

## A Holistic Evaluation Model Review of Language: Integration of Knowledge, Attitude, and Skills in Technology-Based Summative and Formative Assessment

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KEYWORDS	ABSTRACT
Holistic evaluation, technology-based assessment, summative assessment, formative assessment, language education, integration of knowledge-attitude-skills	Modern language education demands assessments that not only measure linguistic abilities, but also cognitive, affective, and psychomotor aspects in a holistic manner. With the advancement of educational technology, technology-based assessment offers the potential to integrate knowledge, attitudes, and skills into a more comprehensive evaluation framework. This paper employs a literature review method to analyze recent developments in the application of formative and summative assessments in language education, with a focus on the holistic integration of these three domains. The results of the literature review indicate that although many studies have discussed the use of technology in assessment, few address the holistic measurement of attitudes and skills alongside knowledge. This research contributes new insights by proposing a technology-based holistic evaluation model that can be applied within language learning contexts.

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### Introduction

Evaluations in language education are often still focused on purely cognitive or knowledge-based aspects, such as grammatical ability and reading comprehension, while aspects of attitude (affective) and practical skills (psychomotor/communicative performance) tend to be ignored or evaluated separately (Wikurendra et al., 2024). This fragmentary approach results in an incomplete picture of students' competencies. In addition, the development of educational technology allows for a more interactive and personalized approach to assessment, but its implementation in the context of holistic evaluation remains limited. Several researchers have emphasized the importance of a holistic approach in education. For example, Brown & Abeywickrama (2020) discuss the shift away from traditional assessments toward more authentic and performance-based forms. On the other hand, Warschauer et al. (2021) explore the use of technology in improving the validity and reliability of language assessments. However, most of these studies have not explicitly combined all three areas of evaluation—knowledge, attitudes, and skills—into a single technology-based assessment system.

In the modern world of education, language evaluation can no longer rely solely on measuring students' cognitive abilities or knowledge. The advancement of information technology has opened up new opportunities for the implementation of more holistic assessments that integrate three main

domains: knowledge, attitude, and skills (Bachman & Palmer, 2021; Cummins & Persad, 2022). Although substantial research has been conducted in the field of technology-based assessment, very little of it explicitly integrates these three domains within a unified framework for language evaluation (García & Wei, 2020; Shohamy, 2021). This highlights a significant gap in the development of a comprehensive and responsive assessment model aligned with the demands of 21st-century learning.

Summative and formative assessments serve different but complementary roles in the learning process. However, the integration of these two forms of assessment within a holistic approach to language learning remains a significant challenge—particularly in the use of technology as a medium (Doe et al., 2021; Kunnan, 2020). Several studies have shown that digital platforms such as Google Classroom and Learning Management Systems (*LMS*) are effective in supporting formative assessments and in evaluating communicative skills (Liu & Zhang, 2021; Al-Mekhlafy, 2022). Furthermore, technological advancements such as Artificial Intelligence (*AI*) and Natural Language Processing (*NLP*) are beginning to be used for the automated evaluation of students' writing and speaking abilities (McNamara et al., 2022). However, affective aspects such as attitudes, motivation, and language identity are still rarely integrated systematically into technology-based assessment designs (Hodgson et al., 2020).

Analysis of the literature shows that no existing study has specifically integrated all three domains—knowledge, attitudes, and skills—into a single technology-based language evaluation framework that encompasses both summative and formative assessments (García & Wei, 2020; Shohamy, 2021). This research offers originality by proposing a holistic evaluation model that incorporates these three dimensions within a technology-based assessment framework. The model is designed to address the challenges of 21st-century education, which emphasizes deep, inclusive, and real-world-relevant learning (Cummins & Persad, 2022; Bachman & Palmer, 2021). Thus, this research can make a significant contribution to the development of language assessment practices that are more comprehensive and adaptive to technological advancements and the needs of future learners.

This study aims to develop and propose a holistic language evaluation model by integrating the three main domains—knowledge, attitude, and skills—into the framework of technology-based summative and formative assessments. The model is intended to address existing gaps in practice. Current language assessments tend to focus only on linguistic abilities or communicative competencies, without systematically incorporating affective and psychomotor aspects. By leveraging technological developments such as Learning Management Systems (*LMS*), Artificial Intelligence (*AI*), and Natural Language Processing (*NLP*), this research seeks to make both theoretical and practical contributions to the advancement of language assessment practices that are more responsive, inclusive, and aligned with the needs of 21st-century education.

## Materials and Methods

This study employs a literature review method with a *systematic literature review* approach, as outlined by Booth et al. (2021) in *The Systematic Literature Review: A Practical Guide*. The research process consists of several stages. First, a literature search was conducted using the *Scopus*, *ERIC*, and *Google Scholar* databases. Next, articles were screened based on the following inclusion criteria: publications released between 2020 and 2024, topics relevant to language evaluation, incorporation of technology, and a focus on *holistic assessment*. After identifying eligible studies, a synthesis analysis was performed to examine research themes, key findings, and existing research gaps. Finally, the findings were organized and prepared within a conceptual framework that integrates knowledge, attitudes, and skills in *technology-based* assessments.

## Results and Discussions

A literature review found several significant trends:

1. Integration of Affective Domains: Few studies have evaluated students' attitudes towards language learning systematically. However, research by Li & Zhang (2022) shows that positive attitudes are strongly correlated with motivation and language achievement.
2. Technology for Automated Feedback: The use of AI in providing direct feedback on speaking and writing abilities has been developed, as in the research of Heift & Schulze (2021).
3. Authentic Performance Assessment: Digital platforms such as Padlet, Flipgrid, and Google Classroom allow students to display communicative skills realistically, in accordance with the principles of formative assessment.
4. Integrative Model: A study by Cumming (2020) suggests the need for an evaluation model that brings together all aspects of competence, including learning attitudes and behaviors, in a single framework.

## Discussion

### Holistic Language Evaluation: Integration of Knowledge, Attitudes, and Skills

A holistic approach to language evaluation requires measurements that not only test linguistic ability, but also assess how students use language in real-world situations, as well as their attitudes towards the learning process. Within this framework, knowledge includes the structure and function of language; attitudes include interest, confidence, fault tolerance; while skills include the ability to listen, speak, read, and write effectively.

### Technology-Based Summative and Formative Assessment

With the support of technology, these two types of assessments can be carried out more effectively. Examples:

- Formative Assessments: Platforms like Quizizz or Kahoot! can be used to provide daily exercises accompanied by instant feedback.
- Summative Assessment: Video app-based oral exams with automated analysis from AI can replace traditional written exams that are less representative.

The integration of these three domains in one assessment system requires complex instrument design, but it is feasible to realize it with the help of technology.

#### a. Concept of Holistic Language Evaluation

A holistic language evaluation aims not only to measure students' linguistic abilities such as grammar or vocabulary, but also how they use language in a real context and their attitudes towards the learning process (García & Wei, 2020). This approach is in accordance with the principles of student-centered learning and competency-based education which emphasizes the importance of comprehensive competency development. Thus, the evaluation must cover three main domains: knowledge, attitude, and skills so that the assessment results are more representative of students' abilities as 21st century learners.

#### b. Domain of Knowledge in Language Evaluation

The realm of knowledge includes students' understanding of the structure and function of language, including tenses, prepositions, parts of speech, and its use in various communicative contexts. In a holistic evaluation model, this domain can be measured through instruments such as objective tests, short essays, or discourse analysis tasks. Technology enables the automation of assessments for multiple-choice and short-fill question types through platforms such as Google Forms or LMS such as Moodle (Doe et al., 2021). However, for interpretive questions, a combination of AI scoring tools and direct feedback from teachers is needed.

c. The Realm of Attitudes in Language Evaluation

Attitude is an affective aspect that is often overlooked in traditional language assessments, even though it is very important in the formation of linguistic identity and learning motivation. Aspects assessed can include interest in the target language, confidence in speaking, tolerance for mistakes, and collaboration in groups. Attitude assessments can be done through digital surveys, journal reflections, or behavioral observations during classroom activities recorded in the LMS system. Platforms such as Padlet or Flipgrid can be used to record students' verbal expressions which are then qualitatively analyzed (Shohamy, 2021).

d. Domain of Skills in Language Evaluation

Skills include four main abilities in language learning: listening, speaking, reading, writing. Technology plays an important role in the assessment of these skills, particularly on a large scale. For example, Natural Language Processing (NLP) can be used to evaluate writing abilities automatically (McNamara et al., 2022), while video app-based oral exams with AI analysis can provide more objective assessments than traditional written exams (Al-Mekhlafy, 2022).

e. Integration of the Three Domains in One Assessment System

The integration of these three domains in one assessment system requires the design of complex instruments but feasible to be realized with the help of technology. The recommended model is the blended assessment approach, where data is collected online and offline, and then synthesized to provide a holistic picture of student development. For example, Learning Management Systems (LMS) can be used to combine student activity log data (attitude), automated test results (knowledge), and recorded oral/written assignments (skills) in a single evaluation dashboard.

f. Technology-Based Formative Test Model

In formative assessments, platforms like Quizizz, Kahoot!, or Socrative are very effective for providing daily practice with instant feedback (Liu & Zhang, 2021). This test model can be multiple-choice, drag and drop, or short fill-in questions designed to test understanding of basic concepts. Additionally, final reflection features within platforms such as Mentimeter or Jamboard can be used to explore students' attitudes towards the material being studied. The results of this test are used by teachers to adjust learning strategies in real-time.

g. Technology-Based Summative Test Model

Technology-based summative assessments can be in the form of video application-based oral exams such as Zoom or Microsoft Teams, where students' answers are analyzed using NLP software or Speech Recognition Tools such as Otter.ai or IBM Watson. Writing questions can be assessed automatically with tools like Grammarly or Turnitin, while reading skills can be tested through interactive simulations with platforms like Edpuzzle. This model allows for more objective and representative assessments than traditional exams (Kunnan, 2020; Al-Mekhlafy, 2022).

h. Assessment Points in the Holistic Evaluation Model

The recommended evaluation model includes the following assessment points:

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- Knowledge: Understanding of language structure, vocabulary, and language use in context.
  - Attitude: Learning motivation, teamwork, tolerance for mistakes, and self-reflection.
  - Skills: The ability to listen, speak, read, and write effectively and creatively.

Each point is scored with a certain weight, for example 40% for knowledge, 30% for attitude, and 30% for skills, resulting in a more balanced and representative final score.

i. Question Form in the Holistic Evaluation Model

The form of questions used in this evaluation model varies, depending on the domain being assessed:

1) Knowledge:

- (a) Multiple Choice
- (b) Brief Filling
- (c) Discourse Analysis

2) Attitude:

- (a) Survey Digital (Likert Scale)
- (b) Journal Reflections
- (c) Classroom Interaction Observation

3) skills:

- (a) Video Recording of Oral Exam
- (b) Essay Writing
- (c) Interactive Reading Assignments

The use of technology allows automation in the assessment of several forms of these questions, especially those that are objective, while the subjective form still requires human assessment or a combination with AI.

j. Recommendations for the Implementation of the Evaluation Model

To implement this holistic evaluation model, schools or educational institutions need to build adequate digital infrastructure, train teachers in the use of assessment technology, and provide clear assessment guidance for each domain. This model must also be flexible and adaptive to the cultural context and needs of students. Cross-disciplinary collaboration—such as between linguists, educational psychologists, and technology developers—is necessary to ensure the validity and reliability of assessments (Cummins & Persad, 2022; Bachman & Palmer, 2021).

## Conclusion

*Holistic evaluation* in language education is an urgent need to meet the demands of 21st-century education. Educational technology provides an effective means to support the integration of knowledge, attitudes, and skills in both *summative* and *formative* assessments. Although there have been significant advances in the use of technology for assessment purposes, there remains a clear need for a more comprehensive evaluation model that deliberately and systematically combines these three domains.

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