

eNunciate!

Empowering Pronunciation Teaching and Learning

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History of the Project



The speech visualization software tools were developed by the project team for the TLEF project “Multimodal approaches to the empowerment of pronunciation teaching and learning: Creating online interactive tutorial videos” (2014, PI: Dr. Bryan Gick)

The precursor to this project is “Visible Speech Project” (2013, PI: Kathleen Hall)

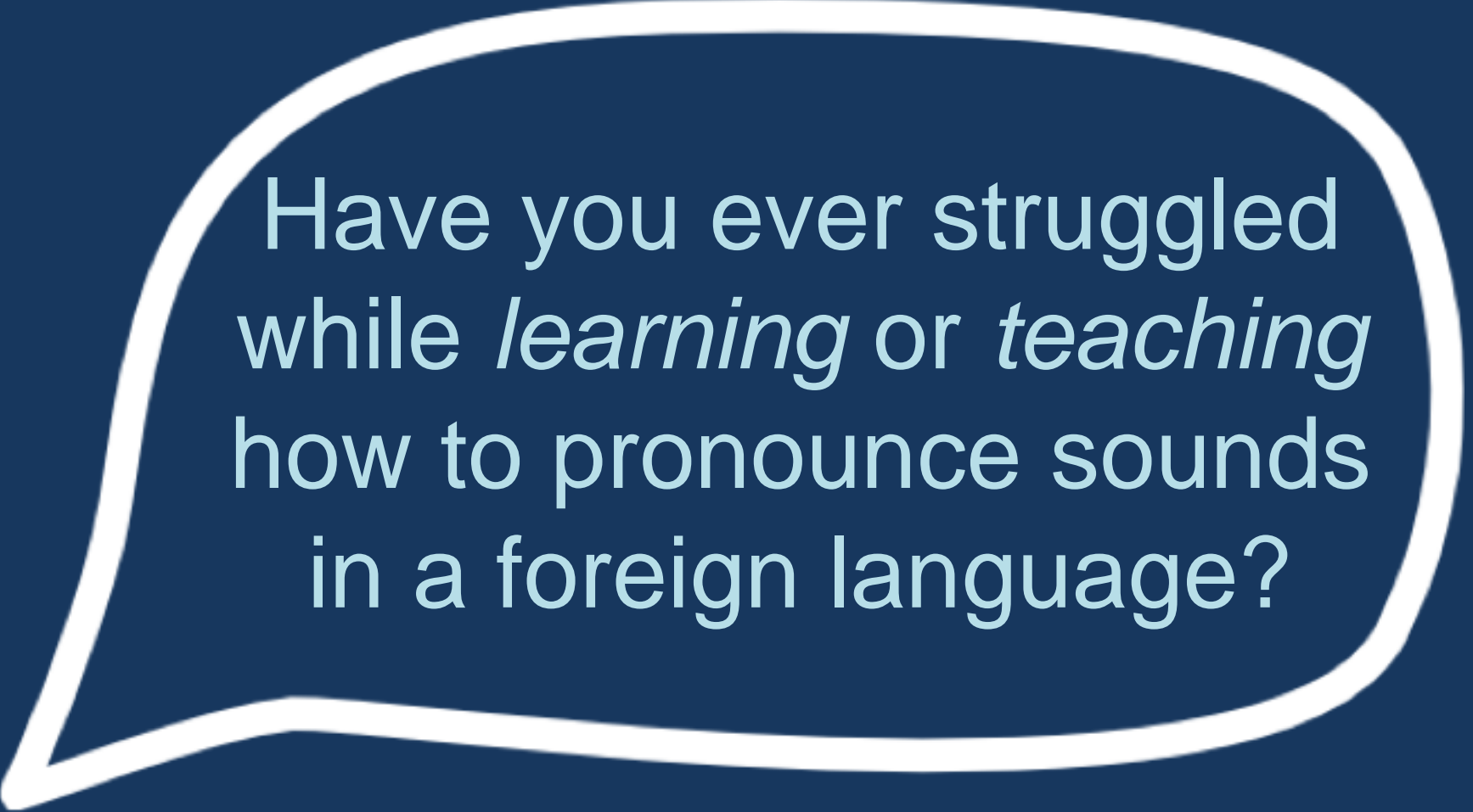
Objectives

Pronunciation is an integral part of communication, but it has proven to be one of the most challenging aspects to incorporate into language pedagogy and to implement in the classroom

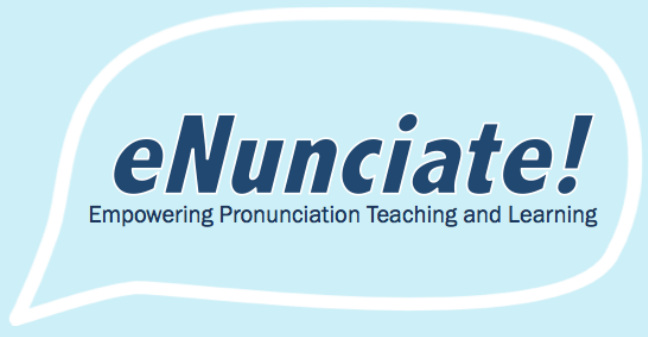
Our project addresses these problems, and gives learners control and autonomy over their own learning

Our tools and resources draw on ultrasound and other speech visualization technology and its application in articulatory phonetics

Evidence-based approach:
We evaluate and report on the impact of our resources on teaching and learning; 9 presentations and publications to date, others forthcoming



Have you ever struggled
while *learning* or *teaching*
how to pronounce sounds
in a foreign language?



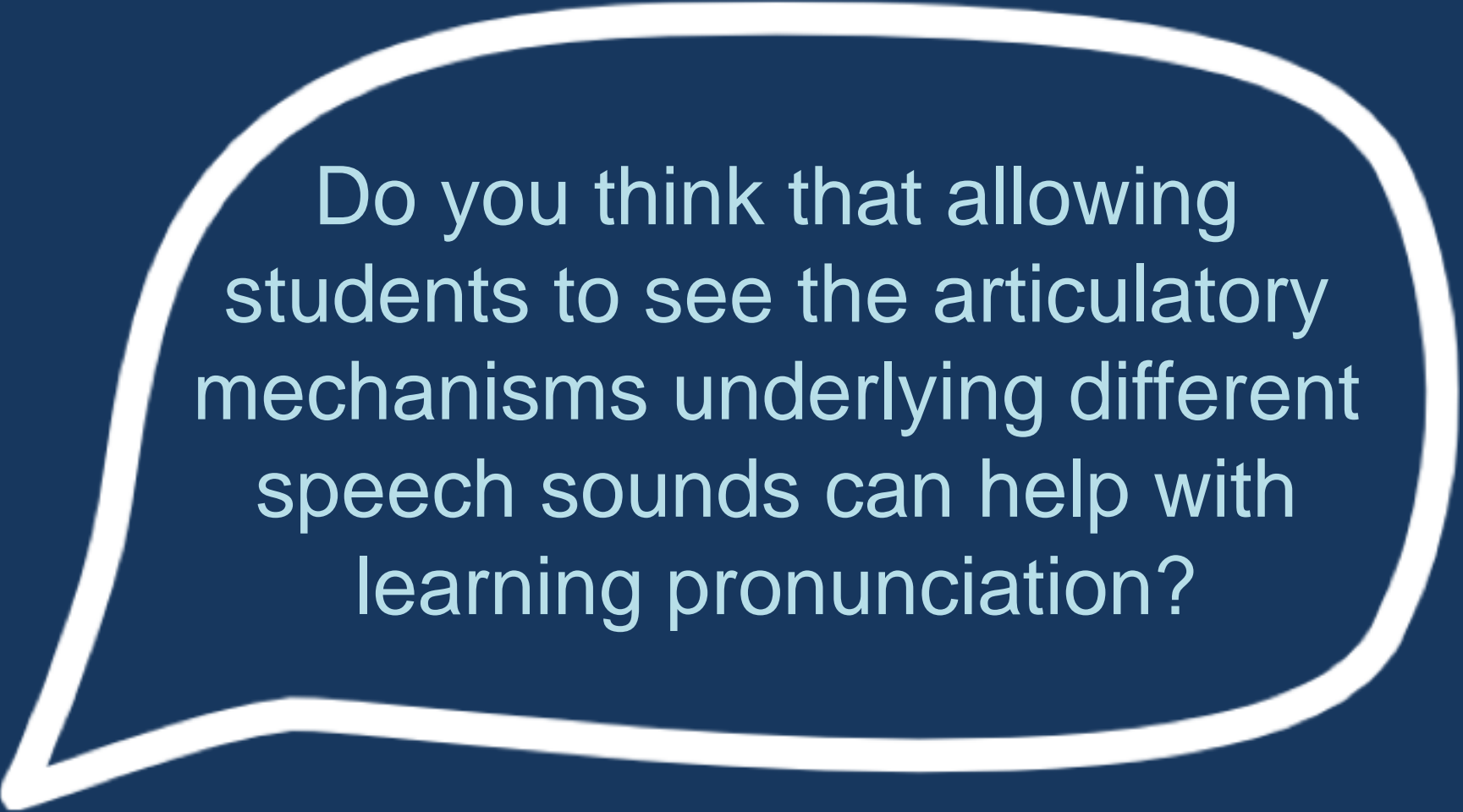
Uses various tools and resources to aid in the learning and teaching of pronunciation such as:

Multimodal tool to visualize speech

Interactive and autonomous training

Biovisual feedback for pronunciation training

Ultrasound kit for customized resources



Do you think that allowing students to see the articulatory mechanisms underlying different speech sounds can help with learning pronunciation?

Interactive International Phonetic Alphabet Chart

Sounds of the World's Languages

	Bilabial		Labiodental		Dental		Alveolar		Postalveolar		Retroflex		Palatal		Velar		Uvular		Pharyngeal		Glottal	
	-V	+V	-V	+V	-V	+V	-V	+V	-V	+V	-V	+V	-V	+V	-V	+V	-V	+V	-V	+V	-V	+V
Plosive	p	b					t	d			ʈ	ɖ	c	ɟ	k	g	q	ɢ			ʔ	
Affricate																						
Nasal		m		ɱ			n				ɳ		ɲ		ŋ		ɴ					
Trill																						
Tap or Flap				ɸ			r				ɽ											
Fricative	ɸ	β	f	v	θ	ð	s	z	ʃ	ʒ	ʂ	ʐ	ç	ʝ	x	χ	ħ	ʕ			h	ɦ
Lateral fricative							ɬ	ɮ														
Approximant		(w)		ʋ			ɹ				ɻ		j		ɰ	(w)						
Lateral approximant							l				ɭ		ʎ		ʟ							

Consonants

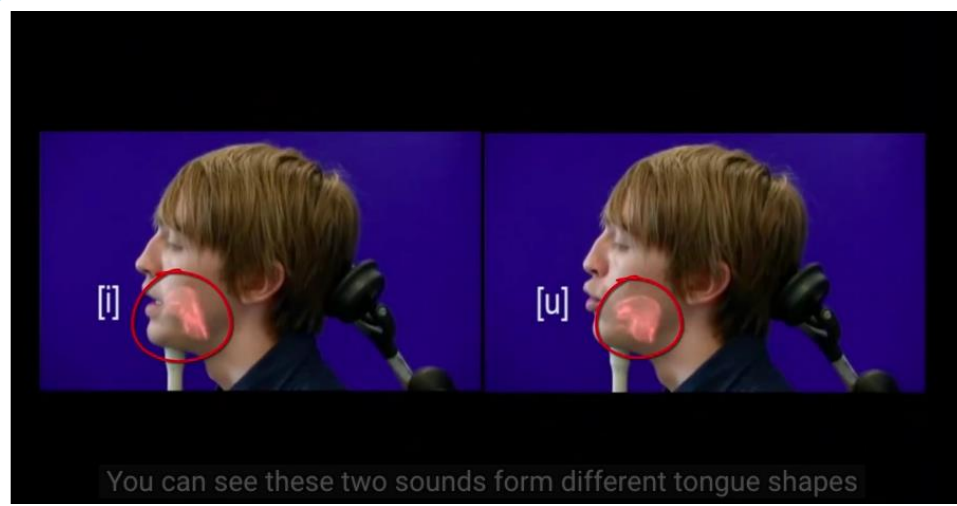
Alternative Airflow Consonants

Vowels

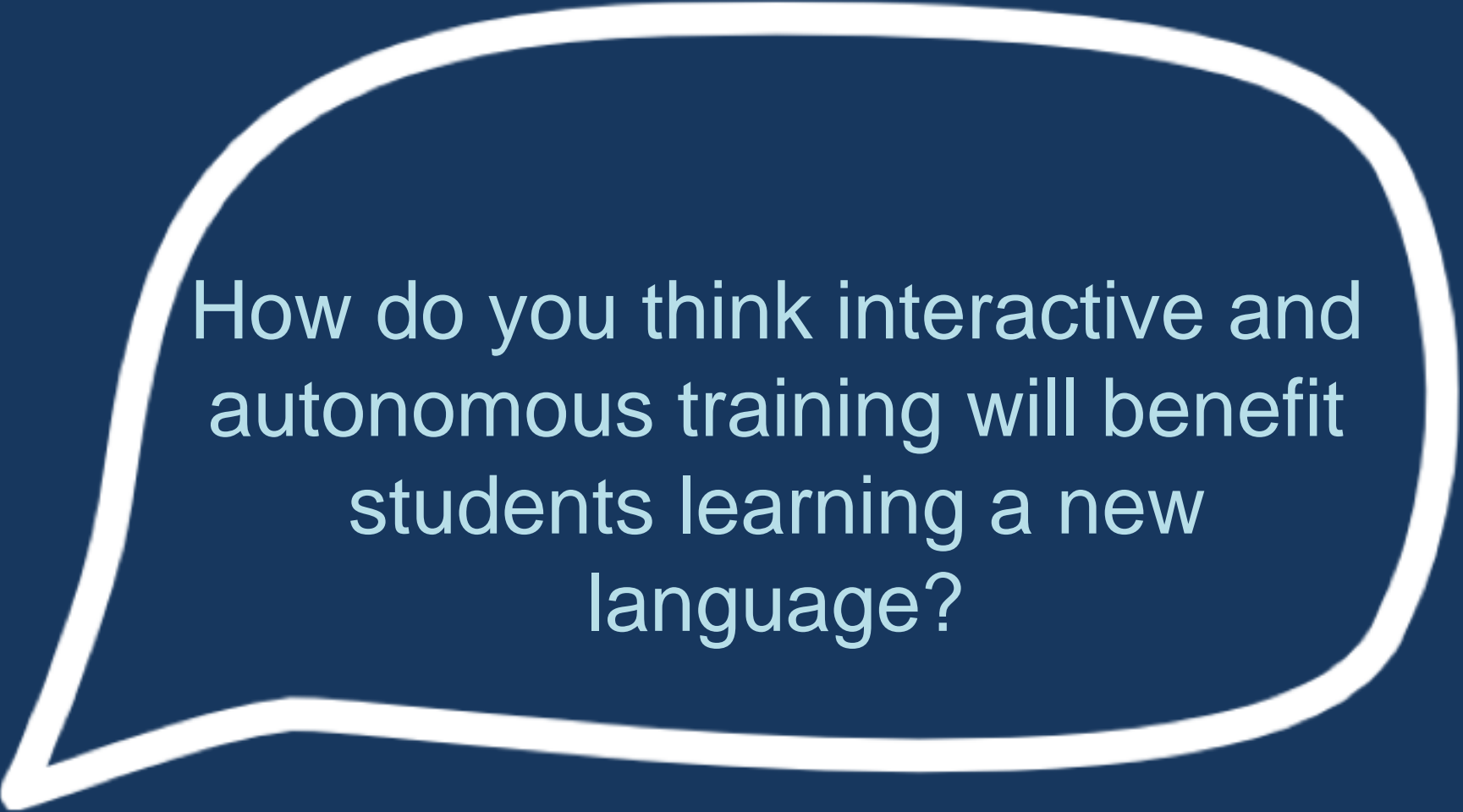
Educational resources enable students to visualize speech sounds of the world's languages



High-quality animations present stylized representations of speech mechanisms



Ultrasounds overlay videos combine mid-sagittal images of tongue movements with external profile views of a speakers head



How do you think interactive and autonomous training will benefit students learning a new language?

Japanese Pronunciation Tutorial website offers learners opportunities for self-directed, interactive pronunciation training

ひらがな hiragana													カタカナ katakana													
N	w	r	y	m	h	n	t	s	k				N	w	r	y	m	h	n	t	s	k				
ん	わ	ら	や	ま	は	な	た	さ	か	あ			ン	ワ	ラ	ヤ	マ	ハ	ナ	タ	サ	カ	ア		a	
			り		み	ひ	に	ち	し	き	い				リ		ミ	ヒ	ニ	チ	シ	キ	イ		i	
			る	ゆ	む	ふ	ぬ	つ	ず	く	う				ル	ユ	ム	フ	ヌ	ツ	ズ	ク	ウ		u	
			れ		め	へ	ね	て	せ	け	え				レ		メ	ヘ	ネ	テ	セ	ケ	エ		e	
			を	ろ	よ	も	ほ	の	と	そ	こ	お			ヲ	ロ	ヨ	モ	ホ	ノ	ト	ソ	コ	オ		o

This is the list of the 46 basic sounds of Japanese.

Exercise Video: Tsu vs Chu

Let's practice the Japanese つ.



Learners have control and autonomy over their learning, engaging with site in a way that mimics one-on-one interactions with speakers. Tutorial consists of instructional videos, practice exercises, and quizzes. Content developed based on Japanese instructors' *knowledge of pronunciation challenges* and linguists' *understanding of speech production*.

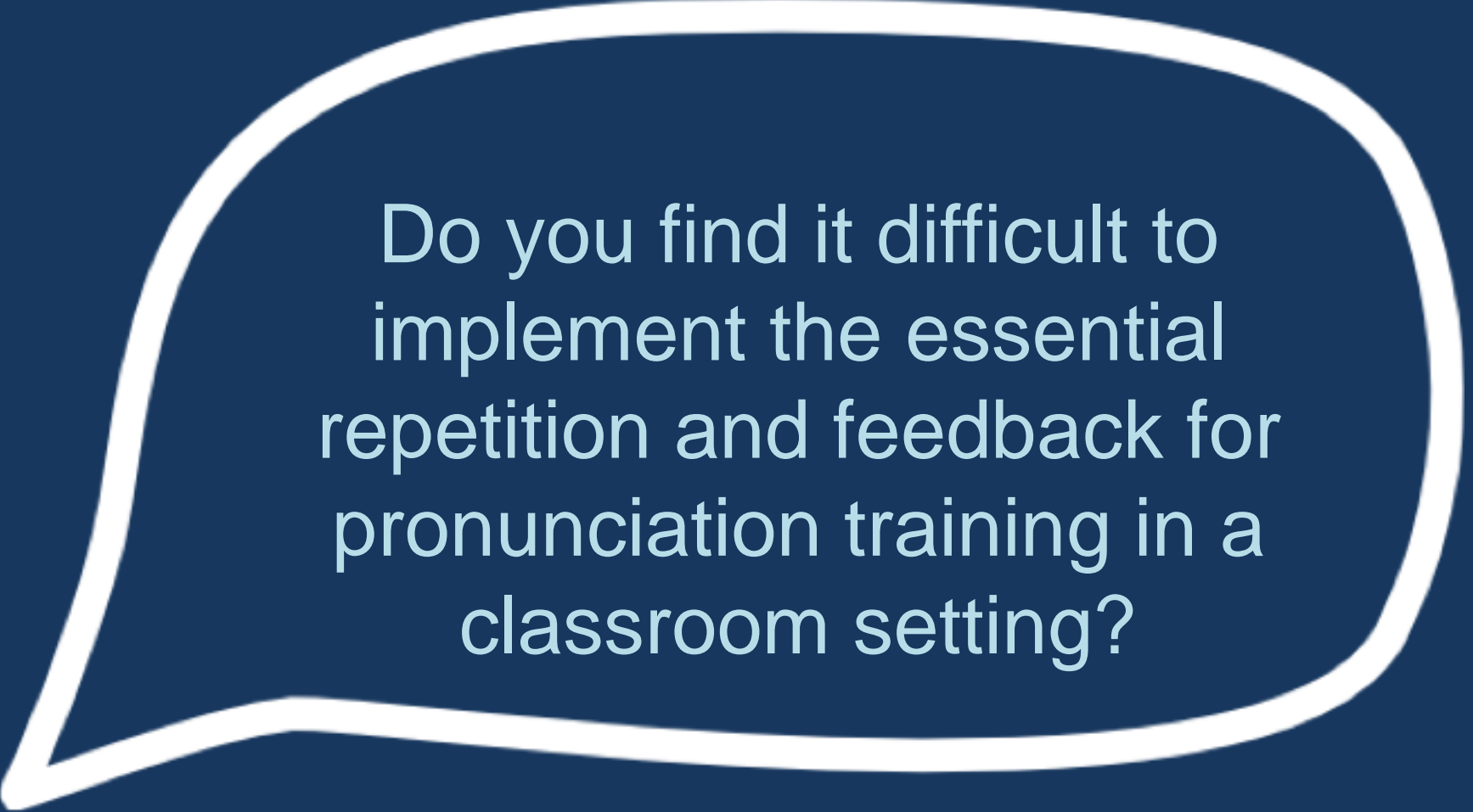
Do you hear different sounds when you
pronounce ざ and じゃ?

ざ vs じゃ



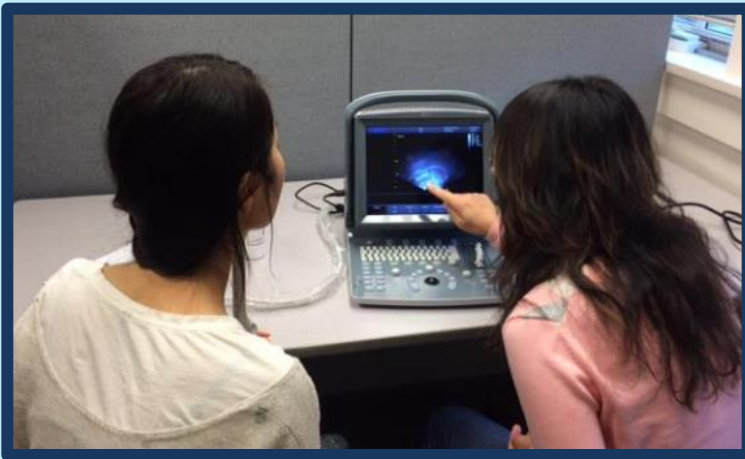
pronounce ざ and じゃ?

Student surveys reported that learners' understanding and pronunciation of Japanese sounds *improved*.
Future developments include websites for other languages including French, Spanish, German, and Chinese.



Do you find it difficult to implement the essential repetition and feedback for pronunciation training in a classroom setting?

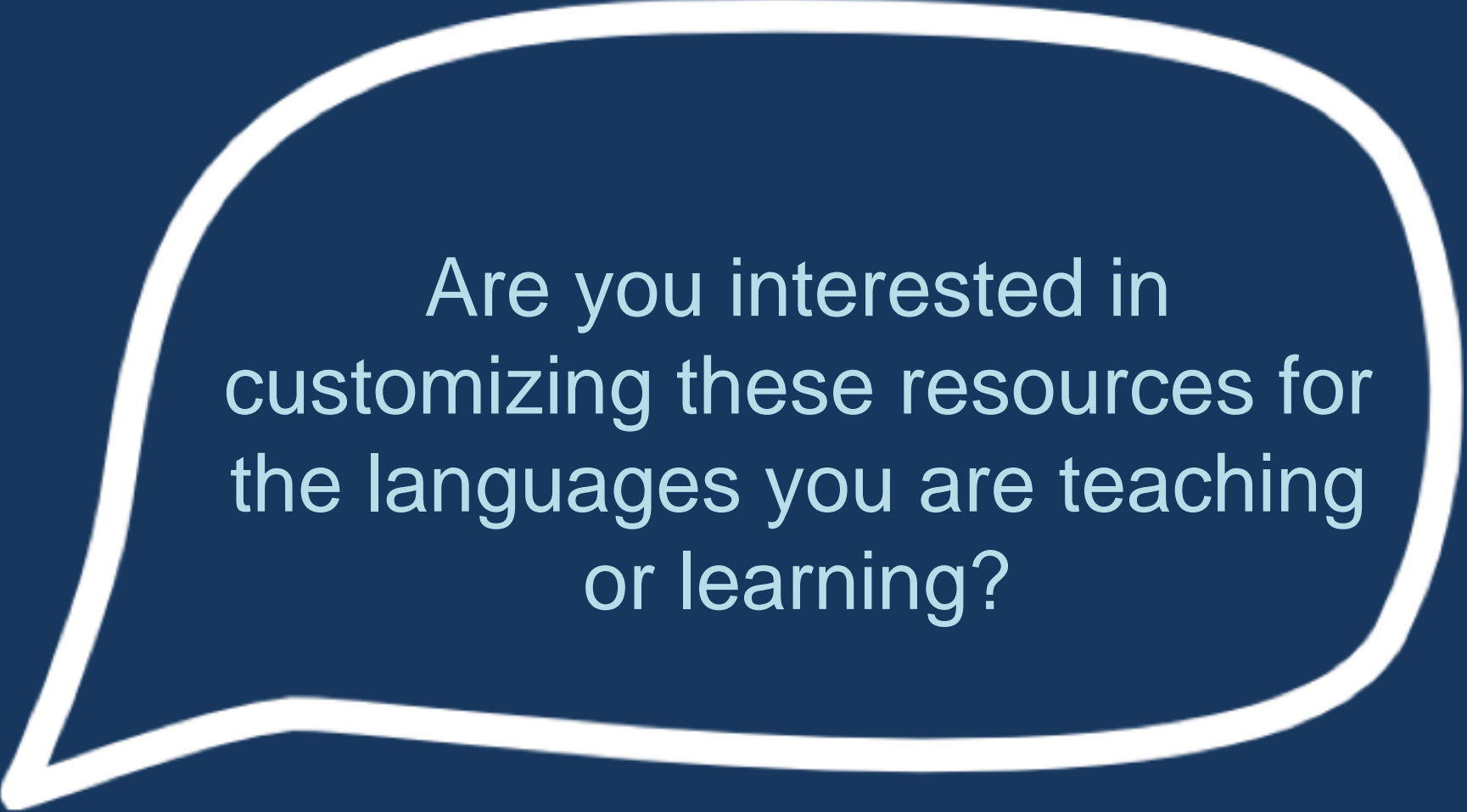
The use of **biovisual feedback** using visualization technology can improve pronunciation for language learners and other populations.



Ultrasound-based tutorials allow learners to get feedback on their pronunciation of challenging sounds

A screenshot of a web application interface for an online prosody visualizer. The interface is divided into two main sections. The top section, labeled "Model speech:", contains a red dotted line graph representing the pitch contour of a model speaker's utterance. The bottom section, labeled "Your speech:", is currently empty. On the right side of the interface, there is a "Select model speech file:" dropdown menu with "English yin question" selected. Below this is a media player control bar showing a play button, a progress bar at 0:01, and a volume icon. A red button with the text "Please allow microphone access" is visible. Below this button, the text "Record yourself and compare:" is displayed, followed by two circular icons: a microphone icon and a plus sign icon.

Online prosody visualizer allows students to record utterances and compare with model speaker.



Are you interested in
customizing these resources for
the languages you are teaching
or learning?

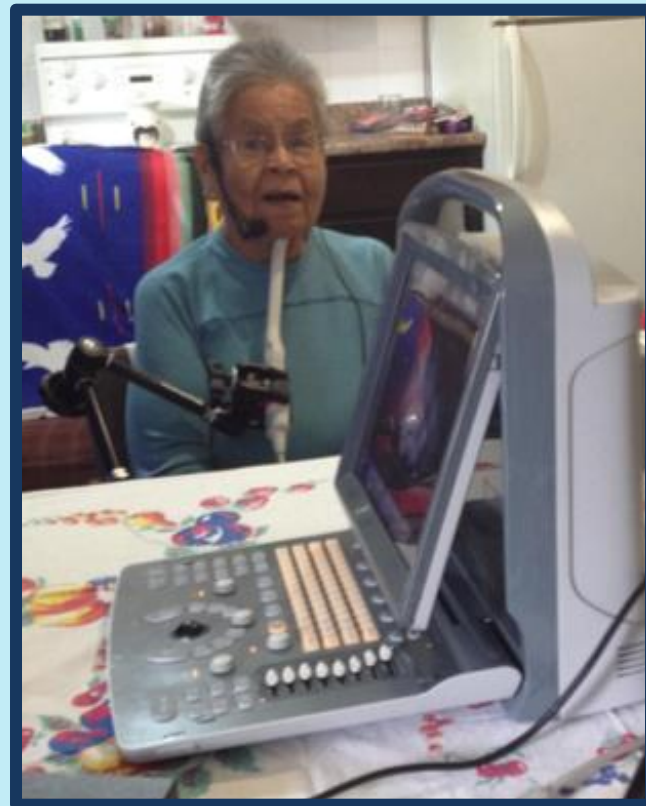
“Tongue visualizer” software enables language instructors and other users to develop customized ultrasound overlay videos

Language teachers will be able to produce *custom resources* focusing on specific pronunciation challenges in their own languages

Particularly useful for the sounds of BC’s First Nations languages

Custom videos in development for:

- Cantonese (final obstruents, vowels)
- Upriver Halq’emeylem (dorsal sounds)
- SENĆOŦEN (full alphabet; created by community language apprentices)



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REFERENCES

Abel, J., B. Allen, S. Burton, M. Kazama, M. Noguchi, A. Tsuda, N. Yamane, B. Gick. 2015. Ultrasound enhanced multimodal approaches to pronunciation teaching and learning. *Canadian Acoustics* 43: 124-5.

Adler-Bock, M., B. Bernhardt, B. Gick, P. Bacsfalvi. 2007. The use of ultrasound in remediation of North American English /r/ in 2 adolescents. *American Journal of Speech-Language Pathology* 16: 128-139.

Bernhardt, B., B. Gick, P. Bacsfalvi, M. Adler-Bock. 2005. Ultrasound in speech therapy with adolescents and adults. *Clinical Linguistics and Phonetics* 19: 605-17.

Gick, B., B. Bernhardt, P. Bacsfalvi, I. Wilson 2008. Ultrasound imaging applications in second language acquisition. In Hansen & Zampini (eds), *Phonology and Second Language Acquisition* . Benjamins: 309-22.

Noguchi, M., N. Yamane, A. Tsuda, M. Kazama, B. Kim, B. Gick. 2015. Towards protocols for L2 pronunciation training using ultrasound imaging. Poster presentation at PSLLT 7. Dallas, TX: October 2015.

Tsuda, A., B. Kim, B. Gick, M. Kazama, N. Yamane, S. Burton. 2015. Ultrasound-integrated pronunciation tutorials. Roundtable discussion presented at the Society for Teaching and Learning in Higher Education. Vancouver, BC.