Main points (Summary)

* Bilingual education has existed for 170 years, yet recently, mathematics has been left out of the discussion and implementation of bilingual programs – not a lot is written about the role of mathematics in bilingual education
* The definition for bilingual education used by this article includes teaching English and another language as language classes, but also using them both as means of instruction. Teachers have observed that instruction in other disciplines should be taught in the student’s home language until they reach a level of proficiency in English for both languages to be used.
	+ The use of both languages in disciplinary classes actually enhances students’ English proficiency because they are practicing a practical and applied usage.
	+ The goals of bilingual education are pluralistic in contrast to assimilation
* In relation to mathematics education, bilingual education emphasizes three items:
* Language of Instruction
	+ For early instruction in the student’s native language, it is crucial for the teacher to be familiar with the mathematical terms in that language. It is also very helpful to have materials for the students printed in their native language. Unfortunately, neither of these solutions are abundant in the United States, especially for Native American languages.
	+ There is, however, a fear with this that it will be difficult to adapt the basic concepts learned in the native language to later concepts learned in English, so some schools opt for all-English mathematics education. The text does support and encourage teachers to be familiar with the mathematical terms in the students’ native language. This kind of instruction would not be used for emerging English speakers, of course; it is better suited to students with proficiency in English already.
	+ Many classes benefit from instruction in both English and the students’ native language. This usually occurs in alternating intervals of different lengths. Most commonly, the teacher will switch between languages as necessary or helpful in each lesson. Others will teach the same lesson once in English and once in the other language, which is most beneficial for mathematics education, while still others will alternate languages day by day without repetition of lessons. For this final interval structure, it is very helpful to review and preview the lessons to get some exposure to both languages for each.
* Cultural Referents
	+ In the cultural realm of family values, etc., mathematics does not tread heavily.
	+ In the cultural realm of real-world experiences and application of mathematical concepts, however, the teacher must search for ones that apply well to the culture of the learners to make it as meaningful to them as for American English speakers.
* Cognitive Styles
	+ Children from certain cultural backgrounds are more likely to prefer field-dependent ways of thinking. They may prefer to work collaboratively with others but with much teacher guidance, and their mindset is usually on global and practical application. This does not mean these are the sole areas on which teachers should focus their methods – they need to be able to teach to learners who prefer this cognition and those who do not and be able to adapt for what they observe their students to prefer.

 The bulk of this article discussed the language of instruction for bilingual mathematics education. It covered the different ways in which English and the students’ native languages could be used in instruction and pointed to a few ways that seemed preferable. It seems a fair judgment that early education should be taught in the native language so the students are sure to understand the basis for the rest of their mathematical studies, but I think it could be beneficial to introduce some English terms as well. Just as in the first way of teaching in multiple languages, the early education teachers should at least make the students familiar with English mathematical terms so the students can recognize them in the future, which may alleviate the fear described when the learners switch to higher-level mathematics in multiple languages. I do appreciate that the article specifies that for later mathematics education, it is beneficial to teach parallel lessons in each language (usually two), but this may be impractical some of the time.

 The one major critique I have is that the article explains mostly ideal situations for these classroom environments, but often notes that such resources to make them possible are not abundant. These provisions and educational structures would have to be set in place on an administrative level – most of these suggestions are not ones a teacher could simply employ at their discretion in the classroom level; they would need support from ESL teachers and administration working cooperatively to plan the student’s tracks, and the article pays little attention to the practical implementation of those ideal situations.

 As discussed above, it seems beneficial to teach the same lesson in English and in the students’ native languages. We can apply this in a way we discussed in class: if we provide an overview of the lesson to bilingual students in their native language, they can read the content ahead of time to be better prepared to understand the lesson in English. Then, it would make great sense to teach the lesson using both languages in class, so the bilingual students can make the language connections while still learning the mathematical content. In addition, I really appreciate the article’s attention to culture and cognition because this plays back into what we continue to say: know your students so you can teach in the way they best learn. This applies to their cultural experiences, which are crucial to understanding real-world application of math, and to their cognitive developmental stage and preferred learning style, which will be different for every student. Above all, varying instruction to accommodate all types of learners is key.

Lovett, C. J. (1980). Bilingual education: What role for mathematics teaching? *The Arithmetic Teacher, 27*(8), 14-17.

Thought-Provoking Question: **How can you tell if the method you use to teach to bilingual learners (assuming you choose from those mentioned in this article) is working effectively?**