Introduction

Meet Alex



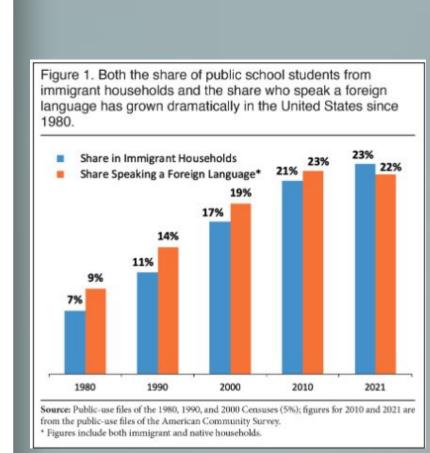
(556) 123-4567			
Course-2024-2025	Credits	GPA	GFA
English as a New Lang.	1.0	_	_
U.S. History	1.0	· -	-
Remedial Mathematics	1.0	_	_
Web Design	1.0	-	
Study Skills Workshop	0.5	-	-
Total Credits Earned	4.5		
Year GPA	3.34		

- Learning English as a second language
- Currently learning English and a programming language
- Struggles with English-based syntax and technical terminology
- Experiences cognitive overload
- Does not participate in Web Design course

The Why?

The Need for TraduCode

As of 2021, over 11 million public school students in the U.S. came from immigrant headed households, with English learners being one of the fastest-growing populations in education. Despite this, there is still an insufficient amount of language and academic support, especially for students, like Alex, facing time constraints in learning both English and academic content before graduation. These constraints are especially evident in CS education. A 2018 study found how non-native English speakers face significant challenges in programming as most materials are English based. These challenges were seen to be cognitive(processing two languages at once), emotional(increased anxiety), and social(reluctance to ask questions due to lack of English fluency.



While many websites offer services for page translations, they generally leave behind a core aspect of a lesson, the example code snippets that demonstrate how programming actually works. This is where TraduCode steps in, by targeting the broader language barriers embedded in programming. There is a lot involved in a single programming language, you have reserved words, method names, class structures, and identifiers, all English-based elements, that form the backbone of coding education. Yet they remain inaccessible to students who are already facing the challenges of learning

in a non-native language.



Example: The code prints "Hello Geek" Else Block" because there is a while (cnt < 3):</pre> print("Hello Geek") print("In Else Block")

No TraduCode

TraduCode

hile (cnt < 3):print("Hello Geek") imprimir("Hello Geek")

TraduCode: Coding Beyond

English

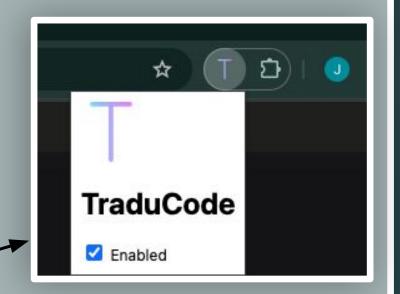
Jardina Gomez Supervised by: Dr.Jami Cotler



How TraduCode Works

Key Features

- Real-Time Code Translation Instantly translates code keywords from English to Spanish
- Tooltip Display Hover over code blocks to see Spanish translation in a popup
- Dynamic Detection Automatically detects and translates both static and dynamically loaded code blocks



- User Control User can enable or disable the extension via a popup UI
- Ad Blocking Blocks distracting ads for a cleaner reading experience





(core logic, content/

background scripts)





tooltips, styling)

HTML & CSS (popup UI,



APIs (messaging, storage,

Chrome Extension

scripting, ad blocking)

What is TraduCode?

TraduCode is a Chrome extension designed to support Spanish-speaking students learning programming by translate programming elements from English into Spanish.

Unlike most page translators, TraduCode is built specifically for computer science education. It scans web pages for code snippets and when a user hovers over a line of code, it displays a popup that replaces key programming elements with their Spanish translation. Allowing students to better understand each line of code without cognitive overload.

Currently, TraduCode focuses on translating Python, the most beginner-friendly language and includes a toggle feature so users can choose when to enable and disable it.

Example Exit the loop when i is 3: Try it Yourself » www.geeksforgeeks.org **Break Statement** The break statement in Python brings control o Cu imprimir ('Current Letter :', letter)

www.w3schools.com

With the break statement we can stop the

Future Work

- Integration of API-Based Translation
- Programming Language Expansion
- Broader Site Compatibility

References

Camarota, Steven A., et al. "Mapping the Impact of Immigration on Public Schools." CIS.Org, 20 June 2023, cis.org/Report/Mapping-Impact-Immigration-Public-Schools.

Najarro, Ileana. "The Growth of Hispanic Students and English Learners Nationwide-in Charts." Education Week, Education Week, 5 Feb. 2025, www.edweek.org/teaching-learning/the-growth-of-hispanic-students-and-english-learners-n ationwide-in-charts/2023/01.

