**Enhancing EFL Read Aloud Through AI-Assisted Self-Regulated Learning**


## Abstract

Although pronunciation is a fundamental component of oral communication, it has long been underemphasized in EFL instruction in Taiwan, particularly at universities of science and technology. Except for a few top science and technology universities, most vocational universities admit students with relatively low English proficiency. Consequently, instruction often prioritizes grammar and vocabulary to meet academic or testing demands, leaving pronunciation marginalized. This neglect affects students' intelligibility and comprehensibility, negatively impacting their self-efficacy and learning motivation. This study employed a mixed-methods design to examine the integration of self-regulated learning (SRL) strategies with AI-assisted pronunciation training, grounded in Zimmerman's (2002) SRL framework, which emphasizes the cyclical phases of forethought, performance, and self-reflection. Forty-four non-English majors from a university of science and technology in southern Taiwan participated in a ten-week pronunciation intervention within an eighteen-week English Reading course. The intervention combined in-class pronunciation instruction, AI-supported read-aloud tasks, and guided SRL activities aligned with Zimmerman's framework. Students set personalized goals (forethought), monitored and adjusted performance through AI feedback (performance), and recorded reflections in learning journals (self-reflection). In this study, intelligibility referred to the number of correctly recognized words determined through a comparison of the pre-and post-test transcriptions, whereas comprehensibility referred to the degree of listener effort required to understand the speech—the higher the score, the more difficult it was to comprehend—following Munro and Derwing (1999). Paired-sample *t*-tests comparing pre- and post-test mean scores revealed significant improvements in intelligibility (+11.02, $p < 0.001$) and comprehensibility (-1.01, $p < 0.001$), with gains

highest among lower-level students (22.40; -1.33), followed by mid-level (13.53; -0.88) and high-level learners (1.00; -0.82). Students who frequently applied SRL strategies outperformed those with lower engagement in word count progress (11.83 vs. 9.47), while both groups improved in comprehensibility, with slightly greater gains in the low-frequency group (-1.05 vs. -1.01). High-frequency users demonstrated greater performance stability ($r$ = 0.90), suggesting that consistent SRL engagement fosters more predictable outcomes. Qualitative data from questionnaires and interviews corroborated these findings, showing that systematic SRL practice enhanced self-efficacy, motivation, and learning autonomy. Overall, the findings underscore that while AI tools provide valuable feedback, effective pronunciation development depends on learners' ability to plan, monitor, and reflect within an SRL framework. Integrating AI-assisted training with SRL-oriented pedagogy can thus promote autonomous, measurable, and sustained improvement in intelligibility and comprehensibility in EFL contexts.

**Keywords**: self-regulated learning, AI-assisted instruction, read aloud, intelligibility, comprehensibility