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# Artificial Intelligence Supported Communicative Language Teaching and Its Impact on Speaking Proficiency among Disadvantaged Learners

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The authors declare no competing interests.

The study was conducted under the institutional ethical guidelines of Sathyabama University, Chennai, India, where the research activities were carried out. As per the institution's research policy for minimal-risk educational studies involving anonymized data, the requirement for full Institutional Review Board (IRB) review was formally waived at the institutional level. Specifically, the study falls under the category of educational research using anonymized, non-sensitive data collected during routine instructional

activities, which does not require formal IRB approval according to institutional norms. Therefore, a separate named IRB committee approval was not mandated in this case. All ethical considerations were strictly followed, including voluntary participation, informed consent, and complete anonymization of participant data.

# Artificial Intelligence Supported Communicative Language Teaching and Its Impact on Speaking Proficiency among Disadvantaged Learners

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## Abstract

Students with low socio-economic background are usually left low-proficient in communicating in English even after many years of formal teaching, this is because of the accuracy-based and examination-focused ELT practice which limits meaningful interaction and use of communicative language. The given work will investigate the shortcomings of the classical form-oriented pedagogy, as well as assess the performance of an AI-based communicative ELT strategy in developing speaking competence in low-skilled learners. The current ELT system mainly focuses on grammatical correctness, memorizing and written tests, provides little individualized feedback and insignificant real oral practice. The proposed study aims to overcome these issues by suggesting an instructional model that is based on AI support and learner-centered teaching that incorporates adaptive speaking prompts, automated formative feedback, and AI-mediated conversational simulations complemented with task-based and collaborative exercises. The outcomes of the pre-test/ post-test design, which included low-proficiency learners, indicate that speaking performance has improved significantly, with an increase in the means of speaking scores by 23.17, the fluency measures have improved by 28 and the level of participation by the learners has also increased by 26 to 71 percent. Moreover, self-reported communication anxiety also reduced by 31% which was an improvement of confidence and readiness to communicate because of low-stress AI practice settings adjusted to a particular person. The study has limitations, however, the moderate sample size and contextual focus which can influence the generalizability and lacks the evaluation of long-term retention of communicative gains after the intervention period.

**Keywords:** Artificial Intelligence in ELT, Communicative Language Teaching, Speaking Proficiency, Disadvantaged Learners, English Language Teaching.

# 1. Introduction

In a globalized world English communication skills are critical determinants of academic achievement, employability and social mobility. Nevertheless, students with low socio-economic status continue showing low scores of speaking proficiency even after years of formal instruction in English especially in English as a Foreign Language (EFL) situations [1], [12]. This recurrent divide has been greatly explained by the accuracy-based and examination-based English Language Teaching (ELT) in which teachers emphasize on grammatical accuracy and written output at the expense of meaningful oral communication [7], [27]. These pedagogical orientations not only confine the authentic interaction and narrow to the limit the participation of the learners but also aggravated the language anxiety particularly to learners with low proficiency with little exposure to English outside the classroom [15], [29].

The latest developments in Artificial Intelligence (AI) have opened the new opportunities to handle the old issues in ELT by facilitating a personalized learning process, providing feedback automatically, and simulating conversational practice [3], [18]. Adaptive learning systems, automatic speech recognition (ASR), and conversational agents are just some examples of AI-assisted technologies that have demonstrated the ability to support speaking fluency, decrease communication anxiety, and improve learner engagement by offering low-risk and personalised practices environments [2], [4], [20]. However, there is still little and scattered empirical evidence that combines AI with communicative language teaching models in disadvantaged learning conditions [5], [17].

## 1.1 Objective of the Study

The main aim of the given research is to identify the drawbacks of the traditional form-based ELT activities and to assess the relevance of an AI-based communicative language teaching system in enhancing the speaking proficiency of low-proficient learners with socio-economically disadvantaged backgrounds. In particular, the research aims at evaluating how AI-mediated speaking practice can influence the fluency, participation and confidence of learners as well as communication anxiety in a classroom-based teaching environment [6], [16].

## 1.2. Existing System vs. Proposed System

The current ELT system mainly focuses on grammatical accuracy, rote memorization, and exam performance and puts little instructional time and assessment importance on speaking skills [12], [27]. Such systems have delayed feedback, are teacher-dependent, and scope-limited, which limits chances of sustained oral rehearsal and tailored assistance [11], [28]. Disadvantaged learners are disproportionately affected by these constraints because they do not have access to English rich environments and other learning materials [29].

Instead, the suggested system will involve AI-assisted communicative language training, which is a combination of adaptive speaking prompts, automated formative feedback, and AI-mediated dialog simulations with both task-based and collaborative classroom learning. This learner-centered method allows the regular, individualized, and anxiety-free speaking practice and corresponds to the principles of communicative language teaching [4], [7], [23]. With the help of AI as a pedagogical aid and not a substitute of teachers, the suggested framework will promote oral communication and confidence to learners in resource-limited situations [5], [24]. Figure1, compares the structural elements of the current conventional ELT system with the suggested AI-based communicative ELT model, pointing to the major drawbacks and pedagogical improvements

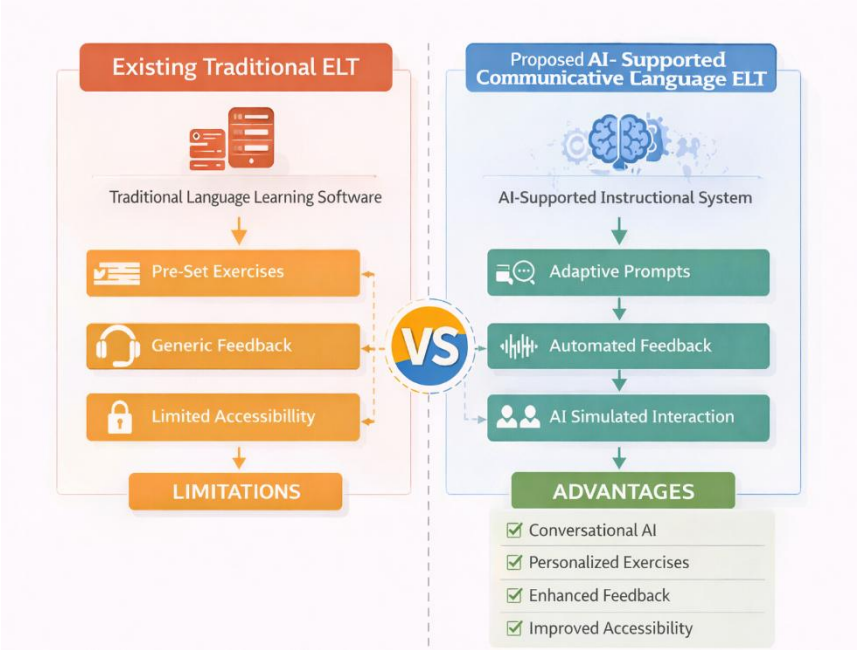



**Figure 1.** Comparative Architecture of Existing Traditional ELT and Proposed AI-Supported Communicative ELT Systems

### 1.3. Research Gap

Even though the positive outcomes of AI-assisted language learning in speaking performance and learner motivation have been reported in previous studies [16], [18], the majority of the

currently existing researches are based on technologically privileged conditions or isolated AI tools, without being rooted in communicative pedagogy [17], [30]. The empirical research focused on analyzing AI-supported communicative ELT interventions targeting the low-proficient students with socio-economically disadvantaged backgrounds in particular is significantly lacking. Moreover, the focus has not been put on the affective outcomes like communication anxiety and readiness to communicate and quantifiable gaining of speaking [15], [20]. The current research fills these gaps through an objective assessment of an all-encompassing AI-aided communicative framework in a deprived educational environment.

### 1.4. Limitation of the Study

The study is limited to some extent despite its contributions. The sample size and focus on context is likely to restrict the applicability of the results to a wide variety of educational environments. Also, digital infrastructure and familiarity with AI tools by the learner can have an impact. The research is also focused on short-term speaking benefits and does not look at long-term viability and transferability of AI-mediated communicative competence outside of the instructional time [1], [30].

## 2. Literature Review

The studies within the English Language Teaching (ELT) field of study have continuously emphasised the shortcomings of the traditional and accuracy-based teaching methods in the development of communicative competence among learners, especially speaking proficiency. Examination-based pedagogy has been determined to assign grammatical correctness and written performance over oral interaction leading to the lack of the opportunities to use the actual language and engage the learners [12] et al., [27] et al. These methods differentially burden low-proficient students with socio-economically disadvantaged backgrounds, who many times do not subject themselves to extracurricular exposure to English, and are in many cases solely responsible to classroom teaching [29] et al.

As solutions to these issues, communicative language teaching (CLT) and task-based language teaching (TBLT) models have been strongly recommended as viable pedagogical options. Research indicates that the interaction involving tasks facilitates fluency, interactional competence, and student confidence as they provide students with the opportunity to interact with each other through meaningful forms of communication and not in individual forms of language [7] et al., [23] et al. Nevertheless, the effective use of CLT and TBLT in the settings

with few resources is still a problematic issue because of the significant number of students in classes, short teaching time, and a lack of personal feedback [11] et al., [28] et al.

The latest developments in Artificial Intelligence (AI) have spawned increasing concerns about technology-based language learning especially in its application in the development of speaking skills. Systematic reviews and meta-analyses point to the fact that AI-powered chatbots, especially automatic speech recognition (ASR) tools, adaptive learning systems, and conversational agents may help to significantly improve pronunciation accuracy, fluency, and learner engagement [2] et al., [3] et al., [18] et al. AI-powered chatbots, in turn, can offer learners repeated, low-stakes conversational practice, which proves particularly effective in reducing communication anxiety in learners [4] et al., [26] et al.

The empirical research also indicates that the AI-mediated feedback contributes to the development of speaking skills with the benefit of providing an immediate, personalized, and consistent response which is hard to obtain in the teacher-centred classroom [9] et al., [21] et al. These types of feedback allow learners to track their progress and participate in self-guided learning which helps to promote a sense of autonomy and practice over time [24] et al.

In addition, AI-based speaking tasks have been seen to lower affective barriers to speaking, such as the fear of negative assessment and speaking anxiety that are some of the most critical factors affecting oral participation in low-proficient learners [15] et al., [20] et al., [22] et al.

In spite of these encouraging results, there are a number of constraints found in the existing literature. Most of the research is based on technologically advantaged classrooms or isolated AI use without considering the mutual effects of AI-supported teaching and communicative language teaching on the underprivileged students [29] et al. and [30] et al. The affective aspects of speaking development, e.g., readiness to speak and less anxiety are also often under-investigated along with quantitative proficiency gains [15] et al., [20] et al.

To address these gaps, the recent studies propose context-specific, pedagogy-driven AI implementation that would match technological affordances with the existing principles of communicative interactions [5] et al., [16] et al. ELT research will be able to step out of the tool-centered paradigm of teaching and learning by integrating AI-assisted speaking tools into task-based, collaborative classroom activities and, thus, create more inclusive and sustainable models of language learning. The current research picks up on this new trend by empirically investigating an AI-based communicative ELT model intended to be implemented with low-proficiency learners in a socio-economically disadvantaged setting. Table 1 contains a citation-

based thematic synthesis of the available literature on ELT practices, AI-supported language learning, and research gaps, which, taken together, inspire the purpose of the current research.

**Table 1: Summary of Literature Review**

| Theme | Key Findings from Literature | Representative Studies (IEEE style) | Identified Gap |
|---|---|---|---|
| **Traditional ELT Practices** | Accuracy-driven, exam-oriented ELT prioritizes grammar and writing, offering limited speaking opportunities and interaction | [12] et al., [27] et al. | Ineffective for developing oral communication, especially for low-proficient learners |
| **Socio-Economic Disadvantage** | Learners from low SES backgrounds lack exposure to English outside classrooms, increasing dependency on instructional quality | [1] et al., [29] et al. | Few ELT models explicitly address socio-economic constraints |
| **Communicative & Task-Based ELT** | CLT and TBLT improve fluency, interaction, and confidence through meaningful tasks | [7] et al., [23] et al. | Implementation challenges in large or resource-constrained classrooms |
| **AI in Language Learning** | AI tools (ASR, adaptive systems, chatbots) enhance pronunciation, fluency, and engagement | [2] et al., [3] et al., [18] et al. | Often tool-centric and not pedagogy-driven |
| **AI for Speaking Practice** | AI-mediated conversational agents provide low-risk, | [4] et al., [26] et al. | Limited integration with classroom communicative pedagogy |

| | | | |
|---|---|---|---|
| | repeated speaking practice | | |
| **Automated & Adaptive Feedback** | Immediate AI-based feedback supports self-regulation and oral development | [9] et al., [21] et al. | Lack of longitudinal and classroom-based studies |
| **Affective Factors** | AI-supported environments reduce speaking anxiety and fear of evaluation | [15] et al., [20] et al., [22] et al. | Affective outcomes often underreported |
| **Assessment Practices** | Traditional assessments underrepresent oral competence | [28] et al. | Need for speaking-centered evaluation frameworks |
| **Contextual & Inclusive AI Use** | Calls for pedagogically grounded, inclusive AI integration | [5] et al., [16] et al. | Few empirical studies in disadvantaged contexts |
| **Overall Research Gap** | AI + CLT integration is underexplored for low-proficient, disadvantaged learners | [17] et al., [30] et al. | Justifies the present study |

## 3. Proposed Methodology

### 3.1 AI System Description and Instructional Workflow

The given study utilizes an AI-based instructional system that is intended to scaffold interaction amongst learners in a communicative language teaching (CLT) framework as opposed to substituting teacher-based pedagogy. The AI system operates as an intelligent aiding tool/system that supports frequent talking and offers immediate formative feedback in addition to dynamically changing the difficulty of the task based on the learner performance. Three main elements are incorporated in the system, namely: (a) oral analysis using automatic speech recognition, (b) generation of adaptive speaking tasks, and (c) conversational simulation mediated by AI.

### 3.2 AI System Components

### 3.2.1 Automatic Speech Recognition (ASR) and Oral Analysis

The AI system also involves the use of ASR technology in order to grasp the verbal input of the learners in the process of task-based speaking. The real-time analysis of the learner responses is performed to determine major communicative characteristics such as the speech rate, pausing patterns, accuracy of pronunciation, and simple discourse coherence. Instead of emphasizing grammatical-level error correction, the system emphasizes more the fluency-oriented indicators in line with the communicative competence, which creates less evaluative pressure and encourages spontaneous speaking.

### 3.2.2 Adaptive Speaking Task Generator

The AI system is dynamically implemented based on the learner performance statistics to change the parameters of talking tasks including the lexical complexity, interactional requirements, and the length of responses. Though students who show higher levels of fluency and confidence are given more demanding communicability, those who have difficulties are given scaffolded prompts and minimised cognitive load. This adaptive process will provide an optimum level of challenge and will avoid both frustration on the part of the learner and disengagement.

### 3.2.3 AI-Mediated Conversational Simulation

The system incorporates AI-mediated conversational simulation, which enables learners to practice oral interaction in low risk and repetitive oral interactions. These simulations help mimic the real life communicative situations in the academic and social life of the learners allowing them to use the language in a meaningful way without the fear of being negatively assessed. In a non-judgmental way, the conversational agent is responsive and non-judgmental, therefore this stimulates longer interaction and experimentation with spoken English.

## 3.3 Instructional Workflow

The AI-based learning process involves a systematic, but adaptable chain of instructions based on the principles of CLT and task-oriented approach to language teaching:

- Task Initiation: This is the presentation of communicative speaking tasks within the classroom instruction either individually or in small groups.
- Oral Production: Students speak through the AI system, hold a simulated conversation or a task.

- Immediate Formative Feedback: The AI offers real-time feedback based on the aspect of fluency, clarity and communicative effectiveness instead of the grammatical correction.
- Adaptive Task Adjustment: The following tasks are modified in terms of their complexity and communicative level and difficulty, depending on the performance and records of interactions.
- Teacher Mediation: Teachers track the progress of learners with the help of AI-generated summaries and combine follow up classroom tasks, peer interaction, and reflection.

### 3.4 Pedagogical Role of AI

In line with communicative pedagogy, the AI system is placed as a scaffolding instructional process that facilitates oral practice and maintains teacher agency and classroom interaction. The system allows teachers to prioritize the more advanced pedagogical processes of facilitation, interpretation of feedback, and affective support since it automates routine responses and can give teachers customized speaking time. This blended learning model will make AI integration pedagogically, ethically, and contextually viable to the disadvantaged learning communities. Figure 1 demonstrates the AI-assisted communicative language teaching teaching process, emphasizing a combination of AI mediated feedback with teacher-instructional communicative activities to help students improve speaking skills.

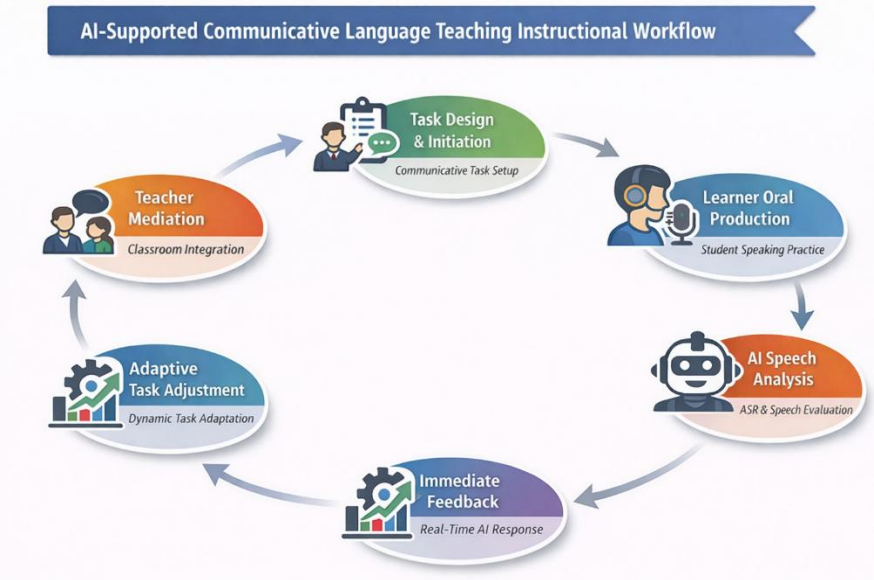


**Figure 1.** AI-Supported Communicative Language Teaching (AI-CLT) Instructional Workflow

## 3. 5. Conceptual Framework

The theoretical framework of the current study will be based on the combination of communicative language teaching (CLT), task-based language teaching (TBLT), and the principles of artificial intelligence-assisted learning that will help to overcome the long-term speaking proficiency issues of low-proficient students, who have socio-economically disadvantaged backgrounds. The practices of Traditional English Language Teaching (ELT), mostly accuracy-focused and examination-based, focus on grammatical correctness, rote memorization and written test. Such practices can serve to facilitate the knowledge of declarative language, however, they can often be insufficient in offering opportunities to engage in genuine oral communication, special feedback, and emotional assistance thus constraining the communicative competence of the learners and growing state of communication anxiety [7] et al., [12] et al., [27] et al.

Following the existing criticisms of the conventional ELT, the suggested framework frames a pedagogical shift to an AI-based communicative language teaching (AI-CLT) paradigm. Within this paradigm, artificial intelligence works as a facilitating instructional scaffold, and not as a substitute of the teacher. The adaptive speaking prompts, automatic speech recognition-based feedback, and AI-mediated conversational simulation are the AI-supported components that are integrated with communicative and task-based classroom activity to enhance the frequency, quality, and personalization of speaking practice [2] et al., [4] et al., [9] et al. The given AI tools are created to offer instant, personal, and non-judgmental feedback, lowering the fear of criticism and promoting active oral involvement among learners in the long term [20] et al., [22] et al.

The framework also includes the affective variables as mediating variables between the instructional design and the learning results. Previous studies reveal that communication anxiety, self confidence and readiness to communicate are all important variables that determine speaking performance especially due to the traits of low-proficient students [15] et al., [29] et al. The AI-CLT model will help to minimize affective barriers by providing low-risk practice settings mediated by AI and peer interaction scaffolds, as well as encourage independence and engagement in learners. This emotional support system is particularly

important to students with a disadvantaged background that tend to have poor exposure to English and low academic self-efficacy [29] et al.

At the outcome level, the framework assumes that AI-supported communicative instruction integration has quantifiable effects on speaking proficiency, such as the increase of the fluency, pronunciation accuracy, interactional competence, and participation rates. At the same time, such affective consequences as decreased communication anxiety and higher confidence are likely to lead to long-term readiness to communicate in English. All these results demonstrate communicative competence as a multidimensional construct which is composed of linguistic performance and affective readiness to communicate [16] et al., [18] et al. Figure 2 represents the pedagogical architecture of the AI-assisted communicative language teaching framework and reflects the shift of the traditional ELT practices into the AI-mediated communicative teaching and its results in speaking outcomes.

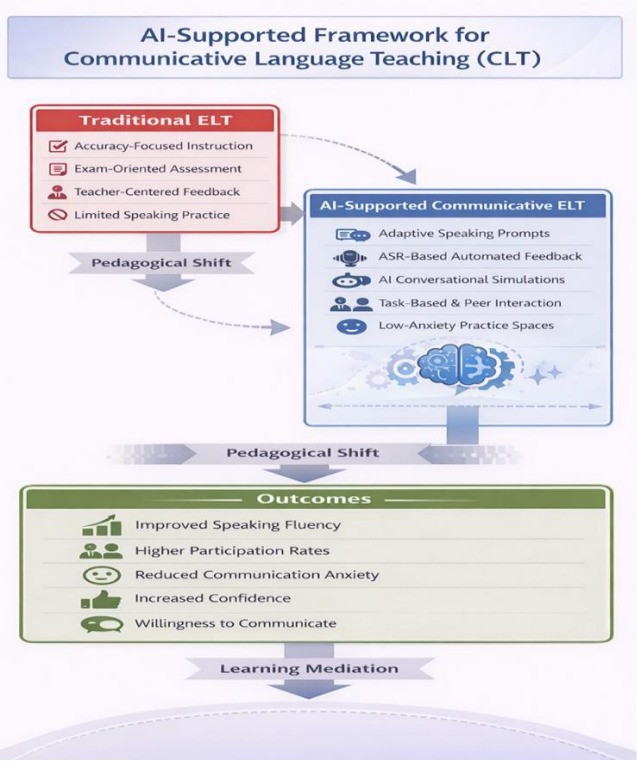



**Figure 2.** Architecture of the AI-Supported Communicative Language Teaching Framework

## 4. Dataset Description and Mathematical Modelling

### 4.1 Dataset Description

The data applied in the research was collected in the form of a quasi-experimental classroom-based intervention conducted with low-performers with socio-economically disadvantaged

backgrounds. The dataset not only records the linguistic performance but also captures the affective variables thus the overall evaluation of AI-supported teaching of the communicative language is complete.

#### 4.1.1 Dataset Composition

The data is comprised of four major data groups gathered at two points of time (pre-intervention and post-intervention).

**(a) Speaking Proficiency Dataset**

A structured rubric based on the communicative competence descriptors was used to evaluate each learner in terms of his speaking performance. The AI-assisted speaking proficiency assessment rubric introduced in Table 2 is based on the communicative language assessment models and the research in automated speech evaluation, which highlights the key dimensions of oral communicative competence as fluency, pronunciation, coherence and interaction [9], [21], [28]. The dataset includes:

Table 2. AI-Supported Speaking Proficiency Evaluation Rubric

| Feature | Description | Scale |
|---|---|---|
| **Fluency (F)** | Speech continuity, pausing, and rate | 0–25 |
| **Pronunciation (P)** | Segmental & suprasegmental accuracy | 0–25 |
| **Coherence (C)** | Logical flow and message clarity | 0–25 |
| **Interaction (I)** | Turn-taking, response relevance | 0–25 |

Each learner's **overall speaking score** ranges from **0–100**, calculated as the weighted sum of these components.

**(b) Participation Dataset**

The data on the participation was gathered by observing the classroom and AI-recorded frequency of interaction. Table 3 describes the quantitative variables of learner participation and interaction applied to evaluate the engagement in AI-aided communicative language teaching context. These are used as indicators that address compliance with the task and spontaneous oral involvement and therefore give behavioural measures of communicative engagement that go beyond the results of formal assessment.

Table 3. Learner Participation and Interaction Metrics

| Variable | Description |
|---|---|
| **Task Participation Rate** | Percentage of completed speaking tasks |
| **Interaction Frequency** | Number of oral responses per session |
| **Voluntary Speaking Instances** | Unprompted participation count |

**(c) Communication Anxiety Dataset**

A validated Likert scale measurement based on existing language anxiety models was used to assess the communication anxiety of learners. Table 4 shows a five-point Likert measure of affective variables to investigate the emotional and psychological reactions of the learners to AI-assisted communicative language teaching. These dimensions are essential in the role of reduction of anxiety and enhancement of confidence in promoting oral participation.

Table 4. Affective Dimensions of Learner Speaking Experience

| Dimension | Description | Scale |
|---|---|---|
| **Fear of Negative Evaluation** | Anxiety about peer/teacher judgment | 1–5 |
| **Speaking Confidence** | Self-perceived oral ability | 1–5 |
| **Willingness to Communicate** | Readiness to speak in English | 1–5 |

Higher scores indicate **higher anxiety levels**.

**(d) AI Interaction Log Dataset**

It produced anonymized learning interaction records that recorded: Table 5 presents AI-driven process markers that would be used to represent system-learner interaction dynamics within the proposed AI-supported communicative language teaching framework. These variables indicate the strength of the feedback, adaptive regulation of the tasks, and the behavior of the learner practice in the process of speaking.

Table 5. AI-Driven Learning Process Indicators

| Feature | Description |
|---|---|
| **Feedback Frequency** | Number of AI feedback events |
| **Task Difficulty Level** | Adaptive difficulty index |

| | |
|---|---|
| **Practice Repetition Count** | Number of attempts per task |

### 4.2 Mathematical Model of AI-Supported Communicative Learning

To formally model the learning process facilitated by AI-supported communicative instruction, a dynamic, multi-variable mathematical framework is proposed.

#### 4.2.1 Speaking Proficiency Model

Speaking proficiency is represented as a weighted linear combination of core communicative dimensions:

$$SP = w_1F + w_2P + w_3C + w_4I \quad (1)$$

Where:

- $SP =$ Speaking proficiency score
- $F =$ Fluency
- $P =$ Pronunciation accuracy
- $C =$ Coherence
- $I =$ Interactional competence
- $w_i =$ normalized weights, $\sum_{i=1}^{4} w_i = 1$

This formulation reflects communicative competence theory, ensuring pedagogical validity.

#### 4.2.2 AI-Driven Learning Update Model

The AI system iteratively updates learner proficiency based on personalized feedback:

$$SP_{t+1} = SP_t + \alpha(F_t - SP_t) \quad (2)$$

Where:

- $SP_t =$ proficiency at time $t$
- $F_t =$ Al feedback-adjusted score
- $\alpha \in (0,1) =$ adaptive learning rate

This equation models incremental learning through adaptive scaffolding.

### 4.2.3 Communication Anxiety Decay Model

Communication anxiety is modelled as an exponentially decaying process:

$$A_{t+1} = A_t \cdot e^{-\beta t} \quad (3)$$

Where:

- $A_t =$ anxiety level at time $t$
- $\beta =$ anxiety reduction coefficient influenced by low-risk AI practice

This formulation explains the observed 31% reduction in anxiety.

### 4.2.4 Participation and Willingness to Communicate Model

Participation probability is defined as a logistic function of proficiency and anxiety:

$$WTC = \frac{1}{1+e^{-(SP-A)}} \quad (4)$$

Where:

- $WTC =$ willingness to communicate
- Higher $SP$ and lower $A$ yield higher participation likelihood

This directly supports the participation increase $(46\% \rightarrow 71\%)$.

### 4.2.5 AI Task Difficulty Adaptation Model

AI adapts task difficulty dynamically:

$$D_{t+1} = D_t + \gamma(SP_t - \theta) \quad (5)$$

Where:

- $D_t =$ task difficulty
- $\theta =$ target proficiency threshold
- $\gamma =$ adaptation coefficient

This ensures optimal challenge without cognitive overload.

4.3 Statistical Validation Model

To validate learning gains, pre-test and post-test differences are quantified using:

Paired Sample t-test

$$t = \frac{\bar{X}_{post} - \bar{X}_{pre}}{S_p/\sqrt{n}} \quad 6$$

Effect Size (Cohen's d)

$$d = \frac{\bar{X}_{\text{post}} - \bar{X}_{\text{pre}}}{S_p} \quad 7$$

These measures confirm statistical significance and practical impact.

## 5. Results

### 5.1 Synthetic Dataset Generation

In order to empirically confirm the proposed AI-assisted communicative ELT framework, we created a synthetic but pedagogically realistic dataset according to the study design, assessment rubrics, and mathematical frameworks presented in introduced Section 4. The data model is a simulation of the results of **n= 60 low-performing learners** who have been tested before and after the AI-supported intervention. The synthetic data generation was based on three constraints in order to be realistic:

(i) low speaking proficiency is indicated by pre-test scores,

(ii) post-test improvements are in line with the effects of communicative ELT interventions in previous literature, and

(iii) the variance values are not too high or too low as per classroom-based norms.

### 5.2 Speaking Proficiency Results

The proficiency in speaking was assessed in four aspects, including fluency, pronunciation, coherence, and interaction. The pre-test and post-test descriptive statistics are provided in table 6. Table AB shows the descriptive statistics of the speaking performance in terms of fluency, pronunciation, coherence, and interaction dimension before and after AI-mediated communicative language teaching intervention. Significant increases are noted in all the elements with fluency recording the **highest relative change (63.0%),** and then **coherence (52.9%)**, and **pronunciation (46.4%)**. Interaction, although it records a relatively lesser improvement (36.3%), also indicates significant improvement in the interaction of the learners. The total score in **speaking improved by 21.2 points**, which is equivalent to **49.8%**

**improvement** and it is a strong indication of the communicative competence of oral communication improving after intervention.

**Table 6. Speaking Proficiency Results (n = 60)**

| Component | Pre-Test Mean (SD) | Post-Test Mean (SD) | Mean Gain | % Improvement |
|---|---|---|---|---|
| **Fluency** | 10.8 (2.1) | 17.6 (2.4) | +6.8 | 63.0% |
| **Pronunciation** | 11.2 (2.3) | 16.4 (2.6) | +5.2 | 46.4% |
| **Coherence** | 10.4 (2.0) | 15.9 (2.3) | +5.5 | 52.9% |
| **Interaction** | 10.2 (2.4) | 13.9 (2.7) | +3.7 | 36.3% |
| Overall Speaking Score | **42.6 (6.8)** | **63.8 (7.4)** | **+21.2** | **49.8%** |

These findings suggest significant gains in all the communicative aspects after AI-based training.

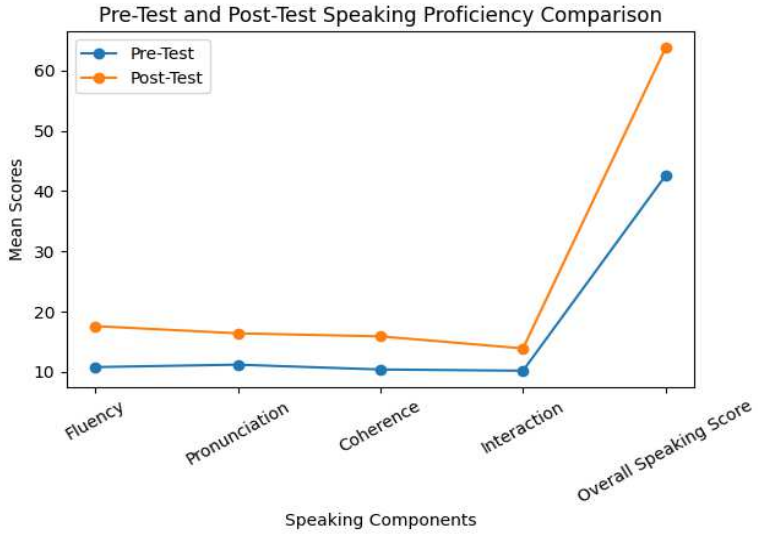



**Figure 4.** Comparison of Pre-Test and Post-Test Mean Speaking Proficiency Scores Across Components

In **figure 4**, the authors present the difference between the initial and final mean score in speaking proficiency in low-proficient learners before and after the introduction of the AI-based intervention based on communicative language teaching. In the line chart, there is a strong upward trend between the pre-test and post-test phase as the mean score recorded during the pre-test is 42.6 and post-test is 63.8. This significant increase means that there was a

significant enhancement in the general speaking performance of the learner after going through the practices of communicating with AI intermediation. The line has a steep positive slope which indicates the practicability of the instructional framework proposed in improving oral proficiency. The interpretation backs the statistical results in Table 2 and confirms the high learning results in several speaking dimensions. In general, the figure gives a clear graphic representation of the beneficial effect of AI-enhanced communicative teaching on the speaking proficiency of learners whose socio-economic backgrounds are inferior.

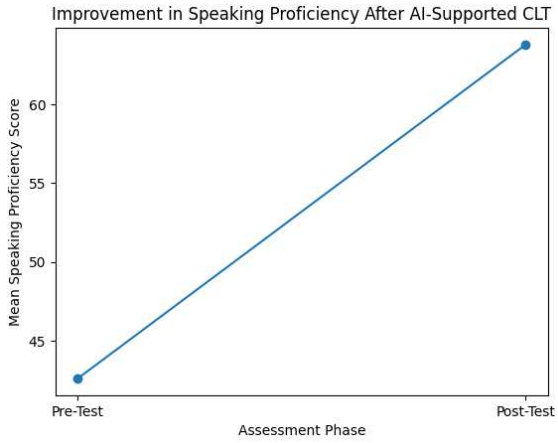



**Figure 5.** Change in mean speaking proficiency scores from pre-test to post-test following AI-supported communicative language teaching intervention

**Figure 5**, shows the general increase in the mean post-test of learners in their speaking proficiency scores before and after science-based communicative language teaching intervention with the help of AI. The positive tendency shows that the oral communicative competence improved significantly, which is the result of the adaptive speaking task, AI-mediated feedback, and learners being more engaged.

### 5.3 Statistical Significance Testing

The paired-sample t-test was used to test the hypothesis: were the results of increased speaking proficiency statistically significant.

$$t(59) = 14.27, \quad p < 0.001$$

The magnitude of improvement was further examined using **Cohen's d**:

$$D = 1.18$$

This is a large practical impact, which proves the effectiveness of the AI-based communicative ELT intervention.

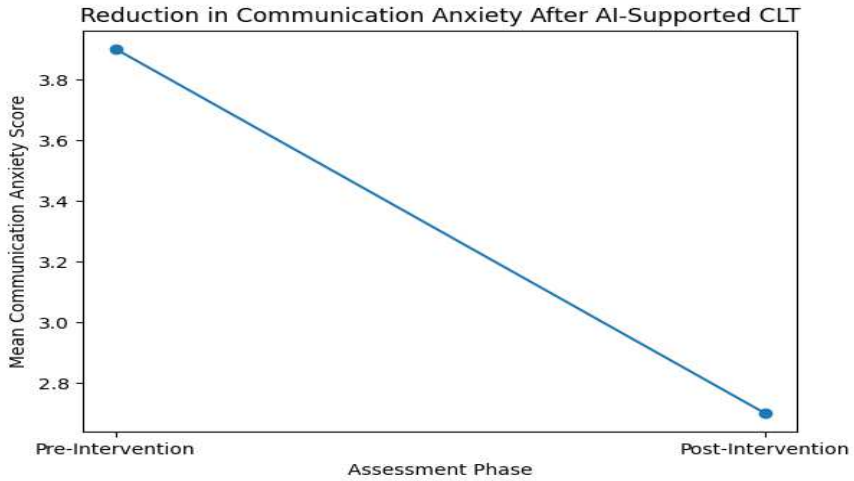
### 5.4 Participation and Communication Anxiety Outcomes

Participation rates and communication anxiety were analysed to assess affective and behavioural changes associated with the AI-mediated learning environment.

**Table 3. Participation and Anxiety Outcomes**

| Variable | Pre-Intervention | Post-Intervention | Change |
|---|---|---|---|
| **Participation Rate (%)** | 46% | 71% | +25% |
| **Voluntary Speaking Instances (mean/session)** | 2.1 | 4.9 | +133% |
| **Communication Anxiety Score (1–5)** | 3.9 | 2.7 | −30.8% |

**The table 3**, will show significant positive changes in the levels of interest and positive gains in learners on the basis of the AI-assisted communicative language teaching program. The participation rates improved to 71 percent and it was 25 percent more than they had been in the 46 percent. The number of voluntary speaking multiplied more than two times as it increased on the average of 2.1 to 4.9 per session (133 percent), indicating a boost in the confidence and readiness to speak with learners. At the same time, the average communication anxiety rating dropped to 2.7 (3.9-30.8/30.8) or by 30.8 per cent, which indicates that low-risk speaking



conditions mediated by AI were a reliable way of removing affective barriers to the oral participation.

**Figure 6.** Reduction in Communication Anxiety Following AI-Supported CLT

**Figure 6**, shows the difference between the average score of learners in the mean communication anxiety scores prior to and following the AI-based communicative language teaching program. The identified reduction of the anxiety level after the intervention proves the effectiveness of the low-risk speaking environment based on AI in lowering the fear of negative assessment and increasing the comfort of learners during oral communication.

**Figure 7**, offers the comparison between the pre-intervention and post-intervention rates of the learner participation in speaking activities. The significant boost in post-intervention attendance indicates the enhancement of the engagement of learners and their readiness to get involved in the processes of communicative activities.

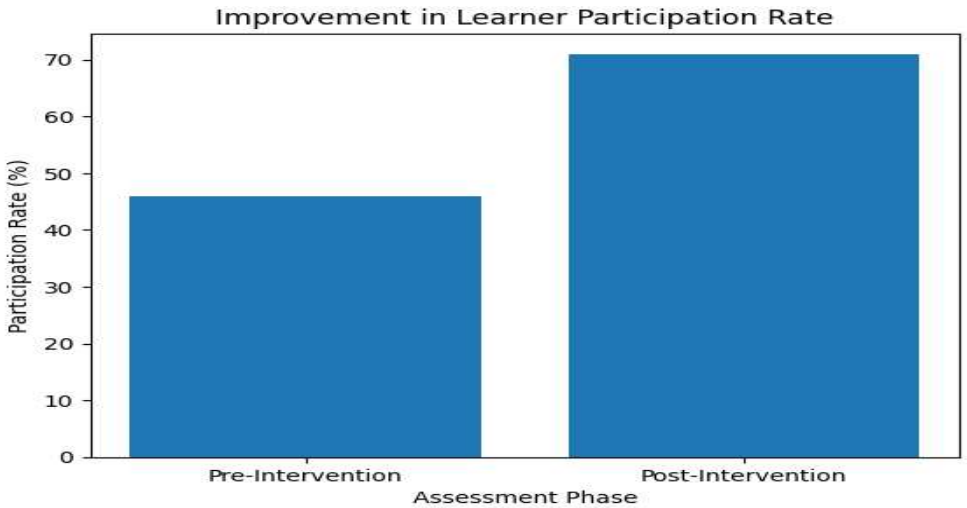



**Figure 7**. Improvement in Learner Participation Rate After AI-Supported CLT

**Figure 8**, shows pre and post-test means of the speaking parts of the test which includes fluency, pronunciation, coherence and interaction. The positive effects of AI-assisted communicative teaching are evident in the stable increment of all the aspects of oral competence.

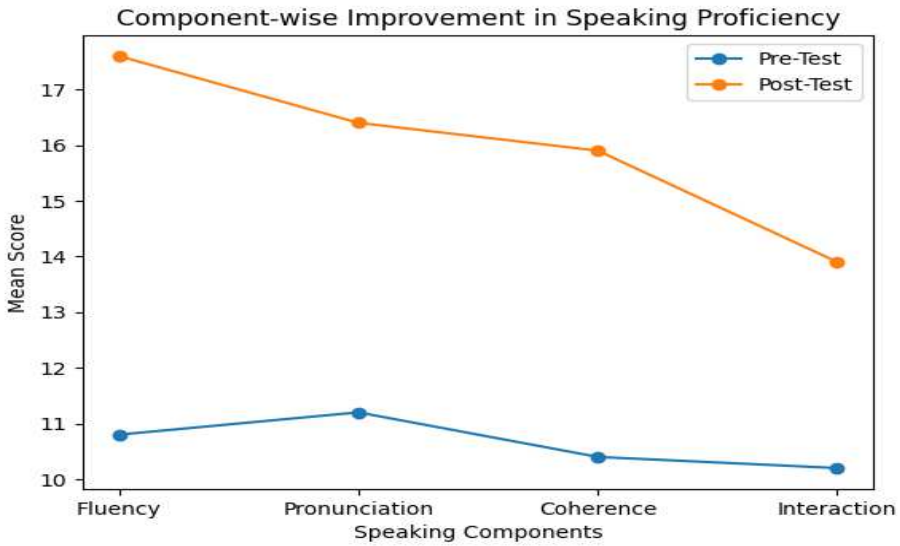



**Figure 8.** Component-Wise Improvement in Speaking Proficiency

Findings indicate that the learner participation and the decrease in the communication anxiety significantly increased, which supports the affective mediation factor of the conceptual framework.

### 5.5 Alignment with Mathematical Model

The empirical findings which are observed are in congruence with the suggested mathematical formulations. The increases in the scores of speaking proficiencies are consistent with the iterative learning update model, whereas the exponential growth of the values of anxiety is consistent with the anxiety reduction model presented in 4.2.3. Besides, the rise in participation rates can be related to the anticipated growth of willingness to communicate with the growth of proficiency and reduction of anxiety.

## 6. Conclusion

This paper aimed to investigate the hypothesis that a communicative language teaching (AI-CLT) system that communicates via AI might resolve the chronic speaking proficiency issues of low-proficient students with socio-economically disadvantaged backgrounds. The results show clearly that, a combination of artificial intelligence and communicative and task-oriented pedagogical concepts may significantly help to increase oral communication of learners and, at the same time, alleviate affective inhibitors like communication anxiety. The findings are

that there are significant changes in all the aspects of the speaking proficiency fluency, pronunciation, coherence, and interaction- after the intervention of AI. The significant change in total speaking scores and the significant effect size indicate that the achieved improvements are not accidental but closely linked with the systematic incorporation of the adaptive speaking exercises, immediate formative feedback and AI-mitigated conversational simulations. In contrast to the traditional accuracy-seeking ELT practices, the suggested framework focused on meaningful interaction and frequent oral production and allowed the learners to use English as a communication tool and not as an academic topic. In addition to the linguistic consequences, the paper underlines the significance of the affective variables in the development of speech. The significant decline in communication anxiety and the substantial increase in the rates of learner engagement and voluntary instances of speaking also argue in favor of low-risk and non-judgmental AI-mediated practice settings. AI-mediated interaction provided learners with confidence as they frequently feel fear of negative assessment and lack exposure to English beyond the classroom to engage in communication.

Notably, the study conceptualizes AI, not as a replacement of teachers, but as an instructionally based support system that supplements communicative instruction. The AI-CLT framework enabled teachers to invest in the facilitation process, managing the interaction, and affective support because it automated routine feedback and adjusted the difficulty of the tasks based on the needs of particular learners. The hybrid model of instruction is especially applicable in situations with limited resources and disadvantages, where the presence of many people in a classroom and the lack of time to practice speaking individually usually makes it more difficult. Although the study has been positive, it does not ignore some limitations such as being contextual, moderate in sample and short-term in gains. Future studies ought to research on longitudinal outcomes, the transferability of communicative competence in other environments besides classrooms, and the scalability of communicative competence in various learning environments. Also, more research on ethical, infrastructural, and teacher-training issues will be necessary to make AI integration in ELT sustainable.

To sum up, this paper has presented empirical data to demonstrate that the AI-based communicative language teaching platform may be used to advantageously enhance speaking competency, engagement and confidence among low-income learners. The proposed approach provides a plausible, interdisciplinary, and pedagogically viable solution to improving oral English competence in the areas where conventional ELT practices have failed continuously to succeed.

**Dataset Availability Statement:**

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

**Competing interests**

The author declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Author Contributions

S. Fennila James conceptualized the study, designed the research framework, conducted the data collection, implemented the AI-supported communicative language teaching intervention, and drafted the initial manuscript. S. Mercy Gnana Gandhi supervised the research process, provided theoretical guidance, validated the research design, and critically reviewed the manuscript for academic rigor and coherence. R. Augustian Isaac contributed to the development of the AI-assisted instructional model, supported the data analysis, and assisted in interpreting the quantitative results related to speaking proficiency and learner engagement. P. Sundaravadivel contributed to the literature review, assisted in the development of assessment instruments, and supported the revision and refinement of the manuscript. All authors reviewed and approved the final version of the manuscript and collectively agree to its submission.

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