

STUDY OF LEARNER AUTONOMY STRATEGIES IN IMPROVING SPEAKING AND SUPRASEGMENTAL ASPECTS THROUGH DIGITAL HUMANITIES

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Abstract

This study explores the use of learner autonomy strategies combined with digital humanities to improve students' speaking skills and suprasegmental aspects in English language learning. The problem addressed is students' need to independently manage their learning while enhancing pronunciation features such as intonation, word stress, rhythm, and pauses to make their speech more understandable. Employing a qualitative case study approach, data were collected through observations, in-depth interviews, and digital activity documentation, including recordings and reflective journals. Thematic analysis was used to interpret the data, focusing on how autonomous learning behaviours and digital tools contributed to speech improvement. The results indicate that learners who applied goal-setting, planning, self-monitoring, reflection, and digital feedback showed significant enhancement in speaking fluency, clarity, and prosodic features. The integration of digital humanities facilitated auditory and visual recognition of suprasegmental patterns, leading to improved pronunciation accuracy. This approach proved effective in supporting independent learning and improving spoken language skills, and it suggested that combining learner autonomy with digital humanities has promising potential for educational practices in language acquisition.

Keywords – Learner Autonomy, Digital Humanities, Speaking Skills, Suprasegmental Aspects

Introduction

Today, the importance of developing autonomous learning skills in language learners has been increasingly recognized as a important factor to enhance communicative competence, particularly in pronunciation and speaking skills. The existence of the rapid advancement of digital technologies, language education has begun to integrate method and innovative tools, such as digital humanities, to facilitate more engaging and effective learning experiences. Learner autonomy—defined as learners' ability to take charge of their own learning processes—encompasses strategies such as goal setting, planning, self-monitoring, reflection, and self-evaluation, which promote active

participation and self-directed growth (Hawkins, 2018; Godwin-Jones, 2019). These strategies are instrumental in enabling students to independently improve their speaking fluency, pronunciation, and suprasegmental features like intonation, word stress, rhythm, and pauses, all of which contribute to greater comprehensibility and communicative effectiveness.

Theoretical frameworks underpinning this study emphasize the dynamic and multifaceted nature of learner autonomy in language learning. It is closely linked to self-regulated learning (SRL) theories, which highlight the significance of metacognitive skills in managing learning processes (Maaie et al., 2022).

Additionally, the role of digital humanities (DH) in language education offers opportunities for authentic practice, multimodal engagement, and critical digital literacy, enhancing students' ability to analyse and produce spoken language through digital artifacts such as recordings, transcriptions, and multimedia content (Lam, 2020; Ramos, 2015). Suprasegmental aspects are fundamental to speech intelligibility and are influenced by learners' control over speech rate, pitch, stress, and rhythm, which are especially challenging for second-language (L2) learners but vital for effective communication (Reinisch et al., 2011; Isaacs, 2012).

This research aims to explore how the integration of learner autonomy strategies with digital humanities tools can improve students' speaking performance and suprasegmental skills. The key questions guiding this study are: (1) How do learner autonomy strategies affect students' speaking and suprasegmental skills? (2) How does the use of digital humanities support the practice, feedback, and reflection processes in developing these skills? The purpose of this study is to examine the effectiveness of combining autonomous learning approaches with digital humanities resources in an English language learning context, particularly focusing on the development of pronunciation, intonation, stress, rhythm, and tempo. The anticipated benefits include not only improved speaking proficiency among students but also enhanced digital literacy and self-regulated learning skills, which are essential for lifelong language development and real-world communication competence. Ultimately, this research endeavors to contribute to the growing body of knowledge on innovative pedagogical strategies that foster independent, technologically-mediated language learning in higher education settings.

Method

This study adopted a qualitative case study approach to investigate how effective it is to combine learner autonomy strategies with Digital Humanities tools for enhancing students' speaking proficiency and suprasegmental features. The participants were fifteen undergraduate students enrolled in an English language course at Universitas Subang. The researchers chose the participants purposively, considering their readiness to engage in self-directed learning and their previous experience with digital technology.

For data collection, the study incorporated several methods. The first method was observation conducted during students' speaking practice sessions, which allowed the researcher to examine learning behaviours in real time. The second method was in-depth interviews with both students and instructors in order to capture detailed perspectives about students' learning experiences, autonomy practices, and the use of digital tools. In addition, the study documented students' digital learning activities, including audio and video recordings, reflective journals, and various digital artifacts. To ensure the data were comprehensive, students recorded their speaking performances, monitored their own improvement through reflection, and compiled digital portfolios. Throughout the process, the researcher used observation sheets and interview guides to maintain consistency and structure in gathering information.

The study relied on a set of instruments to measure and interpret learning outcomes and processes. A speaking performance rubric was used to evaluate fluency, clarity, and accuracy. To assess suprasegmental development, a separate suprasegmental rubric examined intonation, stress, rhythm, and pauses. In order to monitor learner autonomy behaviours, the researcher applied observation checklists. Students also completed reflection logs to record their self-assessments, reflections, and

insights about what they learned and how they improved.

Data were analysed using thematic coding. This analysis followed three main stages: data reduction, data display, and interpretation. During coding, the researcher identified key themes related to improvement in speaking ability and suprasegmental development, and then connected these themes to the participants' use of autonomous strategies and digital tools. To strengthen the credibility of the findings, the study employed triangulation by comparing evidence obtained from interviews, observations, and digital artifacts.

Finally, the research was implemented through a repeated cycle consisting of planning, acting, observing, and reflecting across three iterative phases. In each phase, students determined speaking objectives, used digital resources for practice, received feedback based on the collected data, and reflected on their progress. After the three cycles were completed, the researcher assessed the overall effectiveness of the intervention and identified specific areas that required further refinement.

Results and Discussion

This section presents the findings from implementing a combined instructional approach that integrates learner autonomy strategies with Digital Humanities (DH) tools to improve students' speaking skills and suprasegmental features. The evidence is drawn from three complementary sources: (1) quantitative results obtained from standardized rubrics, (2) qualitative data from students' recordings and reflective journals, and (3) observational evidence that documents changes in learner behaviors related to autonomy, self-regulation, and metacognitive engagement.

Importantly, this study treats speaking not as a single ability, but as a multi-dimensional construct. Therefore, speaking

performance is evaluated through fluency, coherence, grammatical accuracy, vocabulary richness, and intelligibility. Because oral communication also depends on prosody—not only segmental correctness—the study further examines suprasegmental aspects, including intonation, word/stress placement, rhythm, and tempo using a dedicated rubric. In addition, the study explores autonomy and self-regulation as key mechanisms that may explain why learners improve and whether they can internalize strategies for continued growth beyond structured instruction.

The results are interpreted through established theoretical perspectives in autonomous learning, self-regulated learning (SRL), and second language acquisition (SLA). The discussion emphasizes how output-based practice, meaningful and contextualized input through DH resources, and data-informed feedback supported by multimodal tools can work together to strengthen both language development and learner agency. The section concludes with pedagogical implications, limitations, and directions for future research.

Improvement in Speaking Performance

1. Quantitative Data Analysis

The primary quantitative indicator in this study was the overall speaking score calculated using a rubric covering five dimensions: fluency, coherence, grammatical accuracy, vocabulary richness, and intelligibility. Pre- and post-intervention assessments were conducted to track development across three structured cycles of DH-supported practice. Across 30 participants, the mean overall speaking score increased from 65.4/100 before the intervention to 78.6/100 after the intervention, resulting in an average gain of 13.2 points. A paired-sample t-test showed $p < 0.01$, confirming that the improvement was statistically significant. These findings indicate that the instructional design—linking learner autonomy strategies with

DH resources—was effective for improving overall speaking proficiency.

To clarify the nature of improvement, sub-component analysis revealed several areas of strong progress. Fluency increased from 62.3 to 75.4, suggesting longer, more stable production with fewer hesitation breakdowns. Coherence and organization improved from 66.2 to 80.1, reflecting better sequencing of ideas, clearer transitions, and stronger logical flow. Grammatical accuracy improved from 66.2 to 80.1, indicating fewer errors and more appropriate structure use during speaking. Vocabulary richness increased from 68.5 to 79.2, demonstrating broader lexical range and more varied word choice. Finally, intelligibility rose from 64.8 to 77.9, implying that listeners could understand students more easily.

Taken together, these improvements suggest that the intervention produced a broad, not isolated, pattern of effectiveness. In other words, students did not simply “sound better” superficially; they developed multiple competencies required for effective oral communication.

Why These Improvements May Have Occurred? From an SLA standpoint, speaking development typically benefits from repeated opportunities to produce language, receive feedback, and revise output. The DH-supported cycles likely provided structured and frequent opportunities for production, since students practiced speaking tasks based on digital content and then iterated their performance through reflection and review. In addition, learner autonomy strategies may have increased persistence and sustained effort, which are crucial for speaking development because oral proficiency generally requires consistent rehearsal and time-on-task.

DH resources also tend to provide authentic, multimodal materials such as digital stories and audio-visual narratives. Such contextualization can support vocabulary growth and coherence because

learners speak about meaningful narratives rather than practicing isolated sentences.

2. Qualitative Data and Artifacts

Although quantitative results confirm improvement, qualitative evidence helps explain how improvement emerged and what it looked like in real learner performance. The study uses speaking recordings and reflective journals as key artifacts. A consistent pattern appears across cycles: students transitioned from tentative, monotonous, and hesitation-heavy speech in Cycle 1 toward more controlled, natural, and expressive delivery by Cycle 3. For example, earlier recordings showed monotone intonation that later evolved into more dynamic pitch movement. Rhythm also became smoother as students learned to pace their speech, while excessive pauses decreased and became more aligned with syntactic and meaning boundaries.

A student example further illustrates this development. Student A initially displayed frequent disfluencies and an average speaking rate of around 120 words per minute, with frequent filled pauses. By Cycle 3, the rate increased to approximately 140 words per minute, with fewer disfluencies. More importantly, pause placement improved: pauses became more strategically located, often corresponding to idea units. Student A also showed more varied intonation patterns for emphasis and question signaling, indicating improved linguistic control and self-monitoring.

Reflective journals also reveal learners' growing awareness and targeted practice. Student A reported that speech initially felt “very flat,” with difficulty stressing important words, but after practicing with digital stories and paying attention to intonation, delivery became more confident and clearer. This reflection suggests that DH-based practice functioned not only as motivation but also as an instructional medium that helped learners notice prosodic issues, interpret them, and practice

more effectively. Overall, qualitative evidence aligns with rubric findings by showing improvements in fluency, clarity, and expressiveness—core qualities of effective speaking.

3. Interpretation Within Existing Theories

The findings align with major SLA principles emphasizing that language development benefits from meaningful output practice, exposure to authentic input, and strategic regulation of learning. In particular, Swain's Output Hypothesis (1985) argues that producing language encourages learners to notice gaps between what they want to say and what they can say accurately. In this study, students repeatedly produced spoken output, then returned to recordings and reflection notes for revision. The iterative cycle of output and self-correction likely created opportunities for noticing and improvement.

From a sociocultural perspective, Vygotsky (1978) explains that learning occurs through mediation by cultural tools and interactional supports. DH resources can function as mediational tools by providing structured narratives, multimodal references, and accessible material for rehearsal. The intervention likely offered scaffolding at first by guiding engagement with digital content, then gradually enabling more independent self-directed practice. Thus, DH resources may have improved interactional competence by giving learners meaningful “content to speak about” and structured ways to rehearse performance.

Finally, the most distinctive contribution of the intervention is the combination of autonomy strategies with DH practices. Autonomy and SRL are not simply motivational additions; they shape how learners engage with learning tasks. When students set goals, monitor performance, and evaluate progress, they are more likely to practice effectively and persist through

difficulty—two factors strongly connected to language learning achievement.

Enhancement of Suprasegmental Features

1. Quantitative Evaluation via Rubric

A dedicated suprasegmental rubric assessed intonation, word/stress placement, rhythm, and tempo on a five-point scale (1 = poor, 5 = excellent). Before the intervention, the averages were relatively low, including intonation (2.8), stress/word prominence (2.7), rhythm (2.9), and tempo (3.0). After the intervention, scores rose markedly: intonation (4.0), stress/word prominence (3.9), rhythm (4.1), and tempo (4.2). Statistical testing confirmed these improvements were significant ($p < 0.001$). The magnitude of change suggests that the intervention did not only support pronunciation as a minor sub-skill; instead, it meaningfully improved prosodic systems that influence listener comprehension and perceived fluency.

2. Qualitative Improvements in Artifacts

Suprasegmental improvement is best identified through recordings because prosodic features are temporal and auditory. The recordings show progressive control over stress placement, pitch contour, and pacing. For instance, Student B initially produced stress placement that caused misunderstandings, such as weak stress on “eat” in the sentence “I like to eat pizza.” By Cycle 3, the same message was produced with clearer prominence: “I like to EAT pizza,” which helped listeners identify sentence focus. Pitch movement also became more consistent with natural prosody, supporting better comprehension.

Rhythm development also emerged clearly. Students shifted from choppy, unnatural timing patterns to smoother, more native-like phrasing. This change may have occurred because focused practice encouraged learners to segment speech into meaning units and align timing with those units rather than individual words alone. Tempo control also improved: early

recordings often showed learners speaking too quickly or inconsistently, reducing intelligibility. Later recordings demonstrated more appropriate pacing. For example, Student C initially spoke around 160 words per minute, sounding rushed, but in later recordings the rate decreased to around 130 words per minute, with more deliberate pauses and clearer speech.

3. Student Reflections and Metalinguistic Awareness

Student reflections suggest that learners gained metalinguistic awareness regarding prosody. Student C noted that initially they did not realize how stress placement affected understanding, but later they deliberately stressed the right words and controlled rhythm, resulting in speech that sounded more native-like. This shift is significant because it indicates learners began treating prosody as a controllable variable rather than an unconscious by-product. Such conscious attention is essential for effective pronunciation development, especially for learners whose first language may differ in stress and intonation patterns.

4. Theoretical Integration

These results support pronunciation research that emphasizes the role of prosody in intelligibility. The findings also align with the idea that perception and production reinforce each other. When learners can observe prosodic patterns (for example through visual outputs such as waveforms or spectrograms), they may improve both the ability to perceive stress and pitch relations and their capacity to produce them accurately. In addition, multimodal feedback may be especially effective because visual representations of pitch and timing connect what learners hear with what they see, reducing ambiguity and enabling targeted self-correction. Thus, DH tools likely functioned as enabling technologies that supported feedback and iterative refinement.

Increased Autonomy and Self-Regulation

1. Behavioral Observations and Self-Reports

A major outcome of the study was the observable increase in autonomy and self-directed learning behaviors. In earlier cycles, learners depended more on instructor guidance for setting goals, selecting appropriate digital content, and planning practice schedules. By the end of the intervention, most students could identify their weaknesses, seek additional digital materials, and build personalized practice routines.

For example, Student D described how they began setting specific goals for improving intonation and practicing with different videos independently. Student D also used spectrograms to identify improvement areas and recorded themselves repeatedly until satisfied. This reflects a shift from teacher-led tasks to learner-driven practice. Importantly, the autonomy displayed was not mere independence; it was structured autonomy supported by tools that helped learners interpret performance (e.g., spectrograms) and sustain iterative improvement through recording and self-assessment. Observational data reinforced this shift: students progressed from relying on teacher support toward planning and self-evaluation driven by their own needs. This suggests that autonomy strategies were integrated into students' habits rather than practiced only in class.

2. Indicators of Self-Regulation

The intervention also strengthened key SRL processes, including goal setting, strategic planning, self-monitoring, and self-evaluation. Initially, only about 30% of students demonstrated clear planning before practice, but by Cycle 3 this increased to 85%. Students used reflective journals and digital portfolios to track progress, indicating increased metacognitive awareness. Moreover, behaviors such as peer review and repeated

rehearsal became more frequent across cycles. Students increasingly attended to suprasegmental elements during practice, suggesting that self-regulation guided attention and improved task execution. These patterns align with Zimmerman's (2002) SRL model, where learners enhance performance not only through practice but by managing learning processes through cyclical regulation.

3. Theoretical Implications

The increased autonomy observed in this study aligns with research indicating that self-monitoring and goal-setting support more effective learning. From a sociocultural perspective, digital tools and guided self-practice can promote internalization of learning strategies and support learners' movement toward independent performance within the Zone of Proximal Development (Vygotsky, 1978). Learners' reported increases in confidence and ownership also reflect Self-Determination Theory (Deci & Ryan, 1985): when competence and autonomy are experienced, motivation becomes more sustainable. This matters because speaking development requires ongoing long-term practice beyond short instructional periods.

Discussion and Integration

Overall, the findings offer a coherent explanation of the intervention's impact. The combination of learner autonomy strategies and DH resources improved measurable speaking performance, enhanced suprasegmental control, and strengthened learners' self-regulated behaviors.

1. Evidence of the Intervention's Effectiveness

The intervention produced statistically significant gains in overall speaking performance, with improvement observed across all rubric sub-components. At the same time, students demonstrated substantial progress in prosody: intonation

became more accurate, stress placement improved, rhythm became smoother, and tempo was better controlled. These changes are meaningful rather than superficial because prosody plays a central role in how listeners interpret meaning, identify focus, and perceive communicative intention.

2. Mechanisms: Why Autonomy + DH Mattered

Qualitative evidence helps clarify why these outcomes occurred. Students moved from tentative speech to more expressive delivery, and reflections show that they learned to notice prosodic patterns and adjust their output accordingly. Learner autonomy strategies likely encouraged deeper engagement by enabling learners to set personal goals, monitor progress, and evaluate recordings. This may have increased time-on-task and improved practice quality by directing attention to key linguistic features rather than repetitive general rehearsal.

DH tools likely supported these processes by providing multimodal feedback and meaningful contexts for practice. Visual feedback such as spectrogram and waveform representations can reduce uncertainty by connecting speech perception with production outcomes. Multimodal feedback may therefore help learners develop pitch and stress patterns more effectively, which is consistent with the results of this study.

3. Pedagogical Implications

The study suggests that language teaching can benefit from a learner-centered approach that integrates digital tools for pronunciation and prosody training. Using digital narratives, spectrogram analysis, and reflective journals may support linguistic development while also strengthening digital literacy and self-directed learning skills. Practically, educators may: design speaking tasks around digital content that provides meaningful context, use visual-auditory feedback to help learners perceive and

revise prosodic features, embed autonomy processes such as goal-setting and reflection into instructional cycles, and encourage iterative rehearsal through recording and feedback loops to allow learners to monitor improvement over time. These approaches reflect contemporary educational priorities emphasizing creativity, collaboration, and digital literacy as central dimensions of language learning.

4. Limitations and Further Research

Although the findings are encouraging, several limitations should be considered. First, the sample size is relatively small ($N = 30$), which may limit the generalizability of the results to wider populations. Future studies should include larger and more diverse samples with different learner profiles, such as variations in proficiency, first language prosody systems, motivation, and access to technology.

Second, the intervention duration involved only three structured cycles over a limited time period. Short-term improvements may not fully represent long-term acquisition or retention. Therefore, future research should incorporate longitudinal follow-ups to determine whether improvements persist after the intervention ends.

Third, the study design suggests that no control group may have been included, making it harder to isolate the causal effects of DH tools versus autonomy strategies. Future studies should include comparison groups, such as a DH-only group, an autonomy-only group, and a combined DH plus autonomy group, to strengthen causal interpretations.

Fourth, measurement using rubrics may still involve subjectivity, particularly for intelligibility and suprasegmental quality. Future research should improve reliability by involving multiple raters, conducting inter-rater calibration sessions, and adding objective acoustic measures such as pitch variability and speech rate consistency.

Finally, further studies can investigate the optimal duration for prosody training, differences in learner responsiveness to visual feedback tools, how autonomy strategies affect motivation and persistence across semesters, and how peer feedback systems and collaborative digital annotation tools can enhance learning in DH environments. Addressing these issues will help strengthen evidence regarding the effectiveness and scalability of autonomy-oriented DH-supported speaking instruction.

The results demonstrate that combining learner autonomy strategies with Digital Humanities tools enhances students' speaking performance, improves suprasegmental features that are essential for intelligibility, and fosters autonomy and self-regulation behaviour that support sustained language development. Despite limitations, the findings offer meaningful guidance for pedagogical practice and provide a basis for future research. Overall, language education may be strengthened by adopting learner-centered autonomy design and multimodal digital feedback systems.

Conclusions

The study demonstrates that integrating learner autonomy strategies with Digital Humanities (DH) tools significantly enhances students' speaking proficiency, particularly in suprasegmental features such as intonation, stress, rhythm, and tempo. Quantitative data reveal statistically significant improvements across multiple dimensions of speaking performance, with increased fluency, coherence, accuracy, vocabulary richness, and intelligibility, indicating comprehensive development in oral communication skills.

Qualitative evidence from recordings and reflective journals corroborates these findings, showing learners moving from tentative and hesitant speech to more controlled, expressive, and native-like delivery. The use of multimodal DH

resources—such as spectrograms and audio-visual narratives—enabled learners to notice, analyze, and self-correct prosodic features, fostering metalinguistic awareness and self-monitoring.

The intervention also led to increased learner autonomy and self-regulation behaviors. Participants gradually shifted from dependence on instructor guidance to independent goal-setting, strategic planning, and reflective practice supported by digital tools, aligning with theories of self-regulated learning and sociocultural approaches to language development. This autonomous engagement not only improved performance but also cultivated digital literacy and lifelong learning skills.

The combination of strategies resulted in a holistic enhancement of speaking skills, emphasizing the importance of authentic, contextualized input and iterative, data-informed practice. Pedagogically, these findings suggest that language instruction that centers on learner agency, supported by multimodal digital feedback, can produce meaningful and sustainable gains in pronunciation and prosody. Limitations related to sample size, intervention length, and potential subjectivity of assessments highlight the need for further research with larger, diverse populations and more rigorous measurement tools.

This research underscores the potential of innovative, learner-centered approaches that leverage digital humanities tools to foster autonomous, effective, and expressive spoken language skills, contributing valuable insights for future pedagogical practices and scholarly inquiry in the field of language education.

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