

Evolving Student Assessment: AI-Driven Rubrics for Personalized and Equitable English Language Learning

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Abstract—Technological advancements have been reshaping the paradigms of educational scenarios through tools and platforms that enhance the academic experience. The demands of Industry 4.0 and the implications of Moore's Law accelerated these changes paving the way for imbibing innovative approaches in education. This study delves into developing and applying AI-driven rubrics to foster personalized and equitable assessments in English language learning for engineering undergraduates. By leveraging AI tools, the tailored rubrics provide personalized feedback, minimize subjectivity, and improve grading consistency, in alignment with Outcome-Based Education (OBE). This paper studies the impact of AI-generated rubrics on student performance, engagement, and perception, recognizing the advantages and challenges of this approach. The results of the mixed-method study involving 64 first-year BTech students reveal that AI-driven rubrics are perceived as generally transparent, fair, and reflective of student performance. However, students also feel that several areas of the feedback require improvement, like the standard of the feedback, transparency, and AI decision-making. The study ends with suggestions for improving AI-driven rubrics to increase AI capacity to support inclusive, transparent, and individualized evaluation procedures in English language instruction and acquisition.

Keywords—AI-driven rubrics; Equitable Assessment; Feedback; Language Learning; Personalized Learning.

ICTIEE Track: Assessment of Effective Teaching

ICTIEE Sub-Track: AI-Based Assessment and Evaluation: Leveraging Technology

I. INTRODUCTION

In recent years, integrating technology into classroom teaching has revolutionized the teaching-learning processes. Technological advancements revamped the paradigms of educational scenarios through a plethora of tools and platforms improving the academic experience. The advents of Industry 4.0 and Moore's Law not only highlight the need for education to be dynamic and forward-thinking to adapt swiftly.

Schwab (2016) describes Industry 4.0 as a transformative era driven by artificial intelligence, IoT, and automation, reshaping industries and societal structures. As computing power

increases, and AI and IoT are ingrained into everyday life, education systems are forced to evolve to prepare students – the future workforce for this rapidly changing landscape. This includes integrating new technologies into the curriculum and fostering a culture of lifelong learning.

Moore's Law, introduced by Moore (1965), predicts the exponential growth of computing power by doubling transistor density approximately every two years, emphasizing the need for education to keep pace with rapid technological advancements and prepare for future industry demands.

A forward-thinking education system should integrate technology, foster innovation, and prepare students for emerging job roles. Approaches like project-based learning, exposure to new technologies, and cross-disciplinary courses are becoming essential in modern curricula.

In these dynamic learning scenarios, innovative approaches like AI driven rubrics fostering equitable and personalized English Language Learning approaches are evolving. These novel approaches assist the faculty in creating assessments to cater to individual needs, thereby promoting inclusivity and fairness in education providing scope for personalized learning.

Rubric-based instruction is fundamental to the effective application of Outcome-Based Education. Clear, reliable, and comprehensive benchmarks for assessment support the students in attaining the desired learning outcomes. In line with the OBE framework, rubric-based teaching learning and evaluation adopt meaningful feedback and transparency. Moreover, integrating rubric-based assessment empowers teachers and students to work on skill enhancement/competency development and thrive for continuous improvement towards accomplishing a more effective and equitable learning environment.

Rubric-based assessments are the foundation of the English language learning acquisition process. Furthermore, rubrics provide a transparent and structured framework for appraising student performance toward improving proficiency in writing and speaking skills.

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1.1 Rubric-based assessment:

Rubric-based assessment is important in education as it provides clear, consistent criteria for evaluating student performance and provides transparent and objective grading. The establishment of clear objectives provides clarity about the course requirements and expectations in alignment with course outcomes. In addition, this also enhances feedback quality and nurtures the attitude of self-regulation and goal setting among the learners. Furthermore, these kinds of rubric-based assessments improve uniformity and consistency in scoring and support course objectives emphasizing the areas for enhancement.

Rubric-based assessment motivates the learners and provides an opportunity to take ownership of learning, fostering active engagement with the content. In addition, the learner would also understand the transparency of the process mapped with the expected outcomes of the course in alignment with real-world scenarios. The teaching-learning process can be effective through methodical assessment targeting continuous improvement and encouraging lifelong learning.

1.2 Challenges in Traditional Methods:

Traditional rubrics face several limitations that can affect the accuracy and fairness of assessments. These limitations include:

Subjectivity and Inconsistency: The design and application of rubrics are often influenced by individual judgment, leading to variations in interpretation and implementation of criteria. This results in inconsistent grading across different evaluators (Panadero & Jonsson, 2013).

Evaluation Errors: The manual nature of traditional assessment methods increases the risk of errors, fatigue, and misunderstanding, which negatively impacts the reliability of evaluations (Andrade, 2000).

Time-Intensive Process: Traditional rubrics require significant time and effort to design, implement, and assess. This makes the grading process more burdensome for instructors and students alike (Sadler, 2009).

Need for Faculty Training: To ensure consistent and accurate application of rubrics, faculty must undergo training, adding to the workload and reducing efficiency (Jonsson & Svingby, 2007).

Lack of Standardization: The absence of standardized rubrics across different educational contexts leads to variation in grading, making it difficult to compare performance across different instructors, institutions, or disciplines (Panadero & Jonsson, 2013).

1.3 Research Gaps:

AI in education has a lot of promise, but there are still a lot of unanswered research questions. The best ways to include AI assisted evaluations into different teaching strategies and course designs require further study (Luckin et al., 2016). Holmes, Bialik, and Fadel (2019) state that more research is necessary to comprehend how students view AI-assisted exams and how they affect motivation and learning. Further focus is needed on ethical issues to guarantee the proper application of AI in assessment, including algorithmic bias and data privacy (Williamson, Eynon, & Potter, 2020). To investigate how AI assisted assessments affect student learning outcomes and educational equity over the long run, longitudinal studies are required (Siemens & Long, 2011).

1.4 Objectives of the study:

The study aims to

- Improve personalization in English language assessments by creating AI-driven rubrics that are adapted to the needs of students.
- Examine how well AI ensures equity and reduces prejudice in student evaluations.
- Evaluate how AI affects grading accuracy and dependability amongst various assessors.
- Examine how AI-powered rubrics generate feedback and how it affects student learning objectives.

II. LITERATURE REVIEW

Teachers can evaluate their students' performance on a variety of tasks by using rubrics, which are grading tools that provide exact benchmarks. A rubric is a list of requirements together with justifications for different levels of performance. Moreover, detailed instructions are provided for each standard, providing a detailed handbook for both teachers and students. According to Brookhart (2013), evaluation rubrics are essential to language development because they offer consistent feedback, well-defined norms, and a structured framework for assessing advanced skills like speaking, writing, and understanding.

2.1 Components of a rubric:

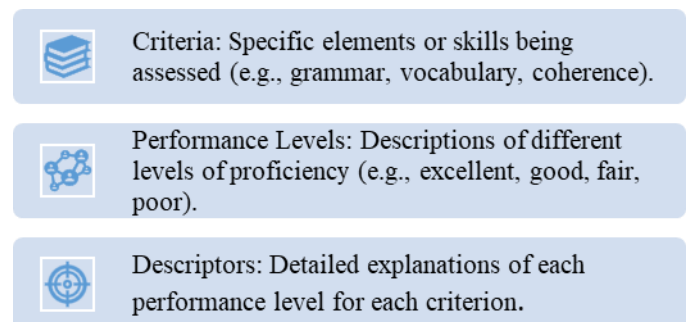


Fig. 1. Components of Rubric

2.2 The importance of rubrics in language learning lies in their ability to:

- Clarify learning objectives and expectations.
 - Provide transparent and consistent grading.
 - Enhance self-assessment and peer feedback.
 - Promote reflective learning and improvement.
- (Andrade, 2000).

2.3 AI in Education: Current Applications

Adaptive Learning Systems: Personalized learning experiences that adjust content and pace based on individual student needs and performance (Woolf, 2010).	Automated Grading: Tools that assist in grading assignments, especially for objective assessments such as multiple-choice questions (Balfour, 2013).
Intelligent Tutoring Systems: AI-driven platforms that provide personalized tutoring and feedback to students (Nkambou, Bourdeau, & Mizoguchi, 2010).	Predictive Analytics: Analyzing student data to predict outcomes and identify at-risk students, allowing for timely interventions (Siemens & Long, 2011).

Fig. 2. Applications of AI education

2.4 Potential benefits of AI in education:

Lessons are tailored using AI-powered personalized learning to fit the prerequisites, pace, and chosen learning style of each learner. Artificial Intelligence (AI) frees teachers to interact more directly with pupils by automating tasks like scheduling, attendance, and grading. Virtual tutors and other powered by artificial intelligence learning tools improve student engagement through enhanced interaction, and data analytics, which examine student performance patterns and learning gaps, and support teachers in making more informed decisions.

Furthermore, the real-time feedback offered by AI can assist the learner to learn from the mistakes immediately. The scalability factor of AI assures reliable, consistent training for a large group of learners. The personalized learning paths, and materials, offered by AI encourage lifelong learning among all ages. Innovative techniques like gamification augmented reality, and resource optimization using AI make the learning interesting when coupled with the best instructional techniques and resources to increase the overall efficacy of education.

III. METHODOLOGY

This study utilized a mixed-method approach, combining both quantitative and qualitative data to provide a comprehensive understanding of the impact and effectiveness of AI-driven rubrics in English language learning. Rubrics for two topics Just a Minute (Speaking Component) and writing component (paragraph Writing) were created using Chat Gpt with necessary inputs for the activity.

3.1 Just a Minute (JAM) Rubric

TABLE I
JUST A MINUTE RUBRICS

Criteria	Excellent (4 points)	Good (3 points)	Satisfactory (2 points)	Needs Improvement (1 point)
Content	Thoroughly addresses the topic with clear, relevant details.	Addresses the topic with relevant details but lacks depth.	Somewhat addresses the topic but with minimal relevant details.	Fails to address the topic adequately or content is irrelevant.
Fluency	Speaks smoothly with no hesitation or interruptions.	Minor hesitations, but overall fluency maintained.	Noticeable hesitations; fluency affected occasionally.	Frequent hesitations disrupt the flow of speech.
Clarity of Expression	Ideas are expressed clearly and concisely.	Ideas are mostly clear, with minor lapses in expression.	Ideas are somewhat clear but lack conciseness.	Ideas are unclear or poorly expressed.
Language and Vocabulary	Uses a wide range of vocabulary accurately and effectively.	Uses appropriate vocabulary, but with limited range.	Vocabulary is basic and occasionally inaccurate.	Vocabulary is limited and frequently inaccurate.
Adherence to Rules	No repetition, hesitation, or deviation from the topic.	Minor repetition, hesitation, or slight deviation from the topic.	Noticeable repetition, hesitation, or deviation from the topic.	Frequent repetition, hesitation, or deviation from the topic.
Pronunciation and Tone	Pronunciation is clear, and the tone is appropriate.	Minor pronunciation errors; the tone is generally appropriate.	Pronunciation errors are noticeable; tone may be inconsistent.	Pronunciation errors hinder understanding; the tone is inappropriate.
Time Management	Completes the speech exactly within the 1-minute limit.	Slightly over or under the time limit (by a few seconds).	Significantly over or under the time limit (by more than 10 seconds).	Fails to manage time, significantly over or under the time limit.
Engagement and Confidence	Demonstrates strong confidence and engages the audience well.	Appears confident and engages the audience adequately.	Appears somewhat nervous; which limited audience engagement.	Lacks confidence; fails to engage the audience.

IV. IMPLEMENTATION

The implementation plan for utilizing the rubrics for JAM and paragraph writing begins with the creation of detailed rubrics. These rubrics were developed using ChatGPT, ensuring they cover all essential criteria for assessing the students' performances. After generating and refining the rubrics to align with learning objectives and assessment standards, they were shared with the students to familiarize them with the assessment criteria. This involved distributing the rubrics via email or a learning management system like Google Classroom, followed by a session to explain the criteria in detail, encouraging students to ask questions for clarity.

This activity was conducted for I B.Tech students, comprising a total of 64 students, as a part of formative

assessment in the English Language Communication Skills Lab.

Next, the rubrics were integrated into classroom activities. They were uploaded to Google Classroom and attached to specific assignments for JAM and paragraph writing. Students were given access to the rubrics before starting their tasks to use them as a guide. The assignments were clearly outlined, and students were made aware that their performances would be evaluated based on the criteria. During practice sessions, formative assessments were conducted, and student's performance was monitored with feedback provided according to the rubric standards.

During practice sessions, the teacher conducted the assessments and provided feedback, aligning with the rubric standards. While the rubrics themselves were AI-driven and served as a tool to standardize and guide evaluations, the monitoring of student performance, formative assessments, and the delivery of detailed feedback were carried out by the teacher. This ensured that the assessments were contextual and that feedback addressed individual learning needs effectively.

Assessment and feedback are key aspects of the implementation. Students' performances in JAM sessions and paragraph writing exercises were thoroughly evaluated using the rubrics. Feedback was detailed, highlighting areas of strength and suggesting improvements. Students were encouraged to reflect on the feedback and apply it in future tasks. Continuous improvement was emphasized to ensure the rubrics remained effective. Feedback from students and educators was collected to refine the rubrics as needed, ensuring they stayed relevant and aligned with learning outcomes as mentioned in Table II.

TABLE II
SURVEY ON AI-DRIVEN RUBRICS

1. Name
2. Course:
3. Subject:
4. How frequently have you used AI-driven rubrics for your assessments?
5. How clear and understandable are the AI-driven rubrics provided for your assessments?
6. How fair do you perceive the AI-driven rubrics in assessing your work?
7. Do you feel that the AI-driven rubrics accurately reflect your performance?
8. How satisfied are you with the feedback provided by AI-driven rubrics?
9. Do you believe that AI-driven rubrics enhance your understanding of what is expected in your assessments?
10. Do you feel that AI-driven rubrics contribute to a more personalized learning experience?
11. Do you think AI-driven rubrics make the assessment process more equitable?
12. What are the main advantages of using AI-driven rubrics?
11. What are the main challenges you face with AI-driven rubrics?
12. What improvements would you suggest for AI-driven rubrics in your assessments?

The following table III summarizes the key findings from the survey with percentages representing the proportion of responses in each category.

TABLE III
CRITERIA-WISE REPRESENTATION OF THE FINDINGS

Aspect	Findings	Percentage
Usage Frequency	Occasionally	75%
	Frequently	20%
	Rarely	5%
Clarity and Understandability	Clear	85%
	Neutral or Not Clear	15%
Fairness of Assessment	Fair	85%
	Neutral or Unfair	15%
Accuracy in Reflecting Performance	Agree	90%
	Neutral or Disagree	10%
Satisfaction with Feedback	Very Satisfied	75%
	Satisfied	15%
	Neutral or dissatisfied	10%
Understanding Expectations	Agree	85%
	Neutral or Disagree	15%
Personalized Learning Experience	Agree	75%
	Neutral or Disagree	25%
Equitability of Assessment Process	Agree	80%
	Neutral or Disagree	20%
Advantages	Clarity of Expectations	70%
	Consistency in Grading	60%
	Faster Feedback	55%
	Personalization of Feedback	50%
	Difficulty in Understanding AI Decisions	20%
Challenges Faced	Lack of Clarity	15%
	Perceived Bias	15%
	Inadequate Feedback	25%
	More Detailed Feedback	25%
Suggested Improvements	Increased Transparency	15%
	Flexibility for Creativity	10%
	Real-Time Feedback	10%
	Address Bias Concerns	15%

- Usage Frequency:** A significant majority of students (75%) use AI-driven rubrics occasionally, while 20% use them regularly. This suggests that AI-driven rubrics have become a regular part of the assessment process, though they are not the primary tool for all students.
- Clarity and Understandability:** 85% of students find the rubrics clear, indicating that the majority of students find them easy to read and comprehend. However, 15% still find them neutral or unclear, suggesting that further clarity is needed for a minority of students.
- Fairness of Assessment:** 85% of students believe the rubrics are fair, which is a positive indicator of their perceived objectivity. Yet, 15% feel the rubrics are neutral or unfair, pointing to a need for greater

V. RESULTS & DISCUSSION

transparency in the assessment process to eliminate these concerns.

4. **Accuracy in Reflecting Performance:** 90% of students agree that the rubrics accurately reflect their performance, indicating that the AI system is generally viewed as aligning well with students' actual work.
5. **Satisfaction with Feedback:** 75% of students are very satisfied with the feedback they receive, and 15% are satisfied, which reflects overall positive feedback from students. However, 10% are either neutral or dissatisfied, indicating room for improvement in the feedback quality.
6. **Understanding Expectations:** From Fig.3 it can be inferred that 85% of students agree that the rubrics help in understanding assignment expectations, suggesting that the rubrics are useful in clarifying what is required for academic tasks. Only 15% feel neutral or disagree, highlighting a potential area for further enhancement.

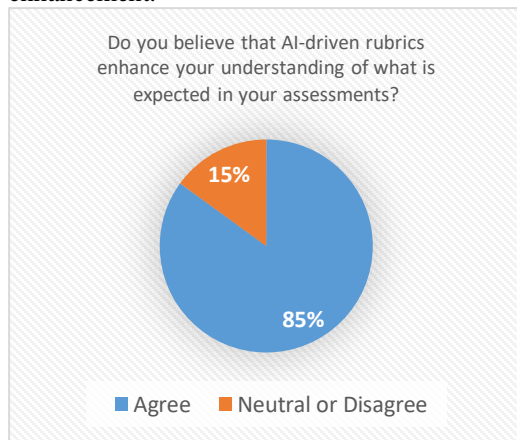


Fig. 3. AI-Driven rubrics -Student Expectation

7. **Personalized Learning Experience:** 75% of students believe that the rubrics enhance personalized learning, indicating that AI-driven rubrics can provide individualized feedback that tailors learning to the student's needs. However, 25% feel this is not the case, pointing to a gap in achieving full personalization.
8. **Equitability of Assessment Process:** 80% of students agree that the rubrics contribute to a fair assessment process, although 20% feel neutral or disagree, suggesting that some students perceive biases in the system(Fig.4).

Do you think AI-driven rubrics make the assessment process more equitable?

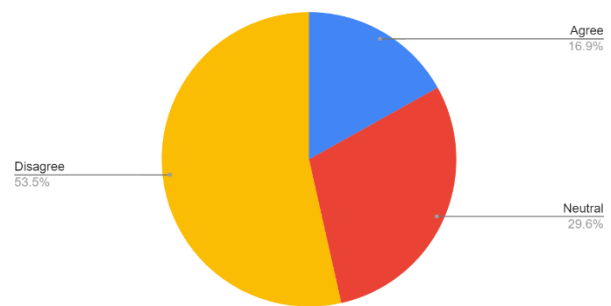


Fig. 4. AI Rubrics- Equitable & Personalised Learning

However, there are some areas of concern. 15% of students think the rubrics are neutral or confusing, and a comparable proportion doubts their accuracy or impartiality. Twenty to twenty-five percent of respondents mentioned problems like bias perception, insufficient feedback, and difficulties comprehending AI choices. These problems imply that although the rubrics are useful, there are still areas in which feedback quality and transparency need to be improved.

Despite these advantages, the survey also reveals notable areas for improvement. Approximately 15% of students encounter issues with the clarity and fairness of the rubrics, indicating that while many find them useful, there are still gaps that need addressing. Challenges such as difficulty in understanding AI decisions and perceived bias in grading were reported by 20% to 25% of respondents. These issues suggest that while AI-driven rubrics are a step forward, there is a need for more transparent and detailed feedback mechanisms to ensure they meet all students' needs effectively. The concern about inadequate feedback and perceived bias highlights the necessity for ongoing refinement in AI assessment tools to address these challenges.

In response to these concerns, students have proposed several enhancements to improve the AI-driven rubric system. The call for more detailed feedback (25%) and increased transparency (15%) reflects a desire for greater insight into how assessments are conducted and how decisions are made. Furthermore, suggestions for flexibility in creative expression and real-time feedback indicate a need for more adaptable and immediate assessment practices. These recommendations suggest that while AI-driven rubrics are beneficial, there is a clear demand for improvements that will make them more responsive, fair, and transparent, thereby enhancing their overall effectiveness in the academic assessment process.

VI. LIMITATIONS

This study faces several limitations that could impact the generalizability of its findings. Firstly, the sample size and diversity may be limited, making it difficult to apply the results to all educational settings. Additionally, participant responses might be influenced by personal biases or varying levels of

experience with AI tools, which could affect their perceptions of rubric effectiveness.

Another limitation is the narrow focus of the comparison, which might not cover all relevant aspects of rubric use, such as long-term effectiveness or impact on student outcomes. The study's findings may also be influenced by the specific AI tools used, which can vary widely in their functionality and implementation.

Furthermore, the study's short duration might not capture the long-term benefits or challenges of using AI-assisted rubrics compared to traditional methods. Technological issues and ethical concerns related to data privacy could also affect the reliability and acceptance of AI-assisted rubrics. These factors highlight the need for further research to address these limitations and gain a more comprehensive understanding of the topic.

CONCLUSION

The integration of AI-driven rubrics in English language learning marks a significant step forward in creating personalized and equitable educational experiences. By harnessing artificial intelligence, educators can develop assessments that are tailored to the diverse needs of students, delivering precise feedback that fosters individual growth. This approach not only enhances the accuracy and fairness of assessments but also aligns with the principles of outcome-based education, where student performance is evaluated against clearly defined learning objectives.

However, the successful implementation of AI-driven assessment tools requires the complementary use of learning analytics and ongoing human intervention. Learning analytics provides valuable insights into student progress and helps educators make informed decisions to support individualized learning paths. Meanwhile, human intervention, particularly the role of teachers, is crucial in ensuring that AI tools are applied ethically and effectively. Teachers bring a deep understanding of their students' unique needs, providing the human touch that technology alone cannot replicate. They guide, interpret, and contextualize AI-generated feedback, ensuring that it is meaningful and actionable for each student.

As educational institutions continue to adopt advanced technologies, AI-driven rubrics offer a more dynamic and responsive framework that can adapt to students' evolving needs. This shift underscores the importance of innovation in education, leading to more effective teaching and learning outcomes.

Moving forward, educators, administrators, and policymakers need to collaborate in developing and implementing these technologies. By integrating AI with learning analytics and maintaining a critical role for teachers, they can ensure that AI-driven rubrics are not only effective but also accessible and equitable for all students, regardless of their background or proficiency level. The future of education lies in our ability to

leverage AI, analytics, and teachers' expertise to create a more inclusive and personalized learning environment for every student.

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