RIWÍ

“Our voices, our knowledge.”

Executive Summary

Education in indigenous communities in Mexico faces significant challenges, such as inequality in access to education resources, linguistic barriers, and cultural disconnect in current teaching methods. These issues often hinder the academic and personal development of students, contributing to higher dropout rates and limited opportunities for future advancement. Moreover, traditional educational approaches often overlook the unique cultural and linguistic heritage of indigenous peoples, leading to a sense of alienation and disconnection from formal learning environments. Riwí emerges as a comprehensive solution to address these issues by combining technological innovation with the respect and promotion of cultural diversity and aims to bridge educational gaps by making quality resources accessible even in areas with limited or unstable internet connectivity.

Riwí is a mobile educational app designed for students in indigenous communities. Its goal is to provide access to educational content that is inclusive, culturally relevant, and technically adapted to the connectivity limitations of these regions. The app features multilingual support, including Spanish and indigenous languages, to ensure that students can learn in their mother tongue.

Challenge faced

With the intention of finding ways of making education more inclusive, we identified many areas of opportunity where traditional education was lacking by failing to provide quality education to many vulnerable communities, but definitely one of the most critical is the lack of quality education for indigenous communities.

In our investigation, we found out that in México, Only 1 out of 10 teenagers who speak only an indigenous language and not Spanish attend school, and around 50% of the teachers do not have a bachelor's degree. On top of that, in all of the evaluations that measure academic achievements made by the INEE, for all subjects for all ages, kids who go to indigenous school are placed at the very bottom of the list under any of the circumstances listed above, which could explain why illiteracy on indigenous communities is five times greater than on other places.

All of this data indicates that quality education is not reaching indigenous communities, and unfortunately, the language barrier and lack of technological advancements have prevented students from these regions to aspire a higher education in more educationally developed schools.

Additionally, traditional education systems often rely on teaching methods that are not adapted to the specific needs and realities of indigenous students. For example, classroom environments may prioritize rote memorization and standardized testing, which do not align well with indigenous pedagogical practices that emphasize experiential learning, storytelling, and community engagement. This mismatch can create an environment where students feel disconnected from the material and unmotivated to pursue their education.

The analysis was carried out in the two essential steps to understand the challenges related to education in marginalized areas, specifically in indigenous communities and other vulnerable populations.

1. Identification of the General Problem

- Education in marginalized areas:

- Students in these regions face barriers such as a lack of educational resources, poor infrastructure, and teaching methodologies disconnected from their cultural reality.

- Impact:
  - This results in low levels of digital literacy, limited access to modern educational tools, and fewer opportunities for economic and social development.

2. Analysis of Specific Factors

- Causes of the Problem
  - Lack of technological infrastructure: Poor connectivity in rural areas.
  - Low digital literacy levels: Lack of programs to teach basic digital skills.
  - Limited personalization: Existing platforms do not adapt to cultural needs or diverse learning styles.

- Access to Technology
  - Adaptive resources: Educational materials in indigenous languages.
  - Multicultural and multilingual content: Lack of representation of local cultural richness.
  - Gamification: Need for interactive elements that promote continuous learning and motivation.

- Business model:
  - We intend to approach Mexican organizations and programs whose primary objectives are centered on promoting the well-being and ensuring the continuity of education for indigenous communities. By presenting them with the Riwí project, we aim to secure their monetary support to facilitate its implementation. This initiative has the potential to reduce costs allocated to this sector while proving to be an effective tool, particularly for reaching remote areas and supporting children who speak only an indigenous language. By instance, the Programa de Apoyo a la Educación indígena (PAEI), which focuses on contributing to the access and development of academic levels for people from indigenous communities between the ages of 5 and 29; and the

Programa de Inclusión Social (Prospera), which impulses social development by helping vulnerable families through food, health and education support. On another side, according to the INEE it's known that the Mexican government directs a portion of the public spending on the development of proposals that strengthen indigenous languages (as was the case in 2015, year in which 155.3 millions of mexican pesos were designated for this area). Knowing that one of the main elements of Riwí is that same one, it could also be fundraised from that category.

- ➢ The app is intended to be completely free of cost for students, educators and schools, knowing that its purpose is to reach children in a vulnerable context.

For all of these reasons, we have found that it is critical to create a way of providing quality education that adapts to the unique context of its students, and investigated ways of achieving this.

To define the solution, we posed the following **key questions:**

1. How can we leverage emerging technologies to create inclusive educational experiences that address specific learning needs in marginalized communities?
2. How can we develop a universal learning platform that promotes equity and provides equal opportunities?
3. How can we foster human flourishing through disruptive education based on technology, reducing the digital gap?

Solution

Given the identified problem, we developed a solution focused on creating an accessible and culturally relevant educational tool for indigenous communities. To address these challenges, we created a mobile app called Riwí, which provides educational content tailored to the needs and traditions of these communities.

In the following link, you'll find more details about the design of our solution, including the app's key features and how we address issues of connectivity and cultural relevance in indigenous education: Link to the design on Canva

The app is designed to facilitate learning in areas such as mathematics, science, and reading comprehension, with content available in multiple indigenous languages and functionality that works even without internet access. Its usage was designed for children aged 12 to 18 years old from indigenous communities, although it is perfectly possible for any kid from any context to use it, as long as they know Spanish, which will be the official language.

Riwí will also be translated into different indigenous languages, which will keep expanding as it grows. For the start though, the first indigenous language implemented will be Tarahumara, which is the official language of the Raramuri, a indigenous community from the north of México, mainly from the state of Chihuahua.

Why Focus on Indigenous Communities in Chihuahua?

Chihuahua is home to indigenous groups such as the Rarámuri, Pima, Guarijío, and Tepehuan. These communities represent about 6% of the state population, but they face significant barriers to quality education. A 2020 study revealed that only 28% of rural indigenous households in Mexico have internet access, and even fewer own digital devices such as computers or tablets. This digital divide exacerbates inequalities in educational opportunities and outcomes. By focusing on these local communities, Riwí will tailor educational content to their cultural contexts and needs while addressing the barriers of connectivity and limited resources. The initial rollout in Chihuahua provides a manageable scope, enabling the application to refine its features and impact before scaling to broader indigenous and rural communities across Mexico.

Purpose

The "Riwí" application is designed to address the educational and technological challenges faced by indigenous communities in Chihuahua, starting with a focus on Mathematics and Sciences. These areas are prioritized because Mexico consistently underperforms in international assessments like the Programme for International Student Assessment (PISA). For instance, the 2022 PISA report reveals that Mexican students rank near the bottom in these subjects, with only 9% achieving proficiency levels 4 or higher in

Mathematics, compared to the OECD average of 26%. This reflects gaps in foundational knowledge crucial for academic and career success.

Designed Prototype

Our demo showcases an intuitive and visually appealing app for android devices that will be fully translated into two languages at the moment of launching, Spanish and Tarahumara, which is the official language of the indigenous community we will be initially focusing on. For the prototype, we created an interactive visual representation, using the tool Figma, of how Riwí will look at the end of its development, with multiple indigenous languages to choose from, and the main three areas of study (mathematics, science and reading comprehension) deeply fledged.

Features of the Prototype

Content Design:

- Subjects Covered:
    - Mathematics: Lessons will focus on basic arithmetic, geometry, algebra, and problem-solving techniques, using examples relevant to everyday life and indigenous contexts.
    - Sciencies: Topics will include physics, biology, and environmental studies, emphasizing local ecological knowledge and sustainability.
    - Reading comprehension
- Culturally Relevant Approach
    - Content will incorporate indigenous knowledge systems, such as traditional farming methods or local biodiversity, to connect educational concepts with students' lived experiences.

1. Technology and Accessibility
    - ❖ Offline Access: Downloadable lessons and quizzes to address limited internet access.

- ❖ Device Compatibility: Optimized for low-cost smartphones, ensuring inclusivity for communities with minimal technological resources.
- ❖ Bilingual Interface: Lessons available in Spanish and Rarámuri (or other indigenous languages) to respect linguistic diversity.

2. Gamification and Engagement
    - ❖ Interactive quizzes and rewards (e.g., virtual coins or badges) will keep students motivated.
    - ❖ Collaborative challenges encourage group learning and problem-solving.

Scalability

Why Mathematics as a Starting Point?

Mathematics serves as the foundation for critical thinking and problem-solving, skills essential for academic success and everyday life. In Mexico, the need for improvement in mathematics is urgent; according to the PISA 2022 results, the country ranks among the lowest globally, with only 9% of students achieving proficiency in mathematics compared to the OECD average of 26%.

Mathematics provides measurable outcomes, making it an ideal entry point to evaluate Riwí's success in improving academic performance.

Long-Term Plan for Scalability

1. Expansion of Subjects:
    - After successfully rolling out Mathematics and Science, *Riwí* will expand to include additional subjects:
    - Literacy and Reading Comprehension: Addressing another critical area of underperformance highlighted in PISA results.
    - History and Culture: Strengthening indigenous identity by integrating local history and traditions.
    - Vocational Skills: Preparing students for employment opportunities by teaching practical skills such as basic financial literacy and sustainable farming techniques.
2. Integration of More Languages:

- Starting with Rarámuri (Tarahumara), *Riwí* will gradually incorporate other indigenous languages such as Nahuatl, Mixtec, etc., reaching a broader audience while preserving cultural heritage.

3. Regional Expansion:
    - Phase 1: Begin in Chihuahua, where indigenous communities like the Rarámuri are concentrated, and refine the app based on local feedback.
    - Phase 2: Expand to other Mexican states with significant indigenous populations, such as Oaxaca and Chiapas.
    - Phase 3: Scale the app to underserved communities across Latin America, adapting content for local languages and contexts.
4. Partnerships and Funding:
    - Partner with NGOs, government agencies, and international organizations to secure funding and expand distribution.
    - Collaborate with technology providers to ensure device accessibility in remote areas.

Implementation Plan

1. **Pilot Roll Out in Chihuahua**
    - Develop Mathematics and Science modules for primary and secondary levels.
    - Partner with local schools and community leaders to test the app.
    - Distribute affordable devices to households lacking access.
2. **Evaluation and Feedback**
    - Gather data on user engagement, learning outcomes, and cultural relevance.
    - Address technical or pedagogical issues based on feedback from pilot users.
3. **Scaling**
    - Expand content to include literacy, history, and vocational skills.
    - Roll out in other indigenous communities across Mexico, leveraging partnerships with NGOs and government agencies.

Pitch

In Mexico, only 1 in 10 teenagers who speak an indigenous language and not Spanish attend school (UNICEF, 2018). 47% of indigenous language speakers are educationally behind, and 70% live in poverty. This raises a critical question: how is it that, as a society, we are depriving young people from this sector not only of their right to education but also of the quality of life that inherently comes with it? And even more importantly, how can we address this with an effective, accessible solution that respects their traditions and customs as indigenous people? We are Riwí.

Let's start with some facts. Across Mexico, 2 out of 3 students are not meeting the expected results in the PISA test for mathematics. Additionally, in 2022, Mexico ranked the third worst in reading comprehension and mathematics, and last in science. There are 81 countries in this ranking. It is needless to say that the situation is critical and severe.

So, what does Riwí propose? Essentially, it is an adaptive learning mobile app where we will deliver content in Spanish, Science, and Mathematics to students, which will be translated into a wide range of indigenous languages, with adequate translations reviewed by professional translators, so that their speakers can access it. By providing adequate education, students will be given the opportunity to attend university and improve their living conditions.

The objectives of the project are to break down linguistic barriers, as well as to respect indigenous languages. For this, the cultural context of the students will be taken into account by integrating regional music and sounds, as well as using traditional legends. Another key feature is the gamification of the media. An important issue in current education is that it corresponds to the needs of centuries past, becoming obsolete in its practicality, as it largely consists of children memorizing and imitating processes without truly reasoning or understanding what they are doing. Through digitalization and the wide range of reach that it offers, we will offer a fun and interactive approach, in which we will ensure students are more immersed in the process of learning, as they will view it as a video game.

As for the app's functioning, the user creates an account and selects their preferred language. Based on the user's education level, a personalized learning plan is generated, tracking progress and identifying areas for improvement as they advance. For monetization, we will seek support from local organizations dedicated to helping indigenous communities.

These organizations, if willing to back the project, can help adopt it as a method to reach these areas, creating a significant impact on future generations by providing them with what we believe is the most essential tool for success: education. And, through our abilities as Computer Science Engineering students, dedication and passion, we are going to make that happen.

➔ Link to the presentation used in the pitch at DigiEduHack 2024, Stage Chihuahua: Click here to view the presentation

Link to the video of the pitch presented at DigiEduHack 2024, Stage Chihuahua:
➔ Click here to watch the pitch video

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