



Supporting Bi/Multilingual Learners in Computer Science Education

What is the Issue?

Multilingual Learners, or students who speak more than one language and may be learning English at school, make up 10% of the K-12 student population in the United States (NCES, 2018). In order to best support these learners, computer science (CS) teachers must have opportunities to learn about language development and multilingualism and their specific students' languages and cultures. Teachers also need access to digital and analog resources that meet students where they are—both culturally and linguistically.

Why It Matters

- ▶ Historically, CS education has not focused on including multilingual learners, so strong nationwide data on their participation is minimal.
- ▶ CS can play a special role in helping bi/multilingual learners express themselves and discover new passions and pathways—but only if their teachers have had adequate professional development (PD) to support them.
- ▶ At present, most CS teachers are not on the priority list for PD opportunities focused on multilingual learners. Instead, they are often busy learning CS content. When teachers and school leaders are equipped with knowledge about language development, bilingualism, and their students' language backgrounds, they support bi/multilingual learners more equitably (Menken & Solorza, 2014).

Things to Consider

CS teachers beginning their PD journey to support multilingual learners should understand the context for their work:

- ▶ For too long, schooling has maintained deficit perspectives on bi/multilingual learners. As Participating in Literacies and Computer Science (PiLa-CS) puts it, “Deficit framings ignore or treat as problems what kids know and can do, viewing standard school learning objectives as the only or primary learning of value” (Vogel et al., 2020, p. 1). These views must be challenged and dismantled.
- ▶ In some contexts, CS education is at odds with language education—because CS is classified as “enrichment,” bi/multilingual learners may be pulled out of classes like CS to receive English learning services. In states where CS counts as a world language, CS might be competing with courses that offer students opportunities to study their home language (CSforEL, 2021).
- ▶ Most CS resources are only available in English, so teachers of bi/multilingual learners may have to create and/or hunt for materials and resources that meet their students where they are. These teachers need more support to find and access relevant resources.

Recommended Actions

- ▶ **Teaching multilingual learners requires a mindset shift.** Historically, the sole focus for educating these students was to transition them to English. Now, the CSTA is part of a research and practice community that acknowledges the rich language practices that multilingual learners bring to classrooms. The CSTA encourages teachers to build on students’ practices to help them learn CS, make connections between community and school subjects, and allow students to express themselves in a range of ways.
- ▶ **Try relinquishing control over language in the classroom and welcome students to translanguage. In other words, use all their communication resources** to help them learn, including home languages you might not know. When students tap into their full linguistic repertoires, they engage in deeper thinking, processing, and expression (García & Li Wei, 2014). For example, instead of expecting students to use only English in your classroom, invite them to pair program using any language, then share their progress with you using English sentence starters. Students might also create their own multilingual dictionaries or posters of computer science terms, including images, words from multiple languages, slang, and code, then discuss when to use one term over another.
- ▶ **Existing tools can be valuable for translanguageing with multilingual CS students.** For example, middle school teachers of emergent bilingual students have leveraged literacy practices and genre conventions from telenovelas, or Spanish soap operas, to introduce Scratch. Designing student aimed at linguistically diverse audiences allows students to apply language skills in authentic contexts.
- ▶ **Investigate and ask for professional development opportunities about supporting multilingual learners.** Any professional development (PD) opportunity for CS teachers must emphasize bi/multilingual learners’ strengths. A place to start is WIDA, which offers self-paced PD opportunities for teachers across content areas.

Reflection Questions

- ▶ What are some ways to make your CS classroom inviting for and inclusive of multilingual learners?
- ▶ How can you use CS as a way to support multilingual learners’ self-expression?
- ▶ Reflect on how you build your relationships with your students. How do you learn about the multilingual learners in your CS classes?

Terms to Know

- ▶ **Multilingual learner** - Student who uses more than one language and may be learning English. This term focuses holistically on students’ language practices, whereas the term “English-language learner” emphasizes what schools think students lack.
- ▶ **Translanguageing** - The practice, common to bi/multilingual people, of communicating fluidly and flexibly using all of one’s language resources (home language, English, drawing, gestures, etc.), defying standard language categories (García & Li Wei, 2014).

Resource List

[CUNY-New York State Initiative on Emergent Bilinguals \(CUNY-NYSIEB\) Translanguageing Guides](#) - Strategies for building on students’ language practices in K–12 general education settings

[Participating in Literacies and Computer \(PiLa-CS\) Educator Resources](#) - Videos, resources, and middle school classroom unit examples, sharing an approach for supporting emergent bi/multilinguals in CS education

[Elementary Computing for All Curriculum](#) – Designed to support identity and language development for multilingual learners via a structured inquiry approach

[Scratch](#) - Programming environment for kids and teens available in over 60 languages, along with [Scratch Creative Computing Guide](#), a curriculum created at Harvard for Scratch