

Language Teaching Supervision for a New Era: AICOLT System's Journey to AI-Driven Innovation

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Abstract

The shortage of teachers is a global phenomenon. According to UNESCO (2024), “the COVID-19 pandemic has had long-lasting effects on the availability of teachers” (p. 6). This issue is particularly evident in the context of language teachers. For example, a study by the Canadian Association for Immersion Professionals (ACPI) and the Canadian Association for Second Language Teachers (CASLT) (ACPI, 2023) revealed a shortage of 10,000 French Immersion and FSL teachers in Canada. The shortage is especially pronounced in rural and remote areas. For many institutions and teacher training programs, offering pre-service teacher internships outside urban centers is very costly, and they need more qualified supervisors willing to travel to rural and remote areas to supervise teacher trainees. According to the United Nations (2020), initial teacher training needs to be reformed, particularly by fostering innovation in pedagogical coaching and supervision mechanisms. Moreover, such reform must address the urgency of adapting language teacher training and supervision to a new digital era.

Keywords: Language teacher shortage, AI technologies, Teacher training, Supervision, Automatic speech recognition

Introduction

The shortage of teachers is a global phenomenon. According to UNESCO (2024), “the COVID-19 pandemic has had long-lasting effects on the

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availability of teachers” (p. 6). This issue is particularly evident in the context of language teachers. For example, a study by the Canadian Association for Immersion Professionals (ACPI) and the Canadian Association for Second Language Teachers (CASLT) (ACPI, 2023) revealed a shortage of 10,000 French Immersion and FSL teachers in Canada. The shortage is especially pronounced in rural and remote areas.

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Previous Research

Previous research in which two authors collaborated has focused on adapting the AICOLT system for the French language within the Canadian educational context (Ishizuka & Pellerin, 2020) to develop innovative supervision mechanisms during internships for French language trainees. More specifically, using the AICOLT system provides a solution for a new era where a lack of access to quality internships in remote and rural areas exacerbates teacher shortages.

AICOLT System

The AICOLT analysis and coding system (Ishizuka & Kibler, 2018; Ishizuka, *in press*) aims to generate quantitative data that enable pre-service teachers to reflect on their actions and further improve their pedagogical practices during their internships. The AICOLT, which was first designed as an automatic English language class analysis system (Ishizuka & Kibler, 2018), measures the structure and content of an English language class for Japanese teacher trainees and in-service teachers as a mechanism to improve their teaching practices without the presence of a qualified teaching supervisor.

Using the Microsoft speech recognition engine to recognize teachers’ utterances, the AICOLT first tries to match the recognized real-time scripts of the utterances with the installed pattern-matching rules. Then, it displays the coding results in a COLT table with a feature summary (Figure 1).

A study by Ishizuka & Kibler (2018) examined the use of the AICOLT system by elementary and high school English teachers in Japan, and the results

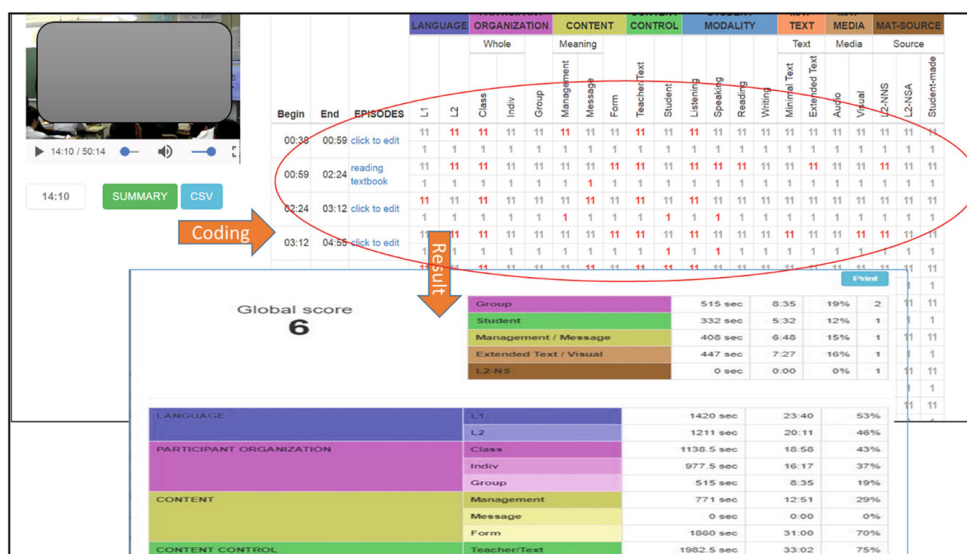


Figure 1. Automatically coded results.

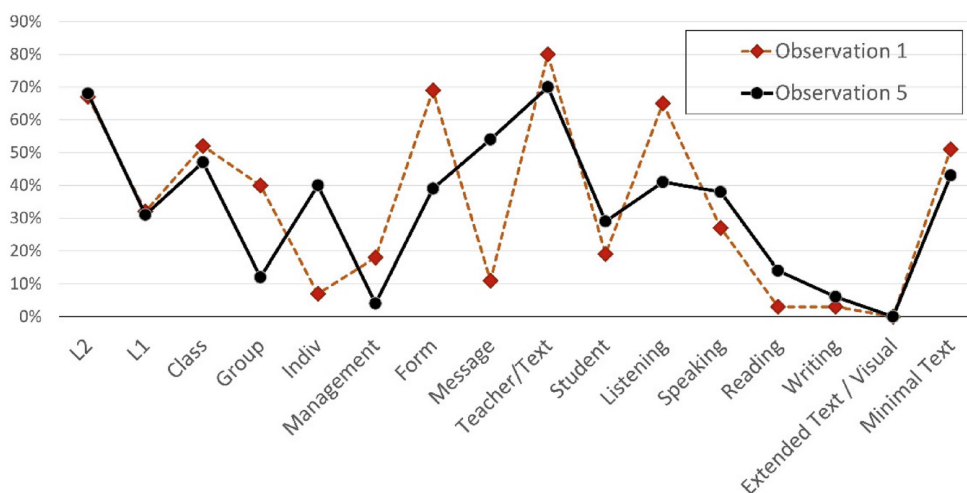


Figure 2. Analysis of the COLT coding results between the 1st and 5th observations showing one of the teacher's pedagogical practice changes in one year.

indicated (Figure 2) a positive impact of using the AICOLT system in improving pedagogical practices of the teachers.

Objectives

The paper has two main objectives. First, it presents recent research (Pellerin & Ishizuka, 2022) on the Automatic COLT (AICOLT), an artificial intelligence

application used for observing, analyzing, and reflecting on teaching practices during French language teacher internships. Second, it discusses an ongoing developmental project that integrates a new AI voice recognition system into the existing AICOLT system, leveraging advancements in AI technologies.

First Study

The study involved pre-service French-language teachers using the AICOLT system during their internships. The quantitative data collected consisted of PDF documents containing Automatic COLT analysis results from audio recordings of classroom lessons conducted during the internships. The qualitative data were based on transcripts of individual interviews with the trainees. One primary outcome of the study is the positive impact of using the AICOLT system in fostering reflection on evolving teaching practices among French language teacher trainees. Moreover, one trainee in a remote area used the AICOLT system, demonstrating its potential in remote internships and how it allows for quality supervision.

However, according to the French second-language trainees, the AICOLT system adapted for the French language could not consistently recognize their voices accurately. Additionally, the AICOLT system could not identify French grammar errors made by the trainees and flagged their use of Anglicisms, a common problem for second-language learners. The trainees' accuracy of French language use is a concern due to the potential negative impact of fossilized errors on their teaching practices and their students' language learning.

Second Study

The second part of the paper discusses the ongoing project with the three authors to integrate emergent automatic speech recognition (ASR) with multimodal (LLM) capabilities into the existing AICOLT system. This will address previous issues related to the accuracy of voice recognition in the French language and the correction of errors using generative error correction (GEC).

Integrating large language models (LLMs) into AI becomes pivotal in language teacher training as technology advances. The emergence of automatic speech recognition (ASR) with multimodal (LLM) capabilities marks a significant turning point in automated speech recognition research. The latest speech recognition AI (e.g., Whisper API, Web Speech API) is revolutionizing the field by surpassing prior ASR models' accuracy and operational efficiency, thus opening new language teaching and learning possibilities. Our ongoing research focuses on supervising teacher trainees using the AICOLT system integrated with the

latest and most accurate speech recognition AI models. We hope these new developments can help eradicate issues related to voice recognition accuracy in French, as observed in our prior study. Additionally, the project explores emergent generative error correction (GEC) based on extensive linguistic datasets to enhance language correction, assess language proficiency, identify common errors, and offer tailored suggestions for improving the language learning of our teacher trainees.

Conclusion

The paper concludes with a discussion concerning the evolution of our research program in CALL in reaction to the emergence of AI technologies. More specifically, it explores the potential of AI technologies in bringing tangible solutions to the language teachers' shortage as a global phenomenon by providing access to innovative, high-quality teacher supervision, especially in remote and rural areas.

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