**Título:** DESIGN AND EVALUATION OF MOBILE COMPUTER-ASSISTED PRONUNCIATION TRAINING TOOLS FOR SECOND LANGUAGE LEARNING

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**Resumen:** The quality of speech technology (automatic speech recognition, ASR, and text-to-speech, TTS) has considerably improved and, consequently, an increasing number of computer-assisted pronunciation (CAPT) tools has included it. However, pronunciation is one area of teaching that has not been developed enough since there is scarce empirical evidence assessing the effectiveness of tools and games that include speech technology in the field of pronunciation training and teaching. This PhD thesis addresses the design and validation of an innovative CAPT system for smart devices for training second language (L2) pronunciation. Particularly, it aims to improve learner's L2 pronunciation at the segmental level with a specific set of methodological choices, such as
learner's first and second language connection (L1–L2), minimal pairs, a training cycle of exposure–perception–production, individualistic and social approaches, and the inclusion of ASR and TTS

technology. The experimental research conducted applying these methodological choices with real users validates the efficiency of the CAPT prototypes developed for the four main experiments of this dissertation. Data is automatically gathered by the CAPT system to give an immediate specific feedback to users and to analyze all results. In particular, the protocols, metrics, algorithms, and methods necessary to statistically analyze and discuss the results are detailed. The two main L2 tested during the experimental procedure are American English and Spanish. The different CAPT prototypes designed and validated in this thesis, and the methodological choices that they implement, allow to accurately measuring the relative pronunciation improvement of the individuals who trained with them. Both rater's subjective scores and CAPT's objective scores show a strong correlation, being useful in the future to be able to assess a large amount of data and reducing human costs. Results also show an intensive practice supported by a significant number of activities carried out. In the case of the controlled experiments, students who worked with the CAPT tool achieved better pronunciation improvement values than their peers in the traditional in-classroom instruction group. In the case of the challenge-based CAPT learning game proposed, the most active players in the competition kept on playing until the end and achieved significant pronunciation improvement results.