

Abstract

We propose the use of technologies to improve verbal fluency using tongue twister games in the Awajun language is proposed, and in turn contribute to the development of other children's skills. Artificial intelligence (AI) will be used; specifically, text-to-speech AI models to create tongue twister practice exercises and speech-to-text AI models to assess progress in improving verbal fluency. In addition, teaching methods will be developed using **vocal techniques** (intonation, breathing, volume, diction), encouraging **motivation** and creating a **trusting environment** in the learning of tongue twisters. The project will be applied to 40 children identified with verbal fluency problems in 1st, 2nd and 3rd grades from a school in Kusu-Kubaim, in the district of Cenepa, Condorcanchi Province, Amazonas Department, Peru.

Introduction

Education in native communities such as that of Awajún (in the departments of Amazonas and San Martín in Peru) presents a series of difficulties in which a deficient educational system stands out due to several factors such as: (i) the lack of teacher training, (ii) the high labor turnover of teachers, temporarily hired that prevent the continuity of teaching projects, (iii) the scarce or non-existent transportation infrastructure that hinders teachers' access to their educational centers in a programmed manner. All this contributes to a teaching system with many problems, one of them identified for this project is lack of verbal fluency.⁽¹⁾

We specifically analyze the case of educational institution No. 16741, in the Kusu-Kubaim community, where it has been identified that 50% of children in 1st, 2nd and 3rd grades (40 out of 80 children) have a verbal expression problem and vocalization difficulty. In many cases, this difficulty prevents children from expressing themselves freely, participating in institutional and cultural events, contributing to their low self-esteem due to this linguistic condition. However, there are studies in Ecuador and Peru that suggest the use of tongue twisters can improve not only communication skills, but also children's creativity and self-esteem⁽²⁾ particularly in native communities such as the Awajún.

Methodology and Materials

An experimental method is proposed. This will involve teaching 100 tongue twisters in Awajun to the children of the Kusu-Kubaim community during 20 class sessions. This teaching will use AI as a work tool and will be complemented by the usual teaching methods used for this type of activities such as vocal techniques, learning motivation and the creation of an environment of trust between teacher and children.

The AI will be used in an application to be installed on the computer or cell phone that will be provided to the children. The installed AI program will have two components. The first will be an AI text-to-speech model that will allow children to practice listening to the tongue twisters created by the teacher, without the need for the teacher to have to previously record the audio with the content of the tongue twister. The second AI speech-to-text model will be used to evaluate the progress of children's verbal fluency because it will allow the audio created by the child to be recorded with the content of the tongue twister, converted to text and compared the transcribed text with the original text; This comparison will allow a score to be obtained with the errors identified in pronunciation. AI models will be created using previous experiences in minority native languages.⁽³⁻⁸⁾



The methodology of teaching tongue twisters will also use traditional teaching methods for this type of activity. Three types of methods have been identified to be used: (1) vocal techniques that will allow working on intonation, breathing, volume and diction of tongue twisters; (2) the motivation of learning with fun exercises, the positive recognition of children's ideas with patience and understanding; and (3) Building trust between teacher and student that creates a positive environment for the communication of students' ideas and learning experiences. There are previous positive teaching experiences of this type that can be applied in this project.⁽⁹⁾

Thus, the outcomes will be qualitatively and quantitatively measured, using the researcher's analysis, but also the AI performance measurements⁽¹⁰⁾

- The qualitative measurement will be made by the teacher who will be able to measure the degree of improvement in the verbal fluency of the students after the tongue twister teaching sessions.
- The quantitative comparative measurement of the verbal fluency (VF) of children before and after the practice of tongue twisters will be verified by the IA according to the percentage of errors produced in the pronunciation of words and vowels, according to the following formula.⁽¹¹⁾

$$VF = \frac{MWV}{TWV}$$

MWV: mispronounced words or vowels ; TWV: Total number of Word or vowels

Discussion and expected results

The project seeks to implement the use of AI in a minority native language. It is challenging to implement the AI models because there are not many data records (texts and audios) in the Awajún language that could be used to train the AI models. The focus will be on collecting and creating data for the model, using data argumentation techniques, and finetuning that allows the use of AI models trained for other languages.

The results of this project could not be measured exclusively by AI because they could be biased; that is, to include in the measurement in the wrong way the errors of the AI model. That is why the project introduces the qualitative evaluation of results by the teacher who carries out this project.

Conclusions

The project to improve verbal fluency using the teaching of tongue twisters in the Awajún language expects to have positive results in the 40 children, as shown by previous work in this area.⁽⁹⁾

This project is innovative because it makes use of artificial intelligence as a learning tool and evaluation of results for a minority language with little information (written and audio). The results of this work will be measured qualitatively (human being) and quantitatively (Artificial Intelligence) to have a complete measurement without information bias due to errors in one of the components.

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