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An Application-Oriented Study of Diagnostic Language Assessment in College English Listening Instruction: The Case of the UDig System

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Abstract: With the increasing integration of artificial intelligence (AI) and educational digitalization, diagnostic language assessment (DLA) has gained attention as a formative approach that supports learning-oriented instruction. Unlike summative testing, DLA focuses on identifying learners' strengths and weaknesses in specific language subskills and providing actionable feedback for pedagogical decision-making. This paper examines the application of diagnostic language assessment in undergraduate College English listening instruction, taking the AI-assisted UDig system as an illustrative case. Drawing on theories of diagnostic assessment and learning-oriented assessment (LOA), the paper proposes an assessment - instruction interaction framework that embeds diagnostic feedback into listening teaching, remedial support, and learner autonomy development. By reviewing representative diagnostic assessment systems and listening-related research, the study discusses the pedagogical value, implementation pathways, and challenges of applying AI-supported diagnostic assessment in university-level English listening instruction. The paper aims to provide a theoretically grounded and practically feasible reference for integrating diagnostic language assessment into College English teaching in digitally enhanced learning environments.

Keywords: Diagnostic Language Assessment; English Listening; Learning-Oriented Assessment; AI-Assisted Assessment; College English

1. Introduction

Listening has long been recognized as a fundamental yet challenging component of second language acquisition [1]. In college English teaching, listening instruction is often constrained by limited class time, uniform teaching materials, and an overreliance on summative testing [2]. Such practices make it difficult for teachers to identify learners' specific listening problems or provide timely, individualized support.

In response to these challenges, diagnostic language assessment has gained increasing attention in recent years. Unlike traditional achievement-oriented testing, diagnostic assessment emphasizes identifying learning gaps and providing actionable feedback to support subsequent instruction [3]. With the rapid development of artificial intelligence and learning analytics, digital diagnostic systems have made it possible to integrate assessment into daily teaching practices in a more systematic and data-driven manner [4]. This study explores the application of diagnostic language assessment in college English listening instruction, taking the UDig system as a representative example.

2. Theoretical Foundations of Diagnostic Language Assessment

2.1 Diagnostic Language Assessment and Formative Assessment

Diagnostic language assessment is conceptually rooted in formative assessment theory, which views assessment as an integral part of the learning process rather than a terminal evaluation [5]. While formative assessment broadly aims to enhance learning through feedback, diagnostic assessment places greater emphasis on identifying specific sources of learning difficulty and informing targeted instructional intervention [6].

In listening instruction, diagnostic assessment focuses on learners' performance at different processing levels, including phonological decoding, lexical access, syntactic parsing, and discourse-level comprehension [7]. By

systematically analyzing learners' responses and error patterns, diagnostic assessment allows teachers to move beyond global proficiency judgments and address concrete listening problems.

2.2 Diagnostic Feedback and Learning-Oriented Assessment

Feedback plays a central role in diagnostic language assessment. Research on learning-oriented assessment suggests that feedback is most effective when it is timely, specific, and directly linked to learning strategies rather than test scores alone [8]. Diagnostic feedback aims to make learners aware of their listening weaknesses and guide them toward appropriate remedial actions.

From a cognitive perspective, diagnostic feedback supports learners' metacognitive development by helping them monitor their listening processes and adjust strategies accordingly [9]. In this sense, diagnostic assessment not only evaluates learning but also becomes a mechanism for fostering learner autonomy and self-regulated learning [10].

3. Diagnostic Language Assessment in College English Listening

3.1Challenges in Traditional Listening Assessment

Traditional listening assessment in college English classrooms is predominantly summative in nature, often relying on standardized tests or end-of-unit quizzes [11]. Such assessments provide limited information about how learners process listening input or why comprehension breakdowns occur.

Moreover, large class sizes and limited instructional time make it difficult for teachers to conduct individualized diagnosis based on manual analysis of listening performance [12]. As a result, instructional decisions are frequently based on overall test results rather than detailed diagnostic evidence.

3.2 Digital Diagnostic Systems and AI-Assisted Assessment

The emergence of AI-assisted diagnostic systems has reshaped the possibilities of language assessment. By collecting and analyzing large volumes of learner data, digital systems can provide fine-grained diagnostic information at both individual and group levels [13]. These systems enable continuous monitoring of learners' listening development and support adaptive teaching practices.

UDig is a representative diagnostic assessment system designed to support formative and diagnostic evaluation in college English instruction. It integrates automated scoring, learning analytics, and feedback mechanisms to help teachers identify learners' listening difficulties and adjust instruction accordingly [14].

4. The UDig System as a Diagnostic Tool for Listening Instruction

4.1 Diagnostic Functions of UDig in Listening Tasks

In listening instruction, the UDig system supports diagnostic assessment by analyzing learners' performance across different listening sub-skills, such as identifying key information, understanding logical relations, and interpreting speaker intentions [15]. Based on learners' response patterns, the system generates diagnostic reports that highlight common error types and learning gaps.

These diagnostic outputs allow teachers to design targeted follow-up activities, such as focused phonetic training, vocabulary reinforcement, or discourse-based listening practice. In this way, assessment results are directly linked to instructional adjustment.

4.2 Pedagogical Implications of UDig-Based Diagnosis

From a pedagogical perspective, the integration of UDig into listening instruction helps shift assessment from a product-oriented model to a process-oriented one. Teachers are able to use diagnostic data to refine teaching objectives, select appropriate materials, and differentiate instruction [16].

For learners, diagnostic feedback provided by the system enhances awareness of listening strategies and encourages active engagement with listening tasks. This aligns with contemporary views of assessment as a tool for learning rather than mere evaluation [17].

5. Conclusion

This study has examined the theoretical foundations and pedagogical value of applying diagnostic language assessment to college English listening instruction, with particular

reference to the UDig system. The analysis suggests that diagnostic assessment, when supported by digital technologies, can enhance the precision of listening diagnosis, promote learning-oriented feedback, and facilitate adaptive teaching practices.

From a theoretical perspective, the study contributes to the growing body of research on AI-assisted diagnostic assessment in language education. Practically, it highlights the potential of systems like UDig to support evidence-based listening instruction in college English classrooms.

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