

## CODING SCHEME

Category	Description	Codes/ decisions	Description
<b>1. CONTEXT &amp; PARTICIPANTS</b>			
<i>Educational level</i>	This category of codes classifies studies based on the educational context from which the sample was drawn.	Primary education	The educational stage between preschool and secondary education. This education stage is typically dedicated to children between the ages of 6 and 12.
		Secondary education	The education stage between primary education and higher education.
		Higher education	This educational for students who successfully completed secondary education.
		Vocational education	A type of education that is dedicated to equipping students with skills needed for occupational fields.
		Adult education	Refers to educational programs dedicated to mature students.
		Professional subjects	Used if the study was conducted with participants who are practicing pronunciation as part of their professional development program.
		Non-student subjects	Used if the study was conducted with participants who are not enrolled at an educational institution.
<i>First language (L1)</i>	The native language of the sample. <i>Mixed L1</i> is used in case the sample involved participants from different linguistic backgrounds.	<b>TBD</b>	
<i>Target Language (TL)</i>	The language that the sample is learning.	<b>TBD</b>	
<i>Language proficiency</i>	The sample's proficiency in the language being learned.	Beginner (A1 – A2)	
		Intermediate (B1 – B2)	
		Advanced (C1 – C2)	
<i>Age group (range)</i>	This category of code classifies studies based on the age range, mean age, or median age of the sample. The <i>Educational level</i> can be used as an indicator for the age group.	Children (6 - 12)	
		Teenagers (13 - 17)	
		Young adults (18 - 33)	
		Middle-aged adults (34 - 59)	
		Senior adults (above 60)	
<b>2. STUDY DESIGN</b>			
<i>Sample size (n)</i>	The total number of participants in a study.	<b>TBD</b>	
<i>Sampling approach</i>	The method of recruitment and sampling of participants for the study.	Randomized	All of the members of the population had an equal chance of being selected for the study.
		Non-randomized	Members of the population did not have an equal the chance of being selected.
<i>Group design</i>	The group design of the study.	One group design	A study conducted with a single group.
		Comparison group design	A study comparing two or more treatments without a control group.

		Control group design	A study investigating the effects of a treatment with a control group.
<i>Measuring effects</i>	The design used to track participants' pronunciation learning changes.	A one-shot study design	A short-term study involving a single assessment.
		Post-test only design	A study involving a learning assessment only after the treatment.
		Pretest/ posttest design	A study involving a learning assessment before and after the treatment.
<i>Treatment duration (weeks)</i>	This code classifies studies based on the duration of the treatment.	<b>TBD</b>	
<i>Training setting</i>	The setting in which the CAPT treatment was taken.	Classroom	If the study took place in a classroom.
		Laboratory	If the study took place in a computer laboratory.
		Home	If participants were instructed to use the CAPT program at home.
		Flexible	If no limitations were set for the place of using the CAPT software.
<b>3. COMPUTER ASSISTED PRONUNCIATION TRAINING (CAPT)</b>			
<i>CAPT system</i>	The name of the CAPT system(s) used in the treatment.	<b>TBD</b>	
<i>Software type</i>	The type of the CAPT system(s) used during the treatment.	Commercial software	CAPT systems designed that are designed to be sold or generate revenue for developers through other means (e.g., ads).
		Open-source/ free software	CAPT systems are available for free and allow end-user to access the source code, modify, and distribute the application for various purposes.
		Software prototype	An in development/ incomplete CAPT system that is being developed and tested for a specific group of L2 learners.
<i>Technological basis</i>	The speech recognition capabilities of the CAPT system.	ASR based CAPT	CAPT systems that make use of automatic speech recognition (ASR) technology.
		Non-ASR based CAPT	CAPT systems that do not integrate automatic speech recognition (ASR) technology.
<i>Input modelling</i>	The method used to raise learners' awareness of the pronunciation feature(s).	Natural speech	Normal speech recordings/ samples.
		Manipulated speech	Speech recordings that are partially or fully modified to highlight specific pronunciation features.
		Synthetic speech	Artificial speech, commonly generated using text to speech applications.
		High variability phonetic training (HVPT)	Representing the target language pronunciation features through the use of multiple voices with different genders and in different contexts.
		Orthography	Normal spelling.

		Phonetic transcription	Representation of the target language pronunciation using International Phonetic Alphabet (IPA).
<i>Scope of training (1)</i>	The component of pronunciation addressed in the CAPT treatment.	Segmental features	Vowels or consonants.
		Suprasegmental features	Stress, intonation, or rhythm ...etc.
		Both	
<i>Scope of training (2)</i>	The mode of pronunciation addressed in the training.	Perception	Awareness of pronunciation features.
		Production	Speaking, articulating, or pronouncing.
		Both	
<i>Practice mode</i>	The way participants accessed the CAPT system during the study.	Self-directed training	CAPT where learners are exposed to the CAPT system on their own.
		Collaborative training	CAPT where learners are exposed to the CAPT system in collaboration with their classmates/ peers online or offline.
		Self-directed & Collaborative practice	
<i>Practice activity</i>	The type of elicited speech during CAPT.	Controlled practice	CAPT activities that rely on reading or listening and repeating.
		Spontaneous practice	CAPT activities that elicit free and uncontrolled speech.
		Controlled & spontaneous practice	
<i>Feedback</i>	The pedagogical classification of the feedback provided by the CAPT system.	Explicit feedback	Feedback that informs the learners about the nature of the pronunciation mistakes that they made in a direct way.
		Implicit feedback	Feedback that raises learners' awareness of their pronunciation mistakes in an indirect way.
		Explicit & implicit feedback	
<b>4. ASSESSMENT</b>			
<i>Scope of assessment</i>	The mode of pronunciation which was measured before and/or after the CAPT treatment.	Perception	Awareness of pronunciation features.
		Production	Speaking, articulating, or pronouncing.
		Both	
<i>Production assessment task</i>	The type of speech that was elicited in the production assessment task.	Controlled speech	Speech tasks that require reading texts or listening and repeating.
		Spontaneous speech	Speech tasks that elicit free uncontrolled speech.
		Controlled & spontaneous speech	
<i>Perception assessment task</i>	The type of perception activity that assessed participants awareness of the different pronunciation features.	Identification task	Tasks that examine learners' ability to recognize a specific sound or a pronunciation feature.
		Discrimination task	Tasks that examine learners' ability to discriminate between two (or more) sounds.
		Discrimination & identification tasks	
<i>Production rating method</i>	The method used to evaluate participants' production.	Human listeners	Assessment where expert or naïve human raters evaluate the pronunciation output of learners based on a specific rubric/ scale.

		Acoustic measures	Assessment where the pronunciation quality is determined based on acoustic features such as frequency, formants, intensity, and pitch. This is often done using speech analysis software packages like <i>Praat</i> .
		Human & acoustic measures	
<i>Learning measure</i>	The pronunciation component that was assessed.	Discrete measures	Assessment where the focus is on segmental or suprasegmental accuracy.
		Global measures	Assessment where the focus is on more general pronunciation qualities like accent, communication, intelligibility, and comprehensibility.
		Discrete & global measures	
<i>Discrete measures</i>	The discrete pronunciation component that was assessed.	Segmental quality	Accurate pronunciation of vowels and consonants.
		Suprasegmental quality	Accurate pronunciation of stress, intonation, and rhythm.
		Segmental & suprasegmental quality	
<i>Global measures</i>	The global pronunciation component that was assessed.	Accent	The extent to which learners' pronunciation is close to that of a native speaker.
		Intelligibility	The extent to which learners' utterances are understood.
		Comprehensibility	The extent to which learners' pronunciation is easy/ difficult to understand.
		Communicative competence	The extent to which learners are able to communicate their ideas.
		Global pronunciation quality	Evaluating global pronunciation generally without the focus on specific qualities.
<i>Theoretical paradigm</i>	The study's definition of a good pronunciation.	Nativeness principle	This principle implies that the ultimate goal of pronunciation learning is to achieve a native-like pronunciation.
		Intelligibility principle	This principle implies that the ultimate goal of pronunciation learning is to achieve an intelligible or comprehensible pronunciation.
		Nativeness & Intelligibility	
<i>Results</i>	The magnitude of the learning results.	Significant learning improvement	Pronunciation learning results where the P value is less than .05 ( $p < .05$ ) or the effect size is large.
		Small to moderate learning gains	Results where pronunciation learning is detected but the p value is not less than .05 ( $p > .05$ ) and the effect size is either small or medium.
		No learning gains	Results where no pronunciation learning is detected.

Notes. Notes. TBD = to be determined, NOT SPECIFIED = category/ code not mentioned in the study, AND = used if study makes use of two or more features/ codes.