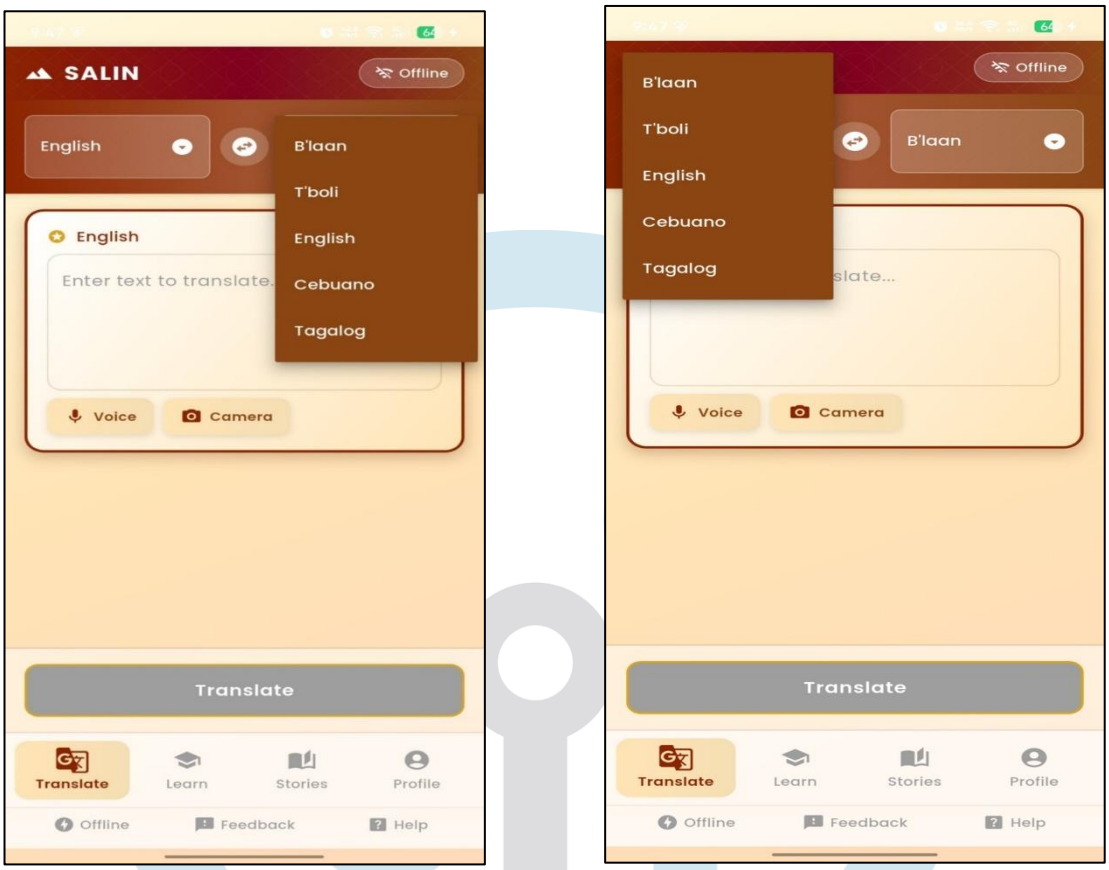
Culturally specific features so both indigenous speakers and non speakers can easily find their way & engage in conversations that matter.

Data Synchronization

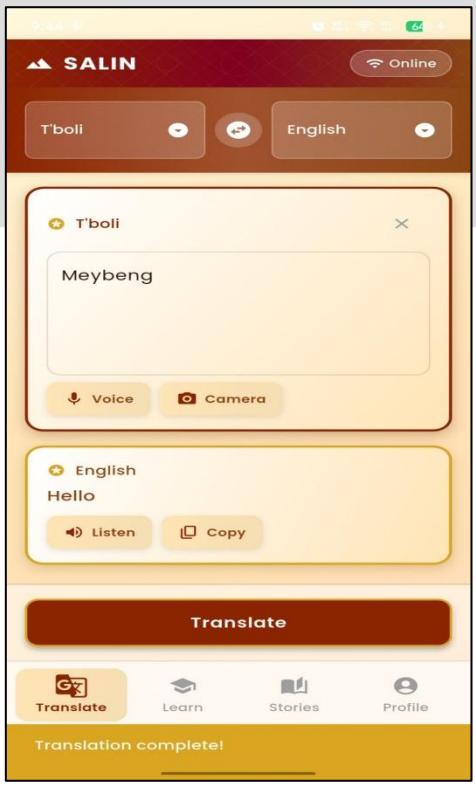
Automatically synchronizes language resources, user settings, and translation records online and offline when the network is available.

4.3 User Interface Design

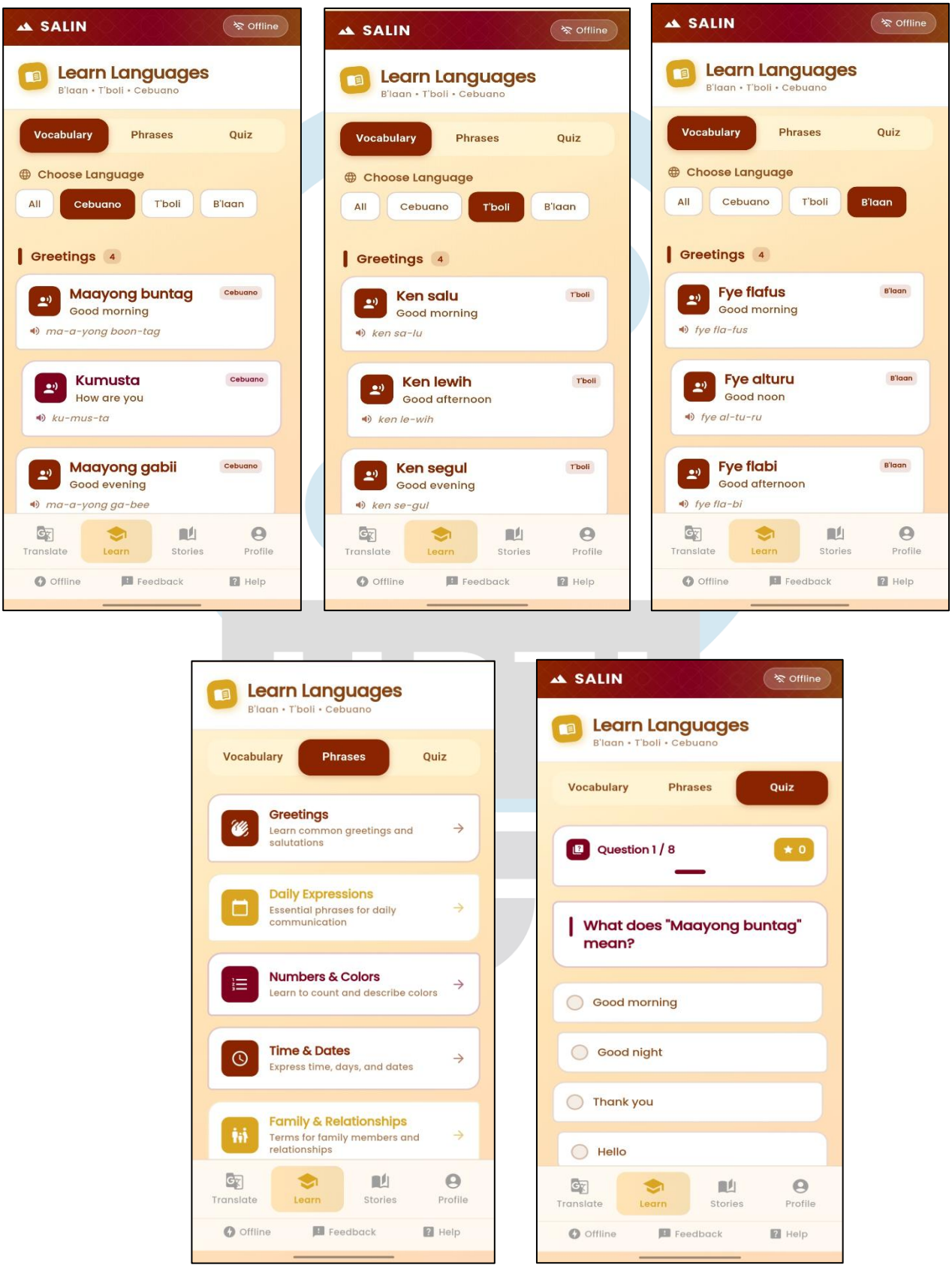
In this figure shows the landing of the SALIN APP.



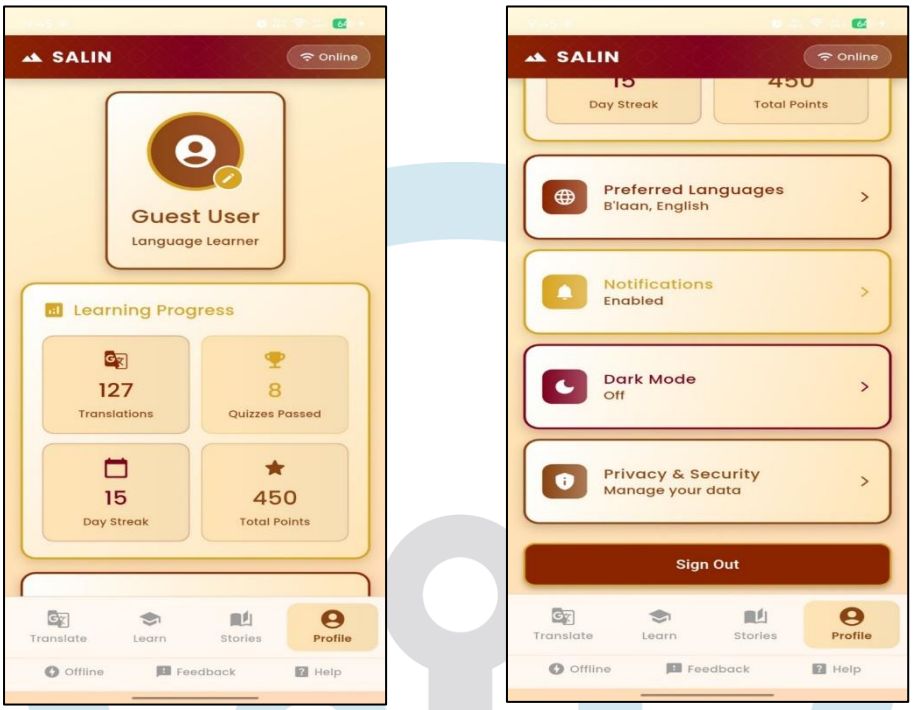
In this figure, it shows the language selection screen allowing users to select languages between B'laan, T'boli, Tagalog, Cebuano and English.



In this figure, it shows the Real-time translation interface where users input text to speech and receive immediate translations.



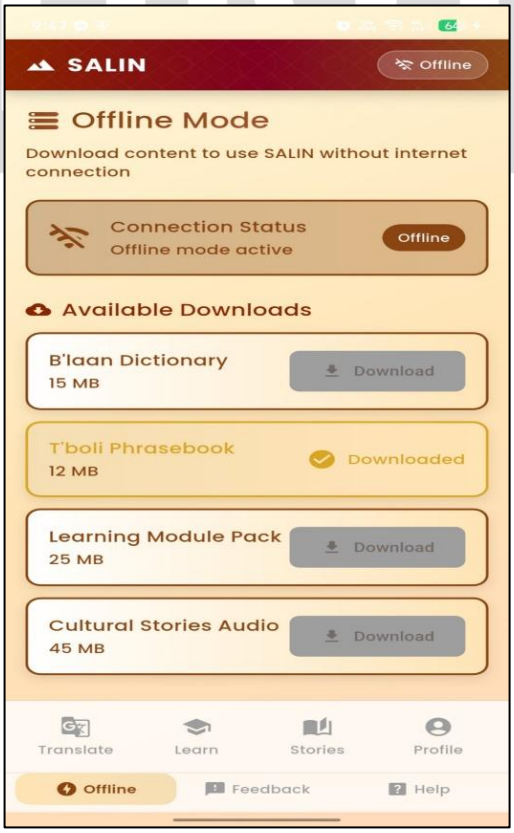
This figure shows an interactive learning module that presents vocabulary, phrases, audio pronunciations, and quizzes to reinforce indigenous language skills and cultural understanding.



This figure shows the user profile and settings page from where the user can manage their accounts, set language preferences, and customize app accessibility options.

This figure shows the culture stories section loading recorded oral histories, folk tales, and traditional knowledge narrated by indigenous elders to support language and cultural preservation.

This figure depicts the feedback and support interface through which users can report translation problems, suggest new features, or seek help from community language experts.



This figure displays the synchronization status indicator that lets users know the data sync between the offline storage and the central database is happening whenever there is internet access.

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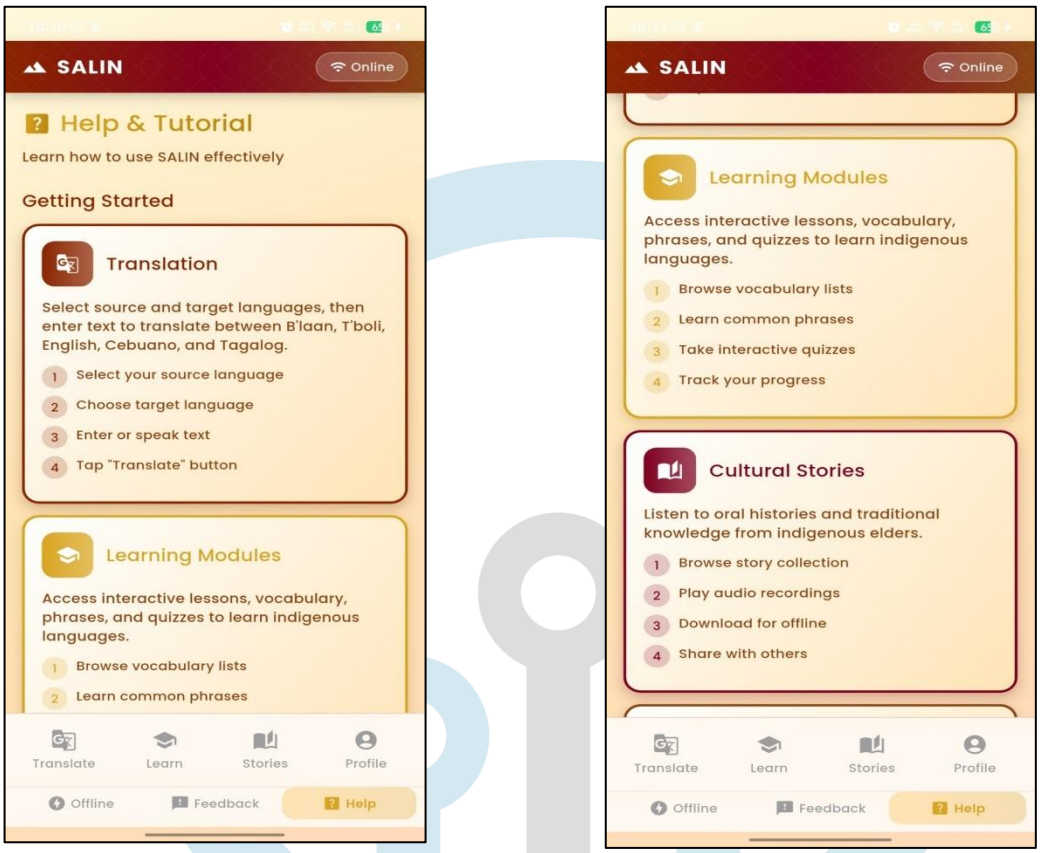
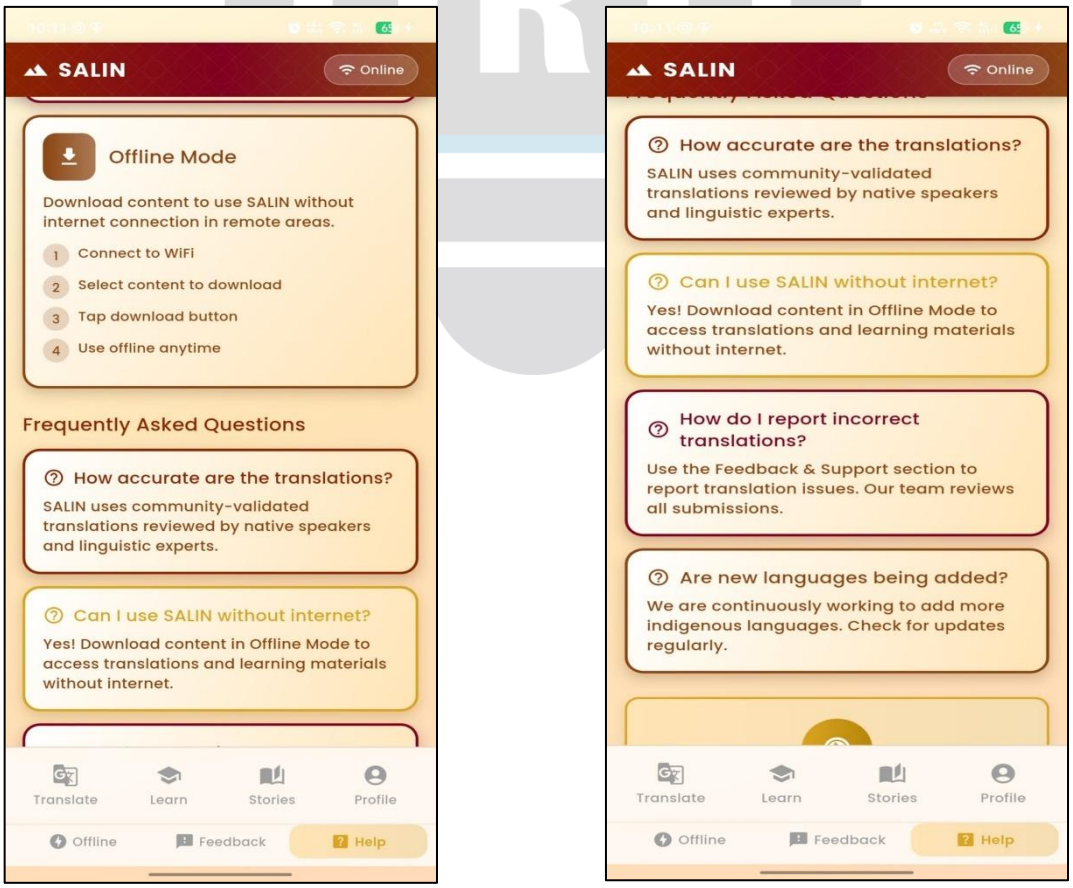


This figure is about the help and tutorial screen that offers the user guidance on the correct usage of SALIN'S translation and learning features, thereby, assuring the interface's friendliness to first-time users.



This figure is about the help and tutorial screen that offers the user guidance on the correct usage of SALIN'S translation and learning features, thereby, assuring the interface's friendliness to first-time users.

5.0 EVALUATION AND RESULTS

5.1 Usability Testing

The user testing of the SALIN system revealed, to a large extent, positive reactions of the indigenous speakers as well as non-speaker users, which confirms the system's substantial compliance with HCI principles. The non-speaker users of SALIN, who are primarily concerned with learning and interacting with the indigenous community, consider the system to be very easy to use (Mean = 4.10 or 82%) and demonstrate a very high level of willingness to use it frequently (Mean = 4.12 or 82.4%), thus, indicating a strong user engagement. On the other hand, native speakers, who used SALIN for cultural preservation and better communication with the dominant community language champions, also believed that the system was easy to use (Mean= 3.90 or 78%) and were confident in the system (Mean = 3.85 or 77%), thus, supporting the ease of use, relevance to the culture and the agnostic nature of the technology. Both groups appreciated that the intuitive and consistent interface made it possible to quickly learn and communicate effectively. These results exemplify SALIN's application across different cultures and its success as a user-driven, culturally sensitive resource that serves the diverse needs.

Table 5.1.1 Usability Result Table

Questions	Non-Speakers Mean	Speakers Mean
1. The translation's accuracy reflects the Blaan and Tboli languages.	4.10	3.90
2. The pronunciation guides were helpful and accurate.	2.85	3.10
3. The system correctly translates cultural expressions and idioms.	3.40	3.75
4. I trust the translation accuracy during real-time conversations.	3.85	3.55
5. The system consistently provides accurate translations without major errors.	2.95	3.20
6. The translated cultural content preserves its original meaning.	2.60	2.85
7. I am confident using SALIN translations in real social interactions.	4.10	3.85
8. The system reduces misunderstandings across indigenous and non-indigenous users.	3.05	3.20
9. I want to keep using SALIN because of its translation reliability.	4.12	3.88
10. Overall, I am satisfied with the accuracy of SALIN's translations.	4.05	3.78
TOTAL MEAN | 3.51 | 3.51 |		

5.2 Performance Metrics

Performance metrics have been put in place to measure the effects of SALIN on users' engagement, confidence, and satisfaction. These metrics were measured in two user groups: non-Speakers (people who use the system for both learning indigenous languages and also communicating proficiently) and Indigenous Speakers (people who use it for maintaining their language preserve during interactions with larger groups). And both groups appreciated the system a lot, mentioning that it was very easy to use and accessible, and happy users had been overall. Non-Speakers stated that they discovered the system more manageable and that they gained more confidence, which means that they considered the system to be intuitive and that it was a good learner for beginners. Indigenous speakers have found SALIN culturally relevant and user-friendly thereby it is implied that the tool is successful across a wide range of users. There was a bit of feedback suggesting that the introduction to the system could still be enhanced, and the provision of help would make learning easier and more consistent.

Accessibility (Non-Speakers): 3.57 (71.4%) – Users found the system very easy to use and accessible. (82%) liked how easy it was to navigate, and (81%) percent felt confident using it. There are good chances to make user guidance better in areas like system complexity (55%) and inconsistency (57%).

Accessibility (Speakers): 3.32 (66.4%) – Indigenous Speakers had a similarly good experience, easily using SALIN to do language preservation and communication tasks. The scores for confidence (77%) and satisfaction (75%) were high, but there were some minor problems with perceived complexity (57%) and requests for better technical support (66%).

Table 5.2.1 Accessibility Result Table

Questions	Non-Speakers Mean	Speakers Mean
1. The interface icons, buttons, and labels are clear and culturally appropriate.	4.10	3.90
2. SALIN is easy to use on mobile devices (smartphones, tablets).	2.75	2.85
3. Offline accessibility works well in low or no-connectivity areas.	3.10	3.30
4. Instructions and help features are easy to locate and understand.	3.05	2.75
5. The system loads quickly and without errors.	3.12	3.30
6. I can easily switch between languages and system features.	2.65	2.80
7. The system accommodates both new and experienced users.	4.05	3.85
8. I rarely experience slow responses or technical issues while using SALIN.	2.85	2.90
9. SALIN is accessible and usable regardless of my location or device.	4.08	3.75
10. Overall, SALIN is easy to access and navigate.	3.90	3.75
| TOTAL MEAN | 3.57 | 3.32		

Functionality (Non-Speakers): 3.66 (73.2%) — People liked the core functionality of the SALIN system. users liked that the translations were so good (4.05 or 81%), how well all the features worked together (4.00 or 80%) and that they started speaking to each other more when using the system (4.00 or 80%). Moderate scores for system response times (completed 3.20 or 64%) and performance smoothness (achieved 3.10 or 62%) imply that the game experience may be improved further, should technically feasible improvements be developed.

Functionality (Speakers): 3.39 (68%) — Indigenous speaking participants indicated that they liked the system's ease of use, including language preservation tools (3.70 or 74%) and overall clarity of the design. But there were a few issues related to how quickly the system response (2.85 or 57%) and how clear it is when you start doing more advanced things with it (3.15 or 63%). Such regions indicate opportunities for more effective user guidance and optimization.

Table 5.2.2 Functionality Result Table

Questions	Non-Speakers Mean	Speakers
1. The translation features worked as expected	4.05	3.85
2. It is easy to understand how the system functions.	3.20	2.85
3. The system responded quickly to my inputs (text or speech).	4.00	3.75
4. I felt confident using the translation and learning features.	3.40	3.15
5. The integration of different features (translation, learning, cultural content) is smooth.	4.00	3.70
6. I did not experience significant technical issues while using SALIN.	3.90	3.55
7. All major features worked as I expected.	3.85	3.65
8. It is easy to navigate through the different functions of the system.	3.10	2.85
9. The feedback provided by the system helped me use it effectively.	4.00	3.60
10. I encountered obstacles or complications while using SALIN's features.	3.10	2.90
| TOTAL MEAN | 3.66 | 3.39		

5.3 Comparative Analysis

The study compared the work of the SALIN system to other language learning and translation platforms that are used in indigenous and cross-cultural contexts. According to both sets of people, the indigenous speakers and the non-speakers, SALIN differs from others as it is a user-centered, culturally sensitive, and offline accessible technology. It was the great convenience of the system and the user-friendly interface that made learning the language and talking to people natural and fun, which satisfied users. Some traditional language apps can sometimes be too general or too difficult to use effectively in indigenous settings. In contrast, SALIN is perfectly balanced between saving culture and providing for practical communication needs. There were a few minor issues, like intermittent synchronization delays and the requirement for more detailed onboarding, but they did not have an impact on overall satisfaction to a great extent. Those who used the SALIN system believed that it was more user-friendly, their culture was taken more into account, and the community's requirements were better met compared to other tools..

5.4 Results and Findings

The combined outcomes of the system's usability, accessibility, and functionality measures are in line with SALIN's successful achievement of its goals:

- Usability – 3.51
- Accessibility – 3.45
- Functionality – 3.53

The System Usability Scale (SUS) survey, along with additional feedback from users, reveals that users are generally confident, satisfied, and interested in the system. Users themselves considered SALIN to be effective and easy to use, thereby enabling more frequent and impactful interaction in speech between the oral community and the non-speaking groups. As a result of this improved communication, both the work to preserve languages and the process of cultural exchange were enhanced, thus demonstrating the practical value of SALIN. The user-friendly design of the system and its flexibility were the main factors that helped to keep the people from the indigenous communities and the visitors engaged and interested.

5.0 DISCUSSION

6.1 Interpretation of Findings

The research focused on how the SALIN system affects the enhancement of communication, usability, and user experience for both indigenous and non-indigenous users in Tupi, South Cotabato. As per the findings, all three factors: SALIN's real-time translation, offline functionality, and culturally sensitive interactive design, substantially contribute to the engagement of users, smooth communication, and increase the satisfaction of users.

Table 6.1.1 Descriptive Survey Result Table

Questions	Mean	Standard Deviation
1. How effective is the real-time translation in improving communication?	3.50	0.52
2. How helpful is offline accessibility in using SALIN in low-connectivity areas?	3.45	0.55
3. How engaging do you find SALIN's culturally sensitive and interactive design?	3.60	0.50
4. To what extent does SALIN increase your motivation to learn or preserve indigenous languages?	3.55	0.53
5. How satisfied are you with your whole experience with SALIN ?	3.65	0.48
TOTAL MEAN	3.55	0.52

RQ1: *How does the use of SALIN's real-time translation features improve communication between indigenous language speakers and non-speakers?*

Based on user feedback, the real-time translation function received a score of 3.50, meaning that it was a significant factor in communication improvement. The real-time translation system was the leading language barrier solution, which facilitated interaction between speakers of native languages and those who do not speak. It made the users feel that the translation tool was not only a great assistant but also user-friendly, which in turn made the common talks and cultural sharing more valuable in the Tupi community, South Cotabato.

RQ2: *How does the user-interface design of SALIN affect the engagement and ease of use for indigenous language speakers*?

The culturally sensitive and interactive design of SALIN got the highest score of 3.60. It means that the users perceived the interface not only as attractive but also as a significant and appropriate way to their culture. Such an engagement design invites the users to invest more time with the tool and makes the learning or language preservation process of the indigenous languages seem less complicated and more fun. Hence, this good experience is probably a motivation booster for users and their language learning goal commitment.

RQ3: *How do SALIN's offline capabilities and culturally relevant features impact the adoption and effectiveness of the system in indigenous communities?*

Offline accessibility also had a good score, a mean of 3.45. This indicates that users value using SALIN even in places where the internet is weak or there is no connection at all, which is a typical problem in many indigenous communities. Together with the cultural relevance of the content and the design, these offline features make SALIN not only a more accessible but also a more reliable tool. Such a combination is a powerful driver of both initial and sustained usage as people recognize that the app is

addressing their practical needs and, at the same time, it is culturally congruent.

6.2 Contributions and Innovation

This research highlights the importance of culturally sensitive and human-computer interaction (HCI) principles in technologies for preserving languages. What makes SALIN different is the combination of real-time, offline translation with an interactive, culturally relevant interface. It's very straightforward and accessible: it makes language speakers who are proficient in the community and those who are not, communicate on an equal level and engage in endangered languages in respectful and supportive ways of learning. The system shows how a simple design can have a significant impact, for example, in language preservation and communication facilitation between cultures.

6.3 Limitations and Future Work

This research only considered local natives and travelers in Tupi, South Cotabato as its participants; thus, the findings might not apply to other populations. Studies concerning a broader demographic and continuation of use of the language, as well as passing down the culture through the language, are required. Improvements in the SALIN language resource could also be the next steps for development, such as more language data, user manuals, and individual learning routes to facilitate usage and language preservation.

7.0 CONCLUSION

7.1 Summary of Key Findings

Usability, engagement, and satisfaction of the SALIN system were highly acclaimed by both native speakers and non-speakers. According to them, the system became more acceptable because of its culturally sensitive design, accessibility, and real-time and offline translations, which they could trust when interacting with both individuals. The research discloses that the user-centered design of SALIN and the accessibility features contribute to its effectiveness in motivating the saving of native languages and facilitating cross-cultural communication.

7.2 Final Remarks

In conclusion, SALIN is a well-functioning, user-friendly and culturally empathetic tool that assists individuals to interact through different languages and thereby, share meaningful conversations. The research highlighted how crucial it is to consider cultural aspects when applying human-computer interaction principles in tech design. As a result of continuous enhancements driven by user suggestions, particularly in terms of system responsiveness and user-friendliness, SALIN is an extremely promising device not only to empower the indigenous communities further but also to gain popularity among a larger number of diverse users.

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APENDICES

Appendix A: System Usability Scale (SUS) Likert Scale Survey Questionnaire

Functionality

Questions	Ratings			
1. The translation features worked as expected	1	2	3	4
2. It is easy to understand how the system functions.	1	2	3	4
3. The system responded quickly to my inputs (text or speech).	1	2	3	4
4. I felt confident using the translation and learning features.	1	2	3	4
5. The integration of different features (translation, learning, cultural content) is smooth.	1	2	3	4
6. I did not experience significant technical issues while using SALIN.	1	2	3	4
7. All major features worked as I expected.	1	2	3	4
8. It is easy to navigate through the different functions of the system.	1	2	3	4
9. The feedback provided by the system helped me use it effectively.	1	2	3	4
10. I encountered obstacles or complications while using SALIN's features.	1	2	3	4

Accuracy

Questions				
1. The translation's accuracy reflects the Blaan and Tboli languages.	1	2	3	4
2. The pronunciation guides were helpful and accurate.	1	2	3	4
3. The system correctly translates cultural expressions and idioms.	1	2	3	4
4. I trust the translation accuracy during real-time conversations.	1	2	3	4
5. The system consistently provides accurate translations without major errors.	1	2	3	4
6. The translated cultural content preserves its original meaning.	1	2	3	4
7. I am confident using SALIN translations in real social interactions.	1	2	3	4
8. The system reduces misunderstandings across indigenous and non-indigenous users.	1	2	3	4
9. I want to keep using SALIN because of its translation reliability.	1	2	3	4
10. Overall, I am satisfied with the accuracy of SALIN's translations.	1	2	3	4

Accessibility

Questions				
1. The interface icons, buttons, and labels are clear and culturally appropriate.	1	2	3	4
2. SALIN is easy to use on mobile devices (smartphones, tablets).	1	2	3	4
3. Offline accessibility works well in low or no-connectivity areas.	1	2	3	4
4. Instructions and help features are easy to locate and understand.	1	2	3	4
5. The system loads quickly and without errors.	1	2	3	4
6. I can easily switch between languages and system features.	1	2	3	4
7. The system accommodates both new and experienced users.	1	2	3	4
8. I rarely experience slow responses or technical issues while using SALIN.	1	2	3	4
9. SALIN is accessible and usable regardless of my location or device.	1	2	3	4
10. Overall, SALIN is easy to access and navigate.	1	2	3	4

Appendix B: Descriptive Survey Questionnaire

SALIN: A Real-Time Translation and Preservation System to Enhance Indigenous Communication and Cultural Heritage in Tupi, South Cotabato

1. How effective is the real-time translation in improving communication?
   ☐ Not At All ☐ Slightly ☐ Very Much ☐ Extremely

2. How helpful is offline accessibility in using SALIN in low-connectivity areas?
   ☐ Never ☐ Rarely ☐ Often ☐ Always

3. How engaging do you find SALIN's culturally sensitive and interactive design?
   ☐ Very Poor ☐ Poor ☐ Good ☐ Excellent

4. To what extent does SALIN increase your motivation to learn or preserve indigenous languages?
   ☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree

5. How satisfied are you with your overall experience using SALIN?
   ☐ Very Dissatisfied ☐ Dissatisfied ☐ Satisfied ☐ Very Satisfied