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Integration of Applied Linguistics, Neuro-Linguistic Programming and AI: Interactional Competence in ESL Group Discussions

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ABSTRACT

Integration of multimodal strategies has emerged as a dynamic approach in advancing group discussion skills (GDS) of English language learners, job seekers, and professionals in today's globalised and technology-driven world. This study tested the impact of an integrated multimodal approach of forty hours to advance ESL learners' proficiency in GD skills. The program included ten-hour sessions each of Neuro-Linguistic Programming (NLP) integrated classroom activities, Artificial Intelligence (AI) assisted training, multimedia-assisted sessions, and practical sessions. This study was initiated with the training of two different experimental groups of thirty-seven learners who were chosen, trained and analysed as two groups using a single experimental group design. Post-test questionnaires were used to assess the framework's efficacy after the study and pre-test quantitative questions were used to gauge the learners' baseline GD ability level. Subsequently, qualitative questionnaires were administered to the learners to collect feedback on their learning experiences following the study period. To compare group discussion skills' scores before and after the test, paired t-tests were used. The learners' test performance after the study showed a substantial statistical difference compared to their learning experiences before

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the study. They excelled in their final employability viva exams. Two-sample t-tests were conducted to check the impact of the multimodal intervention. The findings demonstrated that the chosen learners' experiences with this model regarding learning GDS were significant. The research confirms that this model can be effectively employed among ESL learners to enhance their GD skills, thereby making them more employable individuals.

Keywords: Applied Linguistics; Neuro-Linguistic Programming; Language; Artificial Intelligence; Multimodality; Group Discussion Skills

1. Introduction

The effectiveness of language teaching can be evaluated by the creativity of teachers' pedagogical methods, which motivates learners' readiness to learn and help overcome communication challenges in all academic scenarios. Strong English communication skills are highly valued by employers and essential for thriving in many professional fields. Mastering English is essential for career opportunities in global organizations, as it fosters effective international communication and keeps professionals at the forefront of advancements in various fields. Current language activities focus on the necessity of excellent communication skills to prepare students for group discussion, which is essential for attending interviews in their semester exams and supporting them in preparing for placement purposes, and ultimately, sustaining them in the workplace. To learn and excel in group discussion skills efficiently, some individuals need consistent practice, some need to involve themselves in a group discussion, some need to interact with others regularly, and others need to do all three and other extra activities to enhance their GD skills. Anxiety can occasionally result from not knowing one's learning patterns. This study examines the relationship between these categories and problem-solving techniques, as well as how to effectively teach learners with diverse needs and expectations. To improve ESL learners' group discussion speaking abilities, it is still necessary to find practical solutions to counteract traditional methods by integrating multimodal technologies and interdisciplinary approaches. To teach GD skills to ESL learners at The New College, integrated multimodal pedagogical strategies have been designed (i) Ten hours of Neuro-Linguistic Programme (NLP) integrated classroom activities to advance the proficiency of thirty-seven learners in GDS, (ii) Artificial Intelligence (AI) assisted training for ten hours. (iii) Multimedia assistance for ten hours and (iv) Practical sessions for ten hours. To assess the impact of these strategies, they need to be trained for a prolonged period to enhance their GD skills.

1.1. Theoretical Background

The framework was developed by integrating a forty-hour training module with multimodal pedagogical strategies. According to[1], multimodal pedagogies utilise a diversification of communication channels, including text, images, audio, and video, to facilitate student learning[1,2]. According to[3], multimodal pedagogies can improve learning outcomes, motivation, and student involvement. The use of multimodal pedagogies was validated by[3]. Stillman and others developed the VAK model in the 1920s and several studies are still being conducted about its features[4,5]. Several scholars have researched and found that processing modes may change and develop as individuals progress through different stages of each style during childhood. Grinder and Bandler describe the neurological traits and behavioural indicators that the learners are likely to exhibit, which are listed below (**Figure 1**)[6].

Visual learners have the fastest voice and processing speed. They exhibit movements or changes around the eyes, such as blinks, raised eyebrows, squints, etc., while remaining still[6]. Visual learners are organised, precise, orderly, observant, quieter, appearance-oriented, proficient at spelling, able to memorise by picture, are less constantly distracted by noise, struggle to retain spoken instructions, and would rather read than be read to. When speaking, the chin is up; the voice is high. When learning, students are cautious until they are mentally transparent. They need an overall view, a purpose, and a vision for details. Visual learners remember what they see[6]. Visual students have to have the whole picture when engaged in conversation and are very detailed in their descriptions. They are most accurate in spelling out of the three modes, and they can recognise and spell words.

They are capable of strong and speedy reading and quickly learn to write elegantly, as looks are important. They possess vivid imagery and see possibilities, making this the most effective mode for long-term planning [6].

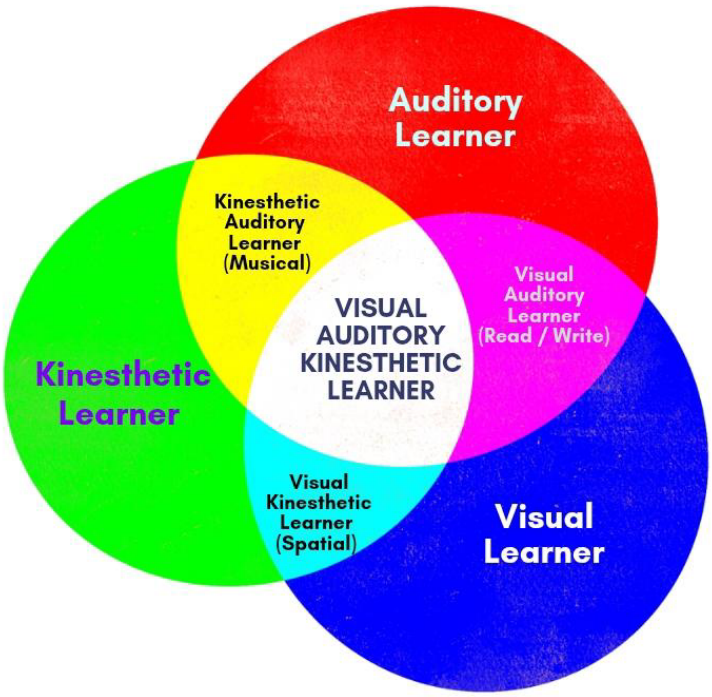

Figure 1. The VAK Model Adapted for Fostering Speaking Skills.

Auditory learners talk to themselves, are easily distracted, move their lips/say words when reading, can repeat back, find maths and writing being more complex than spoken language, speak in a rhythmic pattern, like music, can mimic tone, pitch, and timbre, learn by listening, and memorise by steps, procedure, and sequence. When speaking, auditory students mark off with tone, tempo, and shifts. When learning, students engage in dialogues, both internally and externally, and attempt alternatives verbally first. When engaged in conversation, auditory students exhibit the most talkative behaviour out of the three modes; they love discussions and tend to tell the whole sequential event. They use a phonetic approach and spell with rhythmic movement. They enjoy reading aloud and listening, and often speak slowly because of sub-vocalising.

Kinesthetic learners react physically to rewards; they touch and approach people, are physically oriented, move a lot, react physically more strongly, have early and extensive muscle development, learn by doing, memorise by walking and seeing, grasp concepts when reading, gesture a lot, and react physically. When speaking, the chin is down, and the voice is louder. When learning, kinesthetic students learn through hands-on manipulation and active engagement. When engaged in conversation, kinesthetic students are often laconic and tactile, using gestures, movements, and action words. They count out letters with body movements and check with internal feelings. They prefer plot-oriented books, which reflect the story's actions through body movements. Handwriting is thick and pressured and is not as good as the other two modes.

This article examines the impacts of implementing ten integrated NLP strategies to develop the GDS of the learners. It tests the following group discussion skills of the selected learners: 1) participation 2) vocabulary generation 3) decision making 4) giving or sharing opinions 5) creating something as a group 6) problem-solving 7) negotiating, extending and modifying ideas in a group 8) finalise and act on group consensus 9) persuasion and 10) active listening. These activities are prepared as collaborative learning tasks by the researcher, leading to group success when each group learner is included and is actively engaged and working with other learners. By discussing the same topic, they exchange

their understanding of the topic, extend their conversations, and analyse the ideas or thoughts of other participants. GD skills are one of the essential interview skills in the current scenario. They are challenging for college students from rural and diverse cultural backgrounds [7,8]. In particular, their background changes when they move from rural to urban areas, and they have to interact with others individually and in groups, leading the day-to-day activities. It is essential not only in their daily life but also for getting successful results in their employability skills viva and placement interviews later in their study periods. All forms of daily communication, including personal, professional, and political interactions, involve group discussions and debates [9]. They have the opportunity to test their ideas on others and receive valuable feedback through engaging in thoughtful dialogues, where they share ideas and develop solutions. The learners of The New College have their distinctive problems that need to be addressed. This study focuses on developing their GD skills with their classmates in formal and informal settings through NLP learning styles.

Usually, the training in colleges focuses on assessing whether a candidate possesses particular GD skills that the recruiters look for in their employees. It may include eight to 10 participants and last 20 to 25 minutes. Success depends on how well they communicate to share and give their opinions, solve problems and create new ideas during their GDS. Several factors influence students not to practice their GD skills in English and practice well [10]. The following section reviews existing knowledge on this framework and identifies research gaps to analyse their problems and address them.

1.2. Review of Literature

This section reviews the importance and relevance of integrating multimodal pedagogical strategies, including Neuro-Linguistic Programming (NLP), Artificial Intelligence (AI) assistance, and Multimedia assistance, to enhance group discussion skills. These strategies have the potential to provide a unique classroom experience for ESL learners in India. Kress emphasised the importance of multimodal pedagogies [1], which involve employing multiple modes of communication, such as text, images, audio, and video, to facilitate learning. Jewitt stated that multimodal pedagogies can enhance learners' engagement, inspiration and learning outcomes [3], which confirms the justifiability of using multimodal pedagogies. In his book, Kress explored communication, learning, and multimodality by closely examining how meaning is created in various contexts, including households, schools, hospitals, and museums [1]. Bezemer and Kress go beyond conventional research sites by examining print materials, images, videos, and screenshots [11], concentrating on essential instruments to characterise and examine modern communication and learning. With a strong scientific foundation, the book questions conventional wisdom while providing insightful instances. It also discusses several aspects in applied linguistics, semiotics, multimodality, and related disciplines [11].

Several interdisciplinary studies integrate multimodal approaches within inclusive education and English Language Teaching (ELT), emphasising the use of visual aids, technology, and creative tasks to accommodate diverse learner profiles. However, such studies' reliance on literature-based evaluation limits empirical generalizability, and its application in diverse sociolinguistic contexts remains underexplored. Many researchers have demonstrated the potential of Neuro-Linguistic Programming (NLP) to enhance the communication skills of tertiary learners through targeted interventions. Those studies reported notable gains in learners' confidence, personality development, and communicative efficacy. While the intervention appears effective, the absence of a control group and limited longitudinal follow-up raise questions about the sustainability and scalability of these improvements in broader educational settings.

In contrast, Passmore and Rowson adopt a sceptical lens, critically interrogating the theoretical claims of NLP through a comprehensive literature review [12]. Their findings underscore a dearth of rigorous empirical support for NLP's efficacy, raising important questions about its legitimacy as a pedagogical tool. The critical stance is valuable; however, the review could benefit from a more nuanced differentiation between various strands of NLP practices, rather than a wholesale critique of them. The arguments, though pedagogically plausible, would be strengthened by the inclusion of experimental or observational data to validate the claims. Moreover, certain experimental studies with undergraduate students illustrate a positive correlation between NLP techniques (e.g., Swish Technique, Anchoring) and enhanced learner motivation.

Bakri et al. assess the impact of VAK learning styles on

the oral English proficiency of Indonesian teenagers using a quasi-experimental design[13]. The study demonstrates statistically significant improvements in fluency and accuracy following the intervention. While methodologically structured, the use of purposive sampling introduces potential bias, and the lack of a randomised control limits the robustness of causal inferences. The study nonetheless contributes valuable data supporting multimodal instructional strategies. Applied researchers have discovered that learners behave differently when acquiring new knowledge or information after meeting with individuals of various learning styles on multiple occasions[14]. Visual learners must visualise their subject. Learning with the VAK style indicated a reduction of psychological issues like feelings of fear and anxiety, and a lack of confidence in speaking; they cater to be more accessible when learning through their perceptual system. At the same time, auditory learners will explicitly ask for verbal explanations to recall something. In a different light, their perceptual systems are closely related to the history of their firm positions. For instance, engineers who are kinesthetic learners will find it simpler to learn and complete their tasks in this way. The teacher can better plan the teaching strategy utilised in the students' learning activities by being aware of their traits or learning preferences. Additionally, based on their features, students will comprehend how they enhance their learning.

In his article, Abbassy explored the effectiveness of NLP in improving English oral skills for 60 ESP learners of the Higher Institute of Engineering and Technology in New Damietta City[15]. The participants were randomly assigned to either an experimental or a control group (n = 30 each). Both groups had the same teacher, but the experimental group used NLP, while the control group received regular instruction. The study concludes that NLP is effective in enhancing ESP learners' English oral communication skills. According to Luckin[16], AI-driven solutions can improve the classroom experience by offering personalised feedback, automating grading, and promoting cooperation. AI in language teaching is important in the present setting, allowing learners to have unique experiences in their classes[17]. For example, chatbots with AI capabilities can help group discussions by steering conversations, giving comments, and providing prompts.

1.3. Research Gap

Thus, it is evident from the review that there is a research gap in using integrated multimodal pedagogical strategies, principles of NLP VAK learning styles, AI-driven tools and the applications of applied linguistics to support the development of group discussion skills. The framework insists that in order to facilitate GDS, multiple modes of communication such as text, images, audio, and video, must be incorporated. Moreover, activities based on NLP principles with VAK learning styles facilitate learning experiences towards practising group discussions that promote effective collaboration. AI tools can also be utilized to give real-time learning and personalised feedback to learners at their own pace and create their environment bubble to facilitate their understanding of getting inputs for discussions, getting feedback for their attempts and enhancing learning experiences for collaboration[18]. These integrative methods provide numerous learning opportunities for the learners in an ESL environment. While prior studies have explored individual components such as NLP or AI-based instruction, this study offers a novel integration of these elements into a cohesive, task-specific framework targeting group discussion skills among ESL learners – an area underexplored in existing research.

1.4. Research Questions

These research questions are framed based on the identified research gaps:

a. How effectively do learners' English group discussion skills improve through the integration of multimodal educational strategies?
b. How do students feel about each integrated method's value and efficacy in enhancing their involvement in group discussions?
c. Did students' performance in group discussions differ significantly before and after the integration of the mentioned educational tactics?
d. How do these strategies enable students to confidently practise group conversational skills?

2. Methodology

This section presents the methods adopted in this study.

2.1. Statement of the Problem

The researchers observed that the learners of the I Year B.Sc. Physics and Chemistry had a low level of performance in group discussion skills in the demo classes before the start of their regular classes. Hence, the researchers in the present study investigate how an integrated framework can develop the learners' group discussion skills. Their suggested approach includes various activities that can help learners in several GD tasks.

2.2. Research Objectives

a. To evaluate how significantly students' English group discussion abilities have improved after using integrated multimodal teaching techniques.
b. To investigate how students perceive the benefits and efficacy of each integrated approach (NLP, AI-assisted instruction, multimedia support, and hands-on training) for enhancing their participation in group discussions.
c. To ascertain whether the performance of students in group discussions before and following the adoption of the integrated teaching strategies differs in a statistically significant way.

2.3. Rationale

This study is planned for the following reasons: firstly, the learners should be approached for training group discussion skills through a psychological visual, auditory, and kinesthetic learning style of NLP. Secondly, these methods can always provide learners with practical exposure to learning psychologically and innovatively. Thirdly, adapting AI-assisted training will improve the learning environment and support students in maintaining their goals. The fourth reason is that multimedia resources and quick exercises or tasks are more useful and can be used at nearly any point during the study period. Lastly, the hands-on experience with GDS during class timings gives them more exposure to practice and learn from their mistakes. The methodological framework is encapsulated in **Figure 2**.

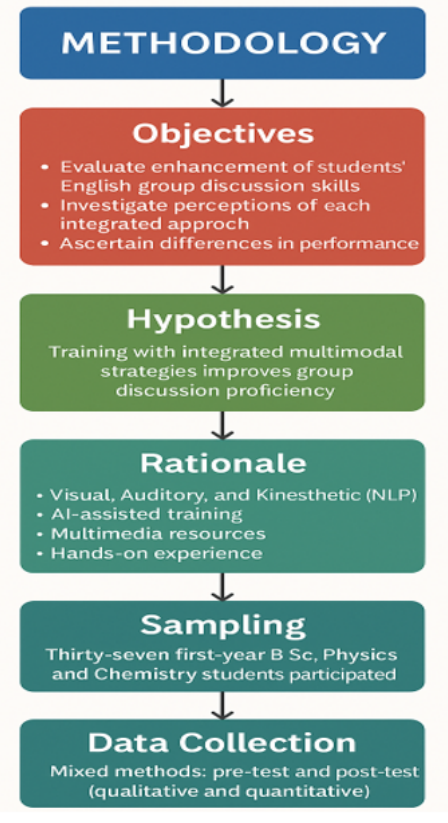

Figure 2. The Methodological Framework.

2.4. The Hypothesis

The training of group discussion skills for the chosen learners using the selected integrated multimodal pedagogical strategies will result in an improvement in the GDS of the selected learners.

2.5. Sampling

For this study, thirty-seven students were chosen at The New College in Royapettah, Chennai, who were enrolled in the first year of the B.Sc. Physics and Chemistry programmes. For the two experimental groups, 37 cooperated and participated actively throughout the study period.

2.6. Sampling Procedure and Instructions

Random sampling was employed to choose participants from a group of learners who had volunteered for this study. There were thirty-seven learners in the experimental group in the research study. The study was carried out to find out how it may help them develop their group discussion skills. The significance of this study was explained to the participants. They were asked to discuss any language-related issues they were having in conversational and communicative contexts. It helped the researchers plan what they had to learn in the activity phase. They were briefed about the two steps they would face in the experiment. The study focuses on L2 learners, and the target population has been examined for its most crucial traits, including age, gender, ethnicity, educational background, academic aptitude, social status, and other characteristics that are known to be connected to the study's key variables. They are questioned about their group communication skills. Group learning is promoted. They are also asked to contact the researcher through social networking and e-mail. The learners were invited to clear their doubts regarding group discussion skills through Q&A sessions through WhatsApp groups.

Research Ethics

Ethical approval was obtained from The New College, Chennai. Informed consent and confidentiality measures were also addressed in accordance with institutional guidelines. Strict adherence was given to the protocol required for the experimental study.

2.7. Data Collection Method

Mixed methods (both qualitative and quantitative) approach was used to collect the data. Data collection was initiated with an introduction to students about the importance of this study and its benefits in their daily lives. In the first phase of the qualitative method, participants were assessed for their basic line skills in group discussions through a 25-mark pre-test. After this stage, they were trained for forty hours. In the third phase, learners in the experimental groups were given a post-test with 25 marks. The data were collected through the pre-test and post-test marks. The results of the quantitative design are treated as performance markers to identify improvements in group discussion skills before and after the training phase.

Marks Collection

The assessment criteria for the pre-test and post-test of group discussion skills are 25 marks based on the twelve items: 1. Sitting Posture (1M) 2. Eye Contact (1M) 3. Body Language (1M) 4. Voice Audibility (1M) 5. Pronunciation (1M) 6. Listening Skills (1M) 7. Sentence Structure (1M) 8. Coherence (1M) 9. Relevance (1M) 10. Reference (1M) 11. Content (5M) and 12. Overall Performance (10M). The qualitative questionnaires were given to the students after ten integrated classroom activities:

2.8. Research Design

Through questionnaires, the students' learning styles were examined. Even though students typically have a main preferred learning style, the results showed that there would be a blend of all three. While some students showed a strong preference for one approach, others exhibited a more balanced combination of two, or occasionally, three approaches. The learning process was most effective when learners' preferred learning styles were recognized. Through this study, the researchers were able to determine the learning methods that benefit learners the most. There was no ideal or undesirable learning style. The idea was that different learning methods existed that suited their preferred learning styles. This study's activities are designed by integrating (i) the classroom with three NLP learning styles: Visual-Auditory-Kinesthetic (VAK), and AI-Powered Assistance.

2.9. Research Tools

Ten classroom activities were prepared to develop learners' group discussion skills using the NLP (visual-auditory kinesthetic) learning style. The activities were planned to focus on the following areas:

1. Participation in GD.
2. Vocabulary Generation Skills in a Group
3. Decision-Making in a Group
4. Give or Share Opinions in a Group
5. Create Something as a Team
6. Problem Solving in a Group
7. Agree or Disagree and Negotiate with others in a Group
8. Finalise and Act on Group Consensus
9. Persuasion Skills
10. Active Listening Skills

Figure 3 visually synthesises the ten classroom activities grounded in NLP and structured through the VAK learning styles. **Table 1** encapsulates the aims, procedures and topics of ten integrated NLP classroom activities with three VAK phases: Visual phase, Auditory phase and Kinesthetic phase. These sessions were followed by question-and-answer sessions with the instructor and them, assisted by Artificial Intelligence (AI) tools like Perplexity, ChatGPT and Copilot.

Figure 3. NLP Integrated Classroom Activities.

Table 1. Aims, Procedures and Topics of Ten Integrated NLP Classroom Activities with Three VAK Phases: Visual, Auditory and Kinesthetic Phases.

Name of the Activity	Aim	Procedure	Topic
Group Participation	To develop learners' group participation skills.	A topic is given to a group of learners who are trained for group participation skills using VAK methods.	Usefulness of Social Networking Websites or just a waste of youth's time
Group Vocabulary Generation	To develop learners' vocabulary generation skills on select themes in a group discussion.	A topic is given to a group of learners, and they are trained for vocabulary generation skills using VAK methods.	Whether Digital Education has taken over Traditional Education
Group Decision Making	To develop learners' decision-making skills in a team.	A topic is given to a group of learners, and they are asked to decide whether Gold is the best Investment or a Bursting Bubble. They are trained through VAK methods.	Whether Gold is the Best Investment or is it a Bursting Bubble

Table 1. *Cont.*

Name of the Activity	Aim	Procedure	Topic
Give or Share Opinions in a Group	To develop learners' skills of giving or sharing opinions in a team.	A topic is given to a group of 20 learners, and they were asked to provide or share opinions on the given topic using the VAK method.	Green Cars-Will They Change the Way We Travel?
Create Something as a Group	To develop learners' skills in creating a poster in a group.	A topic is given to a group of 20 learners, and they were asked to make a poster using the VAK method.	Plan and make a poster for a programme to be conducted for learners
Group Problem Solving	To develop learners' group problem-solving skills.	A topic is given to a group of 20 learners, and they are trained to solve problems in a group using the VAK method.	How can we address the growing issue of cybercrime?
Negotiate, Extend and Modify Ideas in a Group	To develop learners' negotiation skills to extend and modify their ideas in groups.	A topic is given to a group of 20 learners, and they are trained through the VAK method to extend their discussions and modify and negotiate various solutions that arise in a group.	Artificial Intelligence - Pros and Cons
Finalise and Act on Group Consensus:	To develop learners' skills in finalising and acting on group consensus.	A topic is given to a group of 20 learners, and they are trained through the VAK method on the following: 1. Encourage other members to participate. 2. Allow other members to perform different roles. 3. Accept and encourage the sharing of different viewpoints. 4. Focus attention on ideas and not on personalities. 5. Manage acceptance of the consensus in the making process.	Is the World Ready for Cashless Currency?
Finalise and Act on Group Consensus	To develop learners' persuasion skills in a group.	A topic is given to the group of 20 learners, and they were trained using VAK to decide how to do something (e.g. which candidate should get a job).	College Life Vs Married Life
Active Listening Skills	To develop learners' active listening skills.	A topic is given to participants and they were trained using VAK methods to i) listen actively and take notes, and ii) respond to others in a group discussion.	The Impact of Fake News

3. Results and Analysis

The results of this study are presented in this section. The data were collected through two types of questionnaires: (i) quantitative: to compare scores of GD skills before (pre-test) and after (post-test) the study period; paired t-tests were used, and (ii) quantitative: to analyse learners' experiences and self-assessment perceptions; 12 open ended questions were asked in qualitative questionnaires. The results of the quantitative design are treated as performance markers to identify improvements in group discussion skills before and after the training phase.

3.1. Quantitative Analysis

The comparison of pre-test and post-test scores of the two experimental groups: (i) 1 year B.Sc. Chemistry and (ii) Physics (**Figures 4** and **5**):

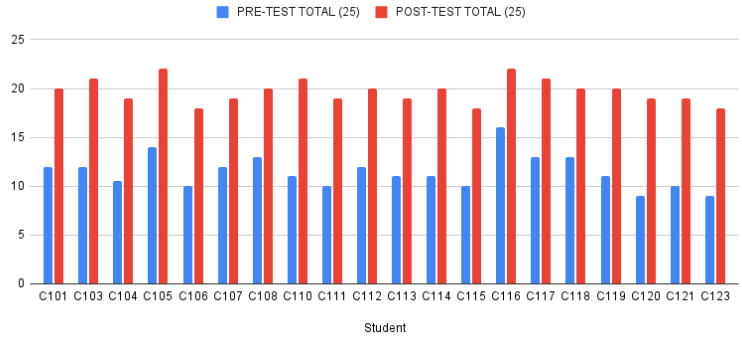

Figure 4. Comparison of Pre-test and Post-test Scores of Group One (Chemistry).

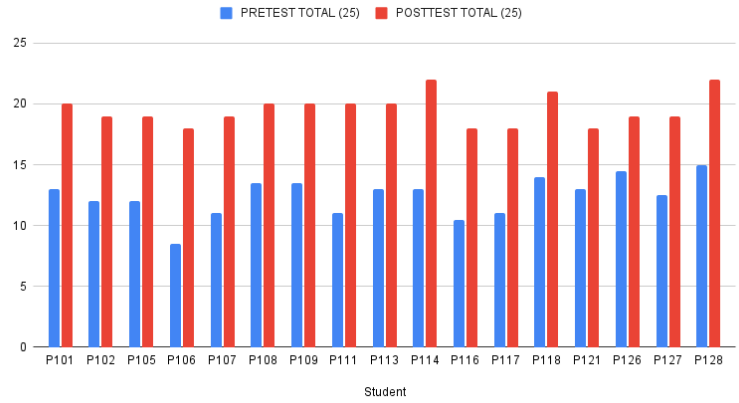

Figure 5. Comparison of Pre-test and Post-test Scores of Group Two (Physics).

A paired sample t-test was conducted with the scores of pre- and post-test of two different groups to evaluate the effectiveness of the integrated Model: (i) Group 1: 20 Chemistry students (**Table 2**), and (ii) Group 2: 19 Physics students (**Table 3**).

Table 2. Group 1 (Chemistry).

Pre-test Mean	Post-test Mean	Mean Improvement	*t*-statistic	*p*-value
11.48	19.70	+8.22	34.79	< 0.0001

Table 3. Group 2 (Physics).

Pre-test Mean	Post-test Mean	Mean Improvement	*t*-statistic	*p*-value
12.29	19.88	+7.36	25.63	< 0.0001

The pre-test and post-test results are compared to assess how well the integrated activities contributed to the 20 students in the Chemistry group's overall performance. The outcomes showed that their performance significantly improved after the activities. The average score before testing was 11.48 (SD = 1.74), and the average score after the test was 19.70 (SD = 1.17). A statistically significant difference between the pre- and post-test scores was found using the paired t-test (t (19) = 34.79, $p < 0.001$). This high t-value and extremely low p-value indicate that the intervention had a significant impact. Therefore, it can be said that the Chemistry group's performance was greatly improved and statistically significantly impacted by the teaching technique used.

The results were compared to assess the impact of the integrated activities on the overall performance of the 17 students in the Physics group. The outcomes showed that performance significantly improved after the activities. The average score before testing was 11.48 (SD = 1.50), and the average score after the test was 19.70 (SD = 1.22). A statistically noteworthy difference between the pre- and post-test scores was found using the paired t-test (t (16) = 25.63, $p < 0.001$). This high t-value and extremely low p-value indicate that the intervention had a significant impact. Therefore, it can be said that the Physics group's performance was greatly improved and statistically significantly impacted by the teaching technique used.

An independent sample t-test was used to compare the results (post-test) of two distinct experimental groups (Chemistry-20 & Physics-17) that received the same multimodal instruction: Chemistry (20) and Physics (17). The purpose of this analysis was to find out if different discipline-specific learner groups produced similar results from the same instruction. The post-test scores of the chemistry group (M = 19.65, SD = 1.18) and the physics group (M = 19.29, SD = 1.28), according to the results, differed statistically significantly (t (35) = 0.88, $p = 0.384$). According to Cohen's d, the effect size was 0.29, indicating a slight practical significance. Initial comparability was indicated by the preliminary examination of pre-test scores, which revealed no discernible baseline differences between the two groups. Therefore, group-specific factors like learner attitudes, disciplinary background, or engagement with the instructional content may be responsible for the observed difference in post-test results. These results demonstrate how important disciplinary context is to language teaching interventions' efficacy which is shown in **Figure 6**.

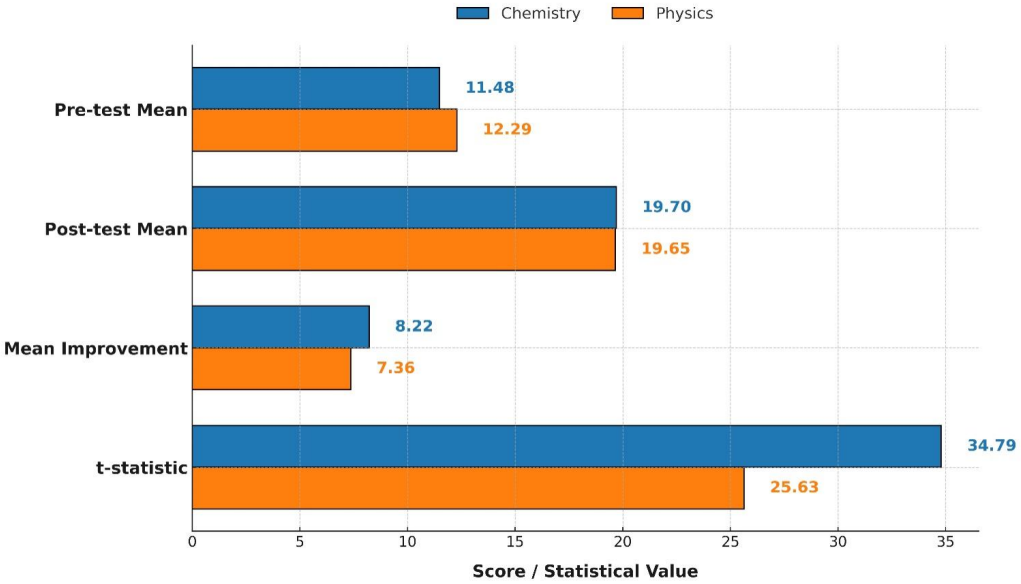

Figure 6. NLP Integrated Classroom Activities.

Figure 6 presents a comparative analysis of inferential statistics for Chemistry and Physics groups in the study. Both groups exhibit substantial improvement in group discussion skills, with post-test means rising significantly from their respective pre-test scores. The Chemistry group shows a slightly higher mean improvement (8.22) compared to the Physics group (7.36). Similarly, the t-statistic values 34.79 for Chemistry and 25.63 for Physics indicate statistically significant differences, supported by *p*-values below 0.0001. Overall, the integrated multimodal approach appears to have been effective across both groups, with Chemistry students demonstrating marginally greater gains.

3.2. Quantitative Analysis

Twelve open-ended questionnaires (**Appendix A**) revealed how integrated classroom activities improved learners' ability to have discussions in groups. There were valuable insights that evolved from this kind of analysis. Integrated classroom activities supported them, and most of them frequently cited that they had a significant impact in participating in group discussions with their co-learners and others in their classrooms. First, through the feedback, it is evident that most of the students felt confident in participating in GDS activities, and their responses supported their confidence level in participation. Second, the learners acknowledged through their feedback that they have improved their vocabulary based on several themes, and they are confident in generating vocabulary. Third, the integrated activities helped them to participate in groups confidently and make group decisions through a collaborative spirit. Fourth, feedback on expressing opinions stated that they felt more comfortable sharing their ideas and opinions during their GDS. Fifth, they had engaged well in collaborative creative tasks like poster preparation and making. Sixth, their responses revealed that they were confident in their problem-solving skills during GDS. Seventh, their responses confirmed that they had learned and practised negotiation skills with respectful agreements and disagreements. Eighth, learners could work towards conclusions and were able to make collective decision-making during GDS. Ninth, they gained confidence in presenting persuasive arguments among their peers in discussions. Tenth, they stated that they listened and responded to other members of the group and had engaged in thoughtful interaction. Finally, most respondents described their experiences as positive, with notable improvements in skills during group discussions. Their responses stated that they were interested in learning because of the multimodal pedagogical strategies used.

4. Discussion

This section analyzes the responses of 37 learners from the two experimental groups, who completed twelve questions after the ten-activity phase. This segment also discusses the summary of the qualitative answers. The outcome of the

study is consistent with earlier research investigations [19]. It shows how learning styles work in conjunction with a wealth of content on social media. The findings suggest that learning styles could improve learning outcomes [20,21]. The VAK literature suggests that this design can be used wherever required and the effectiveness of learning styles used has been attributed to VAK techniques [22,23]. It would be reasonable for a teacher to explore this research to determine the effectiveness of different learning styles as useful educational tools. The current study strongly supports this perspective, validating the use and continued implementation of diverse learning styles. Some cite the literature to support the use of educational psychology to identify "learner preferences" instead of matching instructions or to get students to think about their learning processes. Most research, however, appears to be largely uncritical, often relying on assigning students to a particular learning style category and making recommendations based on those results. Many proponents of evidence-based education might only partially endorse this practice due to its lack of rigour. However, the researchers have considered every factor and approached the investigation with an open mind.

Educational Implications

This multimodal study can be applied in higher education to advance the group discussion skills of ESL learners. For example, auditory learners can make word associations, record lectures, watch videos, participate in group discussions, and take notes. Kinesthetic learners can attend the lab and study for brief periods. Classes, field trips, museum visits, etc. will help them. Students can raise their academic performance and increase their communication skills in their weaker areas by these practices [24–27]. A teacher must learn more about the students' learning preferences for improved instruction. Parents should be informed of various methods to aid in their children's learning.

5. Conclusions

This study concludes that the selected learners developed group discussion skills after the employment of ten classroom activities with an integrated multimodal pedagogical strategy. The experimental group received training for 30 hours with the intervention of the selected learning styles. The study's findings revealed that the selected learners' experiences with learning styles had a significant impact on their group discussion skills (GDS) development. The study affirms that these practices could be employed among ESL learners to enhance group discussion and conversational speaking skills. Although these learning styles are effective, there are only a few studies in the present scientific literature that support their use [28]. Policymakers should prioritize integrated pedagogical strategies that demonstrably improve student learning outcomes. The chosen design allowed the researchers to evaluate the feasibility of such strategies under realistic classroom constraints. Despite a short duration and absence of a control group, statistically significant learning gains affirm the model's practical potential and warrant future longitudinal, controlled studies.

There are several limitations to this study. Future research should be extended to diverse institutions and learner profiles to enhance the generalizability of findings. Moreover, the sample was chosen only from a single institution with relatively homogeneous learners from the first year of Physics and Chemistry. Most of them are from different cultural backgrounds, which may limit the generalizability of the results to broader or more varied ESL contexts. The interventional study was limited to only a duration of 30 hours which may not be sufficient to capture the long-term effects of this pedagogical practice. Sustained improvement in group discussion skills in English and other competencies related to it can be vividly understood in a long-term experiment. Only selected groups from two UG branches underwent training and their enhancement in skills over time proved efficient. Many other groups from the same institute and ESL learners from other colleges may be tested for long-term effects using this model. This study was limited to specific quantitative and qualitative measures, without fully capturing learners' reflections on classroom observations or conversation skills in various settings. Finally, informality with multimodal integrated teaching strategies may have introduced unintentional bias or expectancy effects. Future research should adopt other critical aspects of mixed-methods and longitudinal designs, include more diverse participant profiles, and explore teacher training implications to better understand the efficacy and transferability of this model in group discussion skills. While the sample is limited, the findings are positioned as preliminary. Future studies will broaden the sample base and institutional contexts to strengthen external validity.

The findings of this study hold practical relevance for the design and enhancement of ESL learners' group discussion skills, particularly in business communication. The chosen participants were enrolled in the science stream. Their demonstrated improvements in group discussion skills and paralinguistic competence highlight the effectiveness of integrating multimodal pedagogical strategies into GD skills instruction. Skills such as group discussion are vital not only during study time but also in interviews and business contexts. ESL curricula can be enhanced by integrating targeted techniques with existing teaching methods that support linguistic development. This approach also helps to polish the group discussion and conversation skills required in globalized professional settings. ELT educators are encouraged to incorporate these practices into conversation module trainings. It will enable the learners to better prepare for academic, professional, and real-world communication demands.

Author Contributions

Methodology, N.S.H. and A.S.; validation, A.J.; formal analysis, A.H.H.; investigation, S.T.; resources, S.T.; data curation, S.T.; writing—original draft preparation, A.J., V.S. and G.S.S.; writing—review and editing, A.J. and V.S.; visualization, A.J. and A.S.; supervision, A.S. and A.J.; project administration, A.H.H. and N.S.H. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of The New College, Chennai (Protocol code 1022025 and Date of approval: 02/01/2025).

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

Not Applicable.

Conflicts of Interest

The authors declare no conflict of interest.

Appendix A

1. After the integrated classroom activities, do you feel confident in participating in group discussions? Please describe your learning experience(s).
2. Can you generate and use relevant vocabulary based on specific themes during group discussions following the integrated activities? Please share your learning experience(s).
3. Can you effectively participate in group decision-making after the integrated classroom activities? Describe your learning experience(s).
4. Can you express and share your opinions during group discussions after the integrated activities? Please share your learning experience(s).
5. Can you collaboratively create a poster as part of a group discussion task after the integrated classroom activities? Describe your learning experience(s).
6. Can you engage in problem-solving within group discussions after the integrated activities? If so, describe your learning experience.
7. Can you agree, disagree, and negotiate constructively with others during group discussions after the integrated classroom activities? Share your experience(s).
8. Can you help finalise ideas, work toward group consensus, and take appropriate action during discussions? Please describe your experience(s).
9. Can you effectively persuade or convince others during group discussions after the integrated activities? Share your experience(s).
10. Do you actively listen and respond thoughtfully to others during group discussions following the integrated classroom activities? Describe your experience(s).
11. How would you summarize your overall learning experience in improving group conversational skills through

the integrated classroom activities?

12. Do you have any additional comments or reflections?

Meta Data:

Photos of Integrated Activities: https://drive.google.com/drive/folders/1uc54hBin0brYIUyGBIDvRAnmBtVqRc9x

GDS Training Session: https://drive.google.com/drive/folders/1uc54hBin0brYIUyGBIDvRAnmBtVqRc9x

Google Classroom Link for two groups: https://classroom.google.com/c/NzIyNjAxOTM1Mzgw?cjc=q7pktbk

Group 1 (Qualitative Collection): https://chat.whatsapp.com/Lc1zvakgKXNFzn6ZfQIJYL

Group 2 (Qualitative Collection): https://chat.whatsapp.com/KnEs5puruRw0UavWSP197V

Pre-Test - Video - Physics Batch 3: https://youtu.be/HbAEv6tlGz0?si=lK8sp-XNPfVcpDV6

Pre-Test - Video - Physics Batch 4: https://youtu.be/vtAjfzvnGQ4

Pre-Test - Video - Chemistry Batch 1: https://youtu.be/Kl0yVHcfNYE?si=PHiDySzf-LGNYBJY

Pre-Test - Video - Chemistry Batch 2: https://youtu.be/18PFw77ggFk?si=PSppIKjK1XQD2n5I

Post-Test Photos: https://drive.google.com/drive/folders/1vVh8AFv9ZBU8RlLqffdlFxrOKSZKs-q1

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