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A Feature Survey of Mobile-Assisted Language Learning Apps for Kichwa Language Revitalization: Gaps and Areas for Improvement

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Abstract

As technology becomes embedded in our daily lives and Indigenous languages face extinction, the need for technological solutions to preserve them becomes increasingly urgent. Studies that address gaps and areas for improvement in Indigenous mobile-assisted language learning (MALL) are required to intentionally and successfully empower a new generation of Indigenous language speakers. In the case of the language Kichwa, preserving cultural identity and worldview goes hand in hand with language acquisition. This non-experimental study sought to survey existing Kichwa language learning mobile applications, determining content and usability rubric criteria by which to assess features of the apps. Graded content criteria quantified the degree to which each app was culturally relevant, was aligned with language learning and teaching approaches, included interactive exercises, provided immediate feedback, and was gamified. The rubric also included ease-of-use criteria regarding: the user interface, offline access availability, audio quality, image quality, assessment, progress tracking, technical support, and the inclusion of additional resources for Kichwa language teachers. The analysis of graded rubrics revealed significant areas for improvement, especially regarding the authentic integration of culture with grammar and vocabulary teaching pedagogy. The rubric criteria may contribute to discourse around assessment of indigenous language learning mobile applications, and the findings will inform future technological efforts to revitalize the Kichwa language.

Keywords: *Kichwa, mobile-assisted language learning (MALL), feature survey, language revitalization, indigenous language ICT*

1. Introduction

Kichwa is the largest Indigenous nationality in Ecuador, representing approximately 800,000 people [1]. The ancestral language Kichwa, derived from Quechua and spread through the central and northern Andean region with the expansion of the Incan empire, is an official language of Ecuador since the enactment of the 2008 constitution. Despite efforts made to preserve and promote the use of this language, Kichwa has faced the threat of endangerment due to Spanish language dominance in the education system, relational spaces, and professional life, and with it, the minoritization of the Kichwa language [2,3]. In fact, one out of every five family members of the indigenous group have lost Kichwa as their native language [2]. While dominant languages have proliferated as the use of technologies increases, assisted by Mobile-Assisted Language Learning (MALL), the number of Indigenous language speakers in Ecuador declined from 4.8% to 3.9% from 2010 to 2022 [1].

Revitalizing Indigenous language through technology requires an understanding of the deep connection between Indigenous culture and language. Kichwa culture shapes teaching and learning within communities, and these pedagogies inform the needs of Kichwa users in digital spaces. In Amazonian Kichwa communities, knowledge is transmitted through daily interactions with nature, oral storytelling, experiential learning, community rituals, and intercultural exchanges [4]. This aligns with Amazonian Kichwa cultural expression, as it manifests in mythical narrative and spiritual beliefs, artistic forms and symbolic relationships with the land [5]. In Kichwa communities from the highlands, although cultural practices differ, how knowledge is transmitted largely remains the same: through generational storytelling, traditional practices (agriculture, shamanism, medicine) and artisanal crafts (art) [6]. In other words, language becomes the way culture is transmitted, and language is born from and contextualized within culture; culture and language exist interdependently, and therefore, we cannot separate language from culture.

Consequently, removing Indigenous language from its authentic context in the form of websites and mobile applications is understandably controversial. Western culture is implicit in the digital world, a world created by occidental logic; as such, digital tools often use pedagogical practices informed by Western culture that may not be applicable to Indigenous languages [7]. When these pedagogical

approaches are not used in tandem with community-based approaches, digital tools risk turning the language into a linguistic artifact, sterilized and unused [8]. Without culturally appropriate design and the inclusion of culturally relevant material, these tools further the loss of language through fomenting the loss of culture [9].

Although there is debate on when and how digital tools should be used for Indigenous language preservation and revitalization, there is consensus that insufficient Indigenous language presence online has negative effects. The 5 most used languages on websites make up 70.4% of the total content, English leading with 49.4% and Spanish following at 6% [10]. The digital space reflects a world that has been and continues to be colonized, and due to the increased presence of these colonial languages, a neocolonial process is taking place: “Globalized communication has been known to give rise to more homogenous cultures, reflecting the economic and cultural influence of certain actors whose lifestyles, fashions and trends are adopted across the world. The consequences of this are the loss of linguistic variety” [11]. The loss of culture leads to a loss of language, which creates more colonial language speakers. In a sociolinguistic survey, 64.3% of Kichwa people in Imbabura Province reported using social networks [12], a number that will presumably rise, while in the Salacaca Kichwa community, Spanish holds more prestige in public and digital spaces [13]. These two findings combined paint a troubling picture of a notable deficiency of Kichwa language on digital platforms, potentially leading to further acculturation.

The complexity of choosing criteria for Indigneous language learning apps derives from balancing pedagogies—pedagogies accepted within MALL, necessary due to the digital context, and culturally-grounded indigenous pedagogies. Indigenous nations will ultimately decide what this mixture looks like, and to what extent digital spaces will attempt to reproduce what knowledge transmission and intergenerational interaction looked like before these technologies began to form part of daily life. The delicate balance that is required must not be down-played or minimized.

Research is needed regarding the effectiveness of technological strategies for Indigenous Language Revitalization (ILR) to put the little funding these efforts receive to good use [7,14]. To address this need, this non-experimental study proposes a set of criteria for evaluating Kichwa learning mobile applications. Through a feature survey, gaps and areas for improvement in existing Kichwa language learning apps are identified by grading their content, usability, and cultural relevance. The findings of this study are designed to start a conversation about app evaluation criteria that can guide the development of future high-quality, pedagogically-sound and culturally informed technological efforts for Kichwa revitalization.

2. Theoretical Framework

Creating criteria for Indigenous language mobile applications demands a nuanced process of balancing language structures, cultural context and expression, and feasibility within a limited budget. Although dominant language MALL criteria were considered due to the digital context (2.1), criteria from other indigenous language apps were closely delineated (2.2) to consider more culturally informed criteria.

2.1 Evaluation Criteria for Dominant Language MALL

Assessment criteria for dominant language learning apps are still widely debated. To define the effectiveness of MALL, the criteria may include a graded score [15], may be determined by the number of criteria that an App meets [16], or may be assessed using a rubric [17]. Proposed criteria include the software effectiveness [18], the pedagogical design [19]; language-learning potential, learner fit, positive impact [20]; graphic design, the level of language teaching, curriculum authenticity, the coverage of the four skills of the language, and the pedagogical design of the activities [21]. Due to the varied nature of proposed criteria, there is an unrealized necessity to formulate standards that can help researchers and developers to have a clear picture of exactly what a successful language learning mobile app entails [22].

The most relevant dominant language MALL assessment framework to the present study is Reinders and Pegrum’s [23]. This framework involved three main axes: user features, pedagogical activities and the teacher’s role. User features refer to mobile technology: connectivity, mobility, and ability to access and process information. Therefore, an app designed to learn any language should provide the user access to the activities and content at any time, especially amongst populations with limited internet access. Another axis of this framework refers to the app’s pedagogical tasks, emphasizing the need for activities to be aligned with the second language acquisition approaches, facilitating input, output,

and practice [23]. Thus, an app for Indigenous languages should be aligned with language acquisition approaches, providing the user the opportunity to interact with the language with varied activities designed to interact with the target language and practice it through productive skills. Perhaps the main axis of this framework, and one that is not completely applied in this study, is the teacher's role [23]. According to the researchers, teachers should act as facilitators, using an app to create better learning experiences. Based on this framework, an app for Indigenous language learning should be designed as a tool that can be used by language teachers to monitor and accompany student users, fomenting real communication in the target language.

Through the lens of technological criteria and pedagogical criteria, these evaluative frameworks provide a starting point from which to build assessment items for Indigenous language mobile applications. They collectively suggest, in terms of technological criteria, a focus on the ease of use of the user interface, offline access, sound and image quality, and technical assistance; and in terms of pedagogical criteria: relevance of content, increased difficulty in content, interactivity of activities, gamification, assessment and immediate feedback. Although there are limited ways to measure the teacher's role in standalone apps, a dichotomous criterion of additional materials for teachers and community leaders may partially address this issue, providing flexibility for potential classroom or community use.

2.2 Evaluation Criteria for ILR MALL: Research Gap

Even though interactive mobile applications can be used to learn a language, there is limited systemic analysis of the existing mobile applications for Indigenous languages in Latin America. As such, there are no established criteria to assess Indigenous MALL in the region.

In a study taking place in Canada and the mainland US, Cassels and Farr [24] used a survey to examine the 32 indigenous language learning apps with criteria based on pedagogical relevance, accessibility, disadvantages, and cultural considerations among other criteria. The researchers highlight the importance of similar research since the literature in this topic is scarce and the information can help developers to create more significant and culturally relevant apps.

Another study from Canada on a nêhiyaw language learning app explains what crucial questions to keep in mind when developing IRL apps in terms of the framework of lessons and activities and app evaluation criteria [25]. User assessment criteria were organized into 3 overlapping categories: Device Aspect, Learner Aspect and Social Aspect. The Device Aspect includes criteria such as navigation, intuitiveness and access to help; the Learner Aspect includes criteria such as the effectiveness of audios, images and mini-grammar lessons; the Social Aspect includes criteria such as privileging and supporting Indigenous language and culture as well as how well the app prepares students to communicate. This study provides a robust framework for Indigenous App evaluation, though, as it is based on one app and one Indigenous language and culture, adjustments may be required for other types of apps developed for different Indigenous languages and cultures.

In Peru, a study measured how a mobile app helped children learn the basics of their parents' native language and strengthen their cultural identity [26]. The results were positive, showing the app to be a relevant, usable, and accessible educational tool for both institutions and ethnically Indigenous Huitoto families. Since the goal of this study was a localized measure of one app's effectiveness, only students' progress and results were analyzed. As such, criteria were not organized into a formal rubric that could be used to compare applications across different languages and platforms.

Similar studies on apps for Indigenous Language Revitalization could not be identified in South America. This gap is particularly concerning given the cultural and linguistic diversity of the region and the increase in app development. This study proposes a rubric to analyze Kichwa language learning apps to provide developers with considerations when designing a pedagogically appropriate and culturally relevant app, providing criteria that may be adjusted as needed to evaluate other indigenous language learning apps in a South American context.

Research questions:

- What are the features of an Indigenous language learning app?
- What are gaps and areas for improvement for Kichwa language learning apps?

3. Methodology

This study employed a rubric, based on the theoretical framework, that was designed to examine the mobile applications for Kichwa language learning. The rubric is composed of 15 criteria with

quantitative and dichotomous categories. A quantitative 0-to-4-point scale was employed for pedagogical criteria where zero is “never” and four is “always”.

In the category of quantitative scoring, the first pedagogical criterion in the rubric is *cultural relevance* to determine if the images, dialogues, vocabulary, and content included authentic Kichwa cultural elements. The second, *relevant content,* considers if the language is taught within, and is applicable to, real life contexts. The third criterion, *content coverage,* was established to examine if the content includes a variety of topics (grammar, vocabulary, expressions) and if the content increased in difficulty as the user progressed. *Interactive activities*, the fourth criterion, analyzes if exercises encourage active language practice, including tasks/activities based on second language acquisition approaches. The fifth criterion, *immediate feedback,* measures the frequency of feedback provided, and it correlates with the sixth criterion, *assessment,* included to see if students were given ample opportunity to reflect on their learning through summative assessment.

The dichotomous grading included Yes/No answers where “Yes” was assigned a 1-point score and the “No” was assigned 0 points. Dichotomous grading was used to mostly examine technological criteria such as user interface, availability on multiple platforms, offline access, audio quality, progress tracking, technical support, and additional resources. The last criterion values apps that connect teachers to a platform or other pedagogical resources that may be used in a classroom setting. The highest total potential score was 31 points.

This analysis was carried out from September 2024 to May 2025. Apps were searched for by typing in “kichwa app” and “quichua app” into Google and Bing search engines. The first 6 pages of each of the 4 search results were reviewed, creating a list of 14 apps: Alli Kichwa, Otavalo Rimay, Diccionario Kichwa, Kichwa Chaupi Urcucuna, Radio Alianza Kichwa Imbabura, Quichua Imbabura 2016, Sumak Kichwa Wawa, Kichwa Wayrapi, Guia Quichua, Kichwa Shimi, Runashimi UN, Yachana App Kichwa Tena, Himnario Kichwa, and Kichwa Yachakunchik. From this list, the researchers selected apps for analysis that were available to download and install from Play Store or a website onto phones with Android operating systems (the most common operating system in Ecuador). Each app was evaluated using the rubric described above and was given a score out of 31 points, allowing for a clear picture of the strengths and weaknesses of each app.

4. Findings & Discussion

Unfortunately, many of the 14 apps initially selected were omitted from the study due to technical issues. Otavalo Rimay was found on Google, and even though the installer is available, it was outdated and not compatible with current Android versions, making it impossible to install. Kichwa Shimi, Runa Shimi UN, and Yachana App Kichwa did not have available installers as they had not been updated. Many of the apps were created as thesis projects and therefore their versions were outdated. This indicates a lack of ongoing maintenance, limiting their ability for improvement and usefulness, and evidencing that the development of this type of technology for ILR often lacks a long-term sustainability model.

Several apps were also omitted due to lack of relevance. Radio Alianza Kichwa Imbabura, Kichwa Wayrapi, Diccionario Kichwa, Himnario Kichwa, Qichua Imbabura 2016, Kichwa Wayrapi, Kichwa Chaupi Urcucuna, and Kichwa Yachakunchik were part of the results provided by the search engine, but since they are radio station apps, dictionaries, or biblical apps in Kichwa, they were not designated as language learning apps. Although apps of this nature are valuable as language learning resources, it is not their main purpose.

Only three language learning apps were selected for the analysis with the rubric. A close examination of the apps revealed differences among them in terms of functionality, quality and cultural relevance.

Table 1. App Scores per Criterion

	Apps and Scores		
Criteria	Alli Kichwa	Sumak Kichwa Wawa	Guia Kichwa
Cultural relevance	0	4	4
Relevant content	2	3	3
Content coverage	2	2	3
Interactive activities	2	3	2

Immediate feedback	2	0	0
Gamification	3	2	2
User interface	1	1	1
Offline access	1	1	1
Online availability	1	1	1
Sound quality	0	1	1
Image quality	4	2	2
Assessment	4	2	2
Progress check	1	1	0
Technical assistance	0	0	0
Additional resources	0	0	0
Total	23	23	22

Alli Kichwa obtained a score of 23/31. This app is largely a vocabulary learning app with quiz games to test knowledge, principally using gamification as a second language acquisition approach. Combined with high quality images and some Kichwa cultural elements, mostly in an oral history listening section, the app provides a good experience for the users. The app includes summative and formative assessment activities, allows users to see their progress, and includes content that is relevant and applicable in real-life contexts. However, there are some areas that need improvement such as the cultural relevance of images and variety in interactive activities. The app could include characters and images aligned with the Kichwa culture and activities that allow users to be active participants in the language; for example, a section could be included where the user pronounces some expressions or writes some phrases. The sound quality is another area that needs improvement, which is especially important during the listening activities. Finally, this app, at the moment of evaluation, didn't provide technical support to the users. It also didn't integrate additional resources, such as a web page or platform, for teachers or community leaders.

Sumak Kichwa Wawa obtained a score of 23/31. To use this app, the user needs the storybook Sumak Kichwa Wawa which comes with the Kichwa text and illustrations of oral histories. Pointing the app at specific pages, the user can listen to the story and view the illustrations in 3D. The images and vocabulary are culturally relevant and culturally contextualized. The content is interactive in that it requires the user to interact with the text; however, the content does not increase in difficulty, and it does not provide examples on how to use the language in other contexts. The activities are not varied, and it could use more gamification and activities based on language teaching pedagogy. There is no technical assistance for users, and it does not have additional resources for Kichwa language teachers.

Guia Quichua obtained 22/31. This app stands out in cultural relevance, content relevance and content coverage as it incorporates Kichwa cultural elements and has well-structured content that increases in difficulty as the user progresses. There are some interactive activities such as matching and selecting correct answers, but the app still stands to improve on the inclusion of more activities based on language teaching approaches that provide the user with real, contextualized language use. The app also has audio, and the user can use it offline; however, the app does not provide technical assistance or any other additional resource that can be used by Kichwa language teachers.

The 3 apps mentioned above provide a wide set of vocabulary words, phrases and grammatical structures. However, there is the need for improvement in increasing content complexity, better content organization, and activities that balance practice of the four language skills. There are many more resources for lower levels of Kichwa than for intermediate or advanced levels, which leads to the question of whether some apps were made as symbolic gestures rather than real language learning apps. There must be a focus on communicative competence to effectively revitalize Indigenous language.

Additionally, as explained in the theoretical framework, Indigenous language learning mobile applications need to be grounded in community; otherwise, they inevitably become artifacts of a language that once was. However, exactly how language learning technology can be integrated into Indigenous communities is up for debate. Developers might consider the inclusion of teacher [23] and/or parental platforms, allowing for the app to be used by Kichwa language teachers and

community members in order to strengthen language use amongst youth. The evaluation of these proposed platforms and their correlation with communicative competence amongst its users is an important future topic of research. The integration of Indigenous MALL within community efforts is the most important yet the most difficult goal to achieve.

The results of this study demonstrate the existence of a gap between the Indigenous language mobile applications and the real needs of users. While some applications demonstrate a high quality of audios and images, or a good implementation of language teaching approaches and cultural elements, most of the applications need to be improved in all areas. App developers should be conscience of certain important criteria such as *cultural relevance* and *content relevance* by including visual and auditory representations of authentic Kichwa culture. This is not only important as a language teaching approach, but also to privilege a minoritized language and culture (Koole et al.'s Social Dynamic). In terms of language learning criteria, Indigenous language learning apps should provide immediate feedback as well as progress tracking, for increased motivation and self-assessment. A lack of technical support is also troubling, creating the impression that many of these apps were one-off projects that do not receive maintenance.

Although Indigenous MALL is complex, the discussion around it is necessary. As our use of technology increases and the Kichwa language becomes further endangered, the urgency for technological support for ILR will only rise in demand. Localized frameworks must continue to be proposed to provide app developers with benchmarks to consider.

5. Conclusion

The evaluation of Kichwa language learning apps not only shows the current state of these resources but also identifies critical areas for future developments, highlighting untapped potentials in this field. It is essential to create an evaluation framework for Indigenous language learning app developers that shows a path for applications that are technically feasible, pedagogically-sound and culturally grounded. With further developments in technology such as AI, researchers, activists and community leaders must tap into the full potential of MALL for ILR, or risk witnessing the further endangerment of these valuable languages.

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