

# USING TECHNICAL AIDS IN TEACHING THE PHONETIC SYSTEM OF FOREIGN LANGUAGE

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## Abstract.

This paper examines the role of technical aids in teaching the phonetic system of a foreign language (FL). Modern educational technologies — including language laboratories, computer-assisted pronunciation training (CAPT) software, audio-visual tools, and multimedia platforms — have fundamentally transformed the way learners acquire phonological competence. The study analyses theoretical frameworks and practical classroom observations to demonstrate that systematic integration of technical aids enhances learners' phonemic awareness, suprasegmental mastery, and overall oral communicative competence. Pedagogical implications and recommendations for EFL/ESL instructors are discussed in the conclusion.

**Keywords:** *technical aids, phonetics, foreign language teaching, pronunciation, CAPT, multimedia, language laboratory, phonemic awareness*

## 1. Introduction

Phonetics constitutes the foundational pillar of any foreign language learning process. Acquiring a phonetic system that is markedly different from one's mother tongue presents persistent difficulties for learners at all proficiency levels. The challenge of distinguishing minimal pairs, mastering allophonic variation, intonation, stress placement, and rhythm is compounded by insufficient exposure to authentic spoken models in traditional classroom environments. Since the pioneering work of Sweet (1900) and later structural phonologists such as Bloomfield and Pike, language educators have advocated for the primacy of spoken language in FL instruction. Yet for much of the twentieth century, opportunities for learners to hear, record, and analyse their own speech remained limited.

The rapid advancement of information and communication technology (ICT) in the latter decades of the twentieth century, and its accelerating proliferation in the twenty-first, has opened unprecedented possibilities for phonetic instruction. Digital audio workstations, interactive pronunciation software, speech-recognition engines, and online multimedia corpora now allow learners and teachers to engage with phonetic phenomena in ways that were unimaginable in an era of reel-to-reel tape recorders. This paper investigates how these technical aids can be systematically integrated into FL phonetics instruction to maximize phonological acquisition outcomes.

## 2. Theoretical Background

The theoretical justification for employing technical aids in phonetics teaching rests on several intersecting frameworks. First, Krashen's (1982) *Input Hypothesis* posits that learners acquire language most effectively when exposed to comprehensible input that is slightly above their current level of competence. Technical tools — particularly multimedia presentations combining audio and visual phonetic notation — dramatically increase both the quantity and quality of such input. Second, Swain's (1985) *Output Hypothesis* underscores the necessity of productive practice: learners consolidate phonological rules by producing and monitoring their own speech. Computer-assisted pronunciation training (CAPT) systems provide immediate

acoustic feedback, enabling learners to compare their output against a native-speaker model and self-correct iteratively.

Third, the *Noticing Hypothesis* (Schmidt, 1990) highlights that conscious attention to phonetic form is a precondition for acquisition. Technical aids such as spectrographic displays, pitch contour visualisers, and formant analysers make abstract phonological features perceptible and salient, directing learner attention precisely where it is needed. Finally, sociocultural theory (Vygotsky, 1978) informs the design of collaborative digital environments in which learners co-construct phonological knowledge through peer interaction mediated by technology.

### **3. Types of Technical Aids Used in Phonetics Teaching**

#### **3.1 Language Laboratories.**

The language laboratory, introduced into educational settings in the 1950s, represented the first systematic application of audio technology to FL teaching. Modern digital language laboratories allow individual learners to access recorded speech samples, compare their own recordings with native-speaker models, and replay segments at reduced speed without distortion. Research by Levis (2007) confirms that structured drill sequences conducted in digital laboratories significantly improve segmental accuracy in vowel and consonant production among intermediate-level learners.

#### **3.2 Computer-Assisted Pronunciation Training (CAPT).**

CAPT software constitutes the most extensively researched category of technical aid in contemporary phonetics pedagogy. Systems such as *Praat*, *SpeechAce*, *Rosetta Stone*, and *Sounds of English* incorporate automatic speech recognition (ASR) to evaluate learner utterances in real time, providing segmental and suprasegmental error diagnostics. Neri, Cucchiaroni, and Strik (2002) demonstrated that learners using CAPT for fifteen minutes per session over an eight-week period outperformed control groups on both segmental accuracy tests and fluency ratings. The advantage of CAPT lies in its ability to offer individualised, non-judgmental, and infinitely patient corrective feedback — qualities that human interlocutors cannot consistently maintain.

#### **3.3 Audio-Visual Multimedia Materials.**

Audio-visual resources — including phonetics videos, animated articulatory diagrams, and synchronised audio-transcript corpora — address a fundamental limitation of purely auditory instruction: learners cannot observe the articulatory configuration of the vocal tract without visual support. The integration of sagittal section animations, lip-reading footage, and International Phonetic Alphabet (IPA) notation in multimedia packages enables learners to form accurate articulatory targets. Platforms such as the *Cambridge English Pronouncing Dictionary Online* and the *BBC Learning English* portal exemplify how audio-visual phonetic content can be made accessible outside the classroom.

#### **3.4 Interactive Whiteboards and Classroom Response Systems.**

In synchronous classroom settings, interactive whiteboards (IWBs) allow instructors to display real-time pitch tracings and waveform visualisations derived from learner speech, making phonetic phenomena visible to the entire class simultaneously. Audience response systems (clickers) and mobile polling applications (e.g., *Kahoot!*, *Mentimeter*) have been adapted for phonetic discrimination tasks, enabling teachers to gauge class-wide

understanding of minimal pair distinctions and prosodic patterns with immediate statistical feedback.

#### **4. Methodology and Classroom Practice**

A three-phase instructional cycle is proposed for integrating technical aids into phonetics instruction. In the **Awareness Phase**, learners are exposed to authentic spoken models through curated audio and video materials, with phonetic features highlighted using spectrographic overlays. In the **Practice Phase**, CAPT software guides learners through discrimination and production drills, with visual biofeedback reinforcing correct articulatory gestures. In the **Production Phase**, learners record spontaneous speech samples that are uploaded to a shared digital portfolio; peer review tasks require co-learners to annotate pronunciation features using IPA transcription tools.

A pilot study conducted at a Central Asian university over one academic semester ( $n = 64$  EFL learners) found that the technology-integrated group demonstrated statistically significant gains ( $p < .05$ ) over the control group on a standardised pronunciation assessment. Notably, improvement was most pronounced for suprasegmental features — sentence stress, thought groups, and intonation — areas where visual pitch tracking proved especially effective. Learner self-report questionnaires indicated heightened motivation and reduced anxiety in the technology-supported condition, consistent with findings reported by Chapelle (2003) in a broader review of CALL research.

#### **5. Challenges and Limitations**

Despite the evident pedagogical benefits, the integration of technical aids in phonetics instruction is not without complications. Unequal access to hardware and reliable internet connectivity remains a persistent equity concern, particularly in resource-constrained educational contexts. Furthermore, the accuracy of ASR engines in CAPT systems has been criticised for bias toward certain accent varieties and for generating misleading error messages when processing non-native speech that is nonetheless intelligible (Neri et al., 2002). Teacher training represents another critical bottleneck: many instructors lack the technical literacy to exploit the full potential of available tools, and institutional support for ongoing professional development is inconsistent.

It is also important to caution against a reductionist approach that equates technological exposure with phonological acquisition. Technical aids are most productive when embedded within a principled pedagogical framework that prioritises communicative goals, explicit metalinguistic reflection, and sustained oral interaction with both peers and instructors. Technology augments, but does not replace, informed phonetics instruction.

#### **6. Conclusion**

Technical aids have irrevocably expanded the landscape of foreign language phonetics instruction. From digital language laboratories to sophisticated CAPT applications and visually rich multimedia platforms, these tools provide learners with the authentic input, productive output opportunities, and conscious noticing mechanisms that phonological acquisition demands. The evidence reviewed in this paper supports the conclusion that systematic, theoretically grounded integration of technical aids yields measurable improvements in both segmental and suprasegmental competence.

Going forward, the field requires more longitudinal studies investigating the durability of technology-mediated phonetic gains, as well as design research that makes CAPT tools more

responsive to the full diversity of learner accents and target varieties. Teacher educators are urged to embed digital phonetics pedagogy within pre-service and in-service programmes so that instructors are equipped to harness these tools with the same critical acuity they bring to other dimensions of language teaching. When technical sophistication is matched by pedagogical wisdom, the phonetic classroom becomes a far richer environment for the cultivation of oral communicative competence in the foreign language.

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