

An Intelligent Approach to analyse the Impact of Speaking Skills through an Intervention on Existential Intelligence in an ESP Classroom

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Abstract. Interventions are vital for improving students' knowledge and skills, with varying disciplines necessitating diverse forms of mechanisms. This research investigates an intervention within an English for Specific Purposes (ESP) classroom, using Existential intelligence (EI) as a tool to enhance Speaking Skills. The present approach to assessing these impacts relies on questionnaires and the Communicative Skill Rating Scale (CSRS). Measuring students' progress based on the manual scales has a lot of challenges. This study proposes utilising Artificial Intelligence (AI) and Deep Learning (DL) methods. This approach aids in formulating interventions with reduced bias while supplementing conventional evaluation metrics. The student interactions are captured in the form of video and then are processed. Audio, image/footage, and textual conversation features are extracted and processed to identify the thresholds for various features. These thresholds are then aggregated to yield comprehensive student performance evaluations. The proposed intelligent technique is engineered to produce better performance and inclusive measurements of the impact of the EI Learning Tool on the speaking skills.

Keywords: Intelligent techniques, Artificial Intelligence(AI), Video Analytics, Learning Tools, Existential Intelligence (EI), English for Specific Purposes (ESP) classroom, Theory of Multiple Intelligences.

1 Introduction

Existential Intelligence, a theoretical construct, was introduced by psychologist Howard Gardner in his Theory of Multiple Intelligences. Gardner's framework views intelligence as diverse, initially defining seven types. EI, broadening the seen as the ability to attain a particular state of being rather than conventional problem-solving intelligence [1]. One's genetic predisposition may favour a specific intelligence type, but the environment and culture are pivotal in realising its full potential. Acknowledging the interrelation between diverse intelligences and linguistic competencies is imperative in gaining insight into the intricate and multifaceted dimensions of human capabilities, thereby emphasizing the necessity of extensive

language evaluations in explaining these restraints. The current techniques in analysing the interventions made by the statuses are through the medium of Self-reports, Performance-based measures, Observations and measurements of various factors and Neuroimaging measures, of which the neuroimaging techniques cannot be applied in a classroom setting.

EI-based tools and techniques can significantly improve participants' speaking skills, especially in the ESP Classrooms. The intervention's primary focus is to improve and support students' verbal communication. The change generated by the students has been observed with the help of the CSRS Scale [2]. While filling the scaling system by people, there is a high chance that the scores can be biased in various forms. To bridge this gap, intelligent techniques can be applied to analyse the change generated by the participant, which helps reduce the bias and properly identify the intervention's impact. The advancements in AI and DL help build a hybrid system that can be applied to capture various data points from the interaction of the participants in the tests and can process and provide comprehensive reports and scores for the same.

2 Related Works

Gardner discusses EI as an integral part of Spiritual Intelligence. He highlights the challenges of defining spiritual intelligence, including content, emotional and phenomenological aspects, its often-unsupported truth claims, and the necessity to consider its impact on others. Gardner asserts the growing importance of contemplating cosmic themes within this domain, incited by suffering, deep aesthetics, emotional experiences, or a spiritually oriented environment. Furthermore, he underscores EI as the most explicitly cognitive facet of the spiritual [1]. EI has a developmental trajectory, demonstrated by philosophers and artistic figures, showcasing increasing intelligence from childhood to adulthood [3]. Entheogens' have potential to improve EI, advocating their role as cognitive aids for comprehending and embracing existential aspects [4]. Potential risks and academic development are overlooked, which is the present study's focus. EI's role in art education, emphasizing its relevance for contemporary youth. The study advocates methods such as personal, psychological, moral, and social reflections integrated into a teaching pedagogy [5].

EI, focusing on subjective existence, enhances critical thinking in business students. They analyse management and societal issues, blending critical and existential perspectives [6][7]. Incorporating existential ideas in discussing subjective meaning and global concerns can promote this approach [6][8]. An investigation involving 11th-grade students created tools based on EI to measure their influence on students' creative thinking skills. The results demonstrated enhanced creative thinking abilities and affirmed these learning tools' high validity and practicality [9]. Additionally, using MI learning methods significantly enhanced reading comprehension skills in 4th graders [10]. Language proficiency encompasses knowledge, competence, and language use, assessed through communicative ability or task effectiveness due to limited measurement strategies. In language assessment, especially for speaking and writing skills, technological advancements like NLP and speech recognition have enabled automated evaluation and feedback systems [11][12]. This approach, computer-assisted language assessment (CALT), aims to enhance evaluation efficiency. Various methods, including oral proficiency interviews, semi-direct tests, and automated tests, can assess spoken language and correlate their scores [13].

Various studies have been made in conjunction with applying different intelligent techniques to analyse the student's performance in tools facilitating skill enhancements with timely

interventions. The study examines the connection between communication proficiency and EI through a 30-hour course based on EI-based pedagogy for teaching and learning practices, providing insights into how educational interventions can enhance both language skills and individuals' ability to contemplate profound questions and navigate life's challenges with a proper feedback system from the analysis of the performance and developments through the analysis of videos.

3 Proposed Framework

The proposed intelligent technique is focused on extracting the features from the videos of the participants. The video can be of an individual or a group, in which the activities of the learning tool are introduced, and the components to be measured are carried out. The features to be extracted are identified, and the system is designed according to various standards used to study the students' performance and improvements. Various factors of the students can be captured with the help of intelligent systems, including the application of Turn-taking, Presentation, Fluency, and Negotiation Skills. Many other factors can also be captured from the data input, which helps analyse the student's progress with the interventions given based on his/her current status.

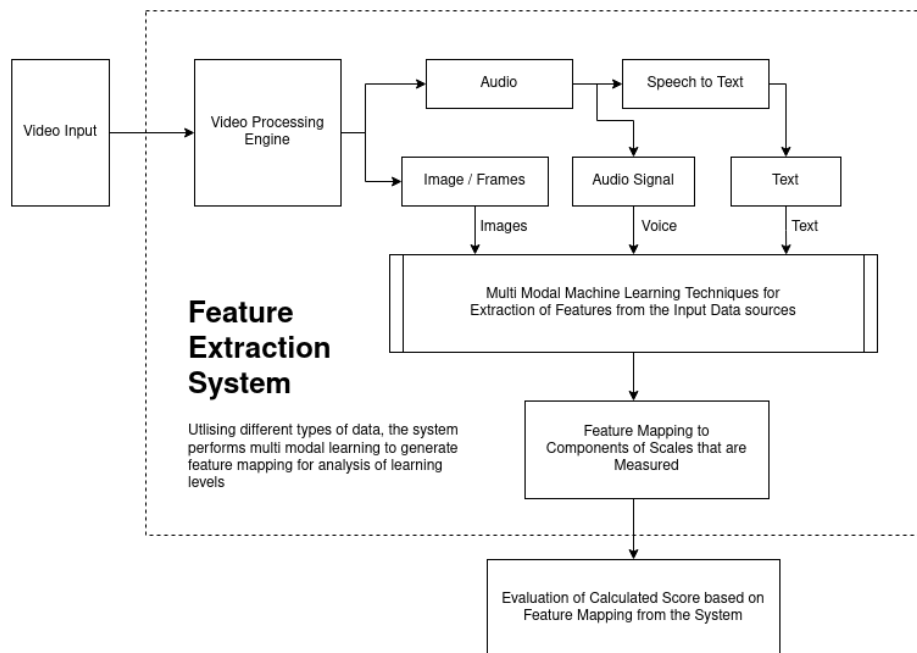


Fig. 1. Architecture of the Proposed Feature Extraction System.

Fig. 1. provides an overview of the proposed Feature Extraction System, designed to extract and analyze videos inputs in an intelligent system that helps analyse the impact of EI tool. The input is processed, and features are extracted and mapped with the CSRS scale. The system employs preprocessing and active feature extraction mechanisms based on multimodal DL algorithms to

extract essential elements for analysis. This includes extracting images, audio signals, and text data from the video input to facilitate a comprehensive assessment. The system focuses on extracting the features in evaluating speaking skills. The extracted features are mapped, weighted, and grouped into Turn-taking, Presentation, Fluency, and Negotiation. The system also is able to capture non-verbal cues like eye contact, hand gestures, postures, and other behavioural aspects as part of the feature extraction process.

The data obtained from this multimodal extraction system is then aligned with existing assessment scales and cross-referenced with relevant research studies to gauge the system's effectiveness. The resulting scores are further processed and synthesized within an evaluation system, generating a comprehensive report for individual participants or entire teams. The results obtained from the system stay as input for providing adequate feedback and interventions that help the student's overall development and improvement of personal skills.

4 Analysis & Discussion

The application of intelligent techniques will help improve the research focused on University Postgraduate Business studies students. It was determined that collecting data from multiple student groups might not yield relevant results. The study led to a 30-hour intervention based on EI for Master of Business Administration (MBA) students, which aimed to enhance their speaking skills to align with managerial qualities. Consequently, only 30 first-year MBA students from Sinhgad Institute of Management were selected using purposive sampling. The students underwent assessment through specific tasks, and their spoken presentations were recorded using audio-visual equipment.

Table 1. Evaluation and Scores of Students.

S.No	Self	Partner	Observer	External
1	98	115	70	75
2	100	111	58	59
3	94	95	63	61
4	81	79	57	52
5	102	103	67	59
10	104	120	67	57

Table 1 demonstrates a clear discrepancy in the assessments made by evaluators during the evaluation of speaking skills in one of the tasks. These scores signify variations in how each evaluator appraised the performance. The substantial divergence in scoring suggests the potential presence of bias and underscores inconsistent assessment methods. Ineffectiveness of standardized assessments when evaluating participants of different races [14]. Therefore, standardized assessments may miss the nuances of student-teacher interactions, especially regarding race. The study emphasizes multifaceted influences on manual ratings, creating significant biases in evaluation. The proposed Feature Extraction System will be tested in the above-mentioned dataset created as part of the research work. The researchers could identify the limitations of the current system, which is a personal rating of the scales and observations that tend to induce bias in the overall results, which motivated the researchers to propose the

new intelligent system to extract features and introduce the application of AI and DL techniques in analysing the results of the tool.

5 Conclusion

The collective body of research highlights that integrating digital assessment tools within the EMI classroom presents a multifaceted landscape characterised by inherent challenges and concurrent advantages. Among the identified limitations are the absence of interpersonal dynamics and individualised feedback intrinsic to face-to-face teacher-student interactions. Technical tools may exhibit constraints in facilitating the creative and imaginative responses that hold significance in evaluating oral communication competencies. Scholarly research has demonstrated that these tools can automate the appraisal of students' speaking proficiencies, yielding time-based effectiveness for educators, and allowing them to allocate pedagogical efforts toward broader instructional requirements.

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