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Empowering STEM through Pragmatic Competence: A Holistic Approach

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***Abstract*—The paper addresses the need to integrate pragmatic competence into STEM (Science, Technology, Engineering, and Mathematics) disciplines to enhance learners' communication skills, collaborative capabilities, and professional readiness, enabling them to face the challenges of the 21st century. The traditional STEM curricula often emphasise technical skills and subject expertise, while overlooking the nuances of contextual language use, which is essential for teamwork, cross-disciplinary collaboration, and effective dissemination of findings. Pragmatic competence equips learners with the requisite skills to collaborate, negotiate, and present ideas clearly in real-world scenarios. In this line, the paper investigates the integration of pragmatic competence into STEM curricula, highlighting its transformative potential for developing both academic and professional outcomes. The study focuses on tertiary-level learners and discusses how pragmatic competence fosters communication and collaboration through the implementation of tasks. The sample comprises first-year B.Tech students (n=62) from the Department of Instrumentation and Control Engineering, and the teacher-researcher has administered the pragmatic tasks to the students. Results from this research indicate that fostering pragmatic competence not only improves student outcomes but also nurtures innovation in STEM professionals. By bridging the gap between technical expertise and effective communication, this study advocates for a holistic STEM education framework that equips the learners to navigate the complex, communicative demands of a globalised workforce. The paper further suggests adapting and integrating pragmatic skills into STEM curricula to create experimental and experiential learning opportunities for the students.**

***Keywords*- Collaboration; communication; engineering education; experiential learning; task-based language teaching; teamwork**

***JEET Category*- Research**

I. INTRODUCTION

The digital age is fast-paced and constantly changing. The rapid advancements in STEM fields have revolutionised the way the world addresses global challenges and creates innovative solutions. Consequently, the demands of the 21st century expand beyond subject mastery and technical proficiency. Effective communication, collaboration, teamwork, and problem-solving are essential skills for STEM professionals to thrive in an interconnected and interdisciplinary global workforce today. The traditional STEM curricula remain focused predominantly on cultivating technical expertise and analytical skills, often neglecting the important skill of using language appropriately across various social situations. "The technical preparation of 21st century engineers is understood to entail working within distinctive social and institutional contexts that require skills that are oriented more toward interaction with other people than with the technological objects that engineers devise, produce, and maintain" (Staley & Bairaktarova, 2022, p. 1663). This gap marks the need to integrate pragmatic competence into STEM disciplines to prepare learners for the complex demands of modern professional environments.

Pragmatic competence refers to the ability to use language contextually and appropriately in real-world scenarios. It enables individuals to navigate social norms, cultural variations, and the varied nuances of communication, making it an indispensable skill for teamwork and cross-disciplinary collaboration in the workplace. STEM professionals often find themselves in circumstances where they have to explain technical concepts to a non-technical audience, negotiate solutions, and collaborate across other fields. In such instances, pragmatic awareness serves as a bridge between technical knowledge and its application in the real world. The paper, hence, addresses the critical need for integrating pragmatic competence into STEM education to develop the learners' communication skills, collaborative abilities, and professional readiness.

Furthermore, the National Education Policy 2020 (NEP 2020) proposed by the Ministry of Human Resource Development (2020) places a significant emphasis on holistic and multidisciplinary education, aiming to transform the educational landscape by fostering the all-round development of students. Holistic education in the context of NEP 2020 emphasises an interdisciplinary approach to STEM education, allowing students to connect across different subjects. The assessments that integrate the humanities and arts with STEM disciplines have positive outcomes, and as noted in NEP, such a holistic approach is bound to enhance creative, critical, and innovative thinking; higher-order cognitive skills; problem-

solving capabilities; strong communication skills; effective collaboration and teamwork; more in-depth learning and mastery of curricula across disciplines; enhanced social and moral consciousness; among others. In this regard, the study aims to enable the learners to tackle the multifaceted challenges of the 21st century by integrating pragmatic competence in the English for Specific Purposes (ESP) classroom. In advocating for this integration, the study also looks at the role of experiential learning, which is key to developing pragmatic competence. The study investigates how incorporating pragmatic competence into STEM curricula can cultivate the essential skills while nurturing innovation and critical thinking in tertiary-level learners. The study demonstrates the transformative potential of pragmatic competence in bridging the divide between theoretical knowledge and practical applications through the implementation of tasks. This holistic approach enhances communication, collaboration, and critical thinking, and promises to nurture a generation of STEM professionals who are technically skilled, socially and professionally responsible, and capable of driving progress through sustainable solutions.

II. THEORETICAL BACKGROUND

A. Pragmatic Competence

Competence is defined by the International Bureau of Education (IBE) as "the developmental capacity to interactively mobilize and ethically use knowledge, skills, values, attitudes and technology to engage and act effectively across 21st century contexts to attain individual, collective and global good" (Marope, 2018, p. 27). According to Thomas (1983), pragmatic competence is defined as "the ability to use language effectively to achieve a specific purpose and to understand language in context" (p. 92). Pragmatic competence is highly significant in real-world contexts, as it supports effective communication, contributes to academic and professional success, fosters intercultural understanding, aids social integration, enhances language learning, and strengthens personal relationships. Pragmatic competence helps individuals convey their messages clearly and appropriately, considering the social and cultural context. This reduces miscommunication and misunderstandings. Individuals communicate intentions and emotions more effectively, deepening understanding with others, leading to more meaningful and fulfilling social interactions. In the workplace scenario, pragmatic competence is crucial for navigating professional interactions, negotiations, presentations, and teamwork. This helps people understand workplace hierarchies and use language suitable for various professional contexts. Pragmatic competence enhances cross-cultural communication as individuals understand and respect cultural differences in language use. This is important in this era of globalisation, where people frequently interact with individuals from diverse cultural backgrounds.

B. STEM and Pragmatic Competence

According to De Educación and Ng (2019), the UNESCO report emphasises the need to redefine STEM education to align with the demands of the 21st century. The report advocates for a competence-based approach which equips learners with the requisite knowledge, skills, attitudes, and values necessary for modern STEM education. The requisite skills include cognitive, manipulative, and technological skills; collaboration skills; and communication skills. "Being able to work independently and in teams and to convey information to other team members or stakeholders in clear and effective ways are fundamental skills for all" (De Educación & Ng, 2019, p. 22). Considering the swift advancements in the STEM fields, UNESCO urges the learners to strengthen these competencies. Kasper (1997) emphasises that pragmatic competence is a significant part of a learner's communicative competence. In addition, Jordà (2005) mentions pragmatic competence as "one of the main components of the global construct of communicative competence" (p. 66). Moreover, collaboration and communication skills go together, as teamwork allows each member to participate and share ideas within a framework of collective responsibility. Building on this, the study aims to use the task-based language teaching (TBLT) approach to facilitate the development of pragmatic competence and the requisite skills.

C. Task-Based Language Teaching (TBLT)

Grounded in the theory of communicative language teaching, task-based language teaching (TBLT) is an approach that uses tasks as the core unit of planning and instruction. TBLT shifts the emphasis from traditional teacher-led instruction to a learner-centred and performance-oriented approach where completion of the tasks drives learning. Van den Branden (2006) defines TBLT as an approach to language education in which students engage in functional tasks that focus primarily on meaning exchange and use of language for authentic, real-world purposes beyond linguistic analysis. This approach can be combined with other methods and approaches to achieve the outcomes. "TBI (task-based instruction) is not monolithic; it does not constitute one single methodology. It is a multifaceted approach, which can be used creatively with different syllabus types and for different purposes" (Leaver & Willis, 2004, p. 3). In this approach, tasks are the primary units of analysis for teaching and learning, which demands that students negotiate meaning and engage in meaningful communication. Immersing the learners in task work provides a "better context for the activation of learning processes than form-focused activities, and hence ultimately provides better opportunities for language learning to take place" (Richards & Rodgers, 2014, p. 175). TBLT proposes the idea of a task as an activity that involves language use to achieve a specific outcome. According to Nunan (1989), "the communicative task is a piece of classroom work which involves learners in comprehending, manipulating, producing or interacting in the target language while their attention is principally focused on meaning rather than form. The task should also have a sense of completeness, being able to stand alone as a communicative act in its own right" (p. 10). This study is based on the TBLT approach and focuses on students completing real-world tasks that replicate scenarios where STEM professionals must use the language pragmatically.

D. ESP and Pragmatic Competence

The paper also examines the intersection of two disciplines, English for Specific Purposes (ESP) and Pragmatics. "ESP has

consistently been at the cutting edge of both theory development and innovative practice in applied linguistics, making a significant contribution to our understanding of the varied ways language is used in particular communities" (Hyland, 2019, p. 338). Hutchinson and Waters (1987) emphasise that ESP is not defined by a particular language, methodology, or set of teaching materials, but its content and method are shaped by the learner's grounds for learning. Robinson (1991) has provided an alternative perspective, stating that ESP draws on three fields of knowledge: language, pedagogy, and the student's discipline. Hyland (2019) asserts that ESP has an interdisciplinary nature; thus, it receives insights and implications from other fields. The present study on developing pragmatic awareness in STEM students is interested in the interdisciplinary nature of ESP.

Developing pragmatic competence is an essential aspect of becoming proficient in a new language. It encompasses the ability to use language appropriately in several contexts and goes beyond mere grammar and vocabulary aspects. For language learners in multicultural settings, developing pragmatic competence aids in social integration, enabling language users to understand social customs, appropriate use of humour, idiomatic expressions, and culture-specific forms of communication. They tend to understand the subtleties of language, such as tone, politeness, mood, and indirect speech, thus navigating sensitive situations and communicating accordingly. In academic settings, students can think more, engage in discussions, present their ideas, and write effectively.

Moreover, according to NEP 2020, the teaching of languages has to be based on experiential-learning pedagogy. Pedagogy must evolve to make education more experiential, holistic, integrated, inquiry-driven, discovery-oriented, learner-centred, discussion-based, flexible, and enjoyable (NEP 2020). Experiential theory has implications for STEM education as it provides a framework for actively engaging STEM professionals. Consequently, this study adopts experiential learning theory to facilitate the holistic development of future STEM professionals.

E. Experiential Learning

Experiential learning provides hands-on, practical approaches to the understanding of STEM concepts. Drawing heavily from the works of Piaget, Lewin, and Dewey, psychologist David A. Kolb proposed experiential learning theory, which involves learning through experience. According to Kolb, experiential learning is "the process of learning where knowledge is created through transformation of experience. Knowledge results from the combinations of grasping and transforming the experience" (Kolb, 2015, p. 67). Unlike the cognitive learning theories that focus on cognition over affect and the behavioural theories that ignore the subjective learning experiences, experiential learning theory takes a holistic approach to education. The theory centres on learning through first-hand experiences, including those of emotions, cognition, and the social and environmental factors that contribute to the learning process. Kolb's 'Learning Styles Inventory' (LSI) serves two purposes: it identifies individual learning preferences and provides a broader explanatory model of experiential learning. He sees the theory as a context where people move between the modes of concrete experience, reflective observation, abstract conceptualisation, and active experimentation. Thus, the effectiveness of the learning process relies on the ability to balance these modes, which, according to Kolb, act as opposite activities that promote learning. As a result of our hereditary equipment, our particular past life experience, and the demands of our present environment, most people develop learning styles that emphasise some learning abilities over others (Kolb, 2015, p. 114). He theorises that the four combinations of perceiving and processing determine one of the styles of learning. These can be due to behavioural patterns and background. Kolb introduces a four-stage learning cycle, where each stage represents a phase of the learning process. Effective learning requires a balance between all the stages. At the first stage, i.e., concrete experience, the learner begins with a tangible or real-world experience. At the second stage, reflective observation, the learner reflects on that experience from different perspectives. The learner then forms ideas and concepts based on these reflections. This thought of generalising to other situations occurs at the stage of abstract conceptualisation. Finally, at the stage of active experimentation, the learner applies their new concepts and ideas to the world, experimenting with what they have learned in new situations. This suggests that learning is a continuous, active process, where experience and reflection lead to abstract ideas that are tested in practice. He argues that learners adopt their styles based on the way they approach the learning cycle. As the learner moves through multiple stages, they become adept at learning from experience and integrating different ways of knowing.

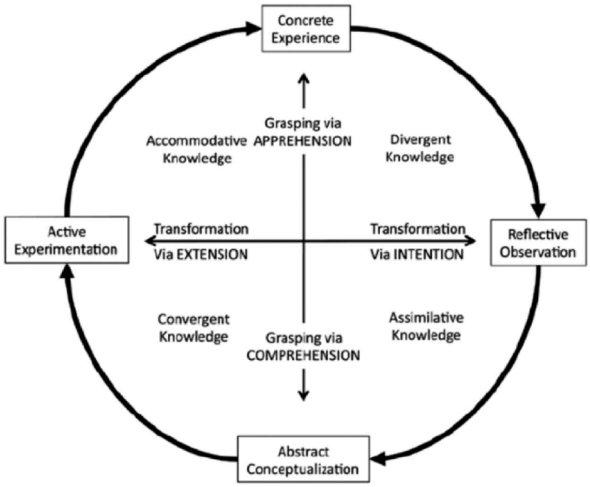

Fig. 1. Experiential learning cycle (*Kolb, 1984*)

F. Studies on Pragmatics in STEM Disciplines

Rowland (2003) has used pragmatics to examine communication in mathematics education, where he has focused on classroom interactions and the discourse between teachers and students. Rooted in qualitative analysis, the study has investigated the vagueness of language in mathematical teaching and learning. The research has analysed linguistic features such as pronouns, hedges, and generalisations to examine their impact on students' understanding. The key finding is that teachers should develop an awareness of the pragmatic aspects of language, and explicit teaching on how to

use vagueness in language strategically can improve mathematical communication and reasoning.

Al-Aghbari (2016) has explored the significance of enhancing pragmatic competence among medical students at Taiz University, Yemen, using qualitative and quantitative approaches. The study has administered a questionnaire consisting of a discourse completion task to assess the students' speech act production, along with an awareness test to evaluate their ability to recognise the appropriate utterances. The researcher has also conducted interviews with graduate medical students to gain insights into their experiences and perspectives on the learning and usage of English. The data have revealed that students exhibit low pragmatic competence in both production and awareness, and that students recognise the importance of learning English for usage in contexts besides the medical field. The author has also proposed a framework for integrating pragmatic competence with the help of a medical TV show, which would keep the medical students motivated in learning English.

Almazova and Sheredekina's (2022) study, conducted within the domain of legal English, aimed to compare the case method with traditional methods used for teaching Legal English, particularly the first legal advice strategy, a component of pragmatic competence. Conducted through distance learning, the results of the study have shown a high efficiency of the case method for developing pragmatic competence in an ESP course for law students in comparison with traditional methods. The experiment has also demonstrated that an online format can serve as an effective methodological approach for achieving the objectives of foreign language training for professional courses with time limits.

Noonkong et al. (2017) have conducted a study to develop Thai Engineering students' ability to make complaints and apologies appropriately in English and have focused on exploring how the pragmatic consciousness-raising approach (PCR) can improve students' ability to use complaints and apologies appropriately in English, emphasising helping Thai students to enhance the pragma-linguistic and socio-pragmatic skills. The results have highlighted the effectiveness of PCR in addressing pragmatic deficiencies in EFL learners and have suggested its potential application in other professional contexts. Vargas et al. (2024) have explored a structured, pragmatic framework for assessing learning outcomes in competency-based education (CBE). The framework foregrounds ongoing evaluation and adaptation based on changing academic and industry needs to ensure its relevance and effectiveness.

Though there have been some studies on pragmatics in ESP contexts, pragmatic competence remains an underemphasized skill in STEM education. Also, there is limited research on developing pragmatic competence through rhetoric-based tasks. The current study aims to enhance the pragmatic ability in STEM students through the TBLT approach and experiential learning to facilitate the holistic development of the students.

III. RESEARCH QUESTIONS

Q1 – What is the need for pragmatic competence in STEM professionals?

Q2 – How does pragmatic competence build communication and collaboration skills among the STEM students?

IV. METHODOLOGY

A. Participants and Tools

The participants of the study are first-year B.Tech Instrumentation and Control Engineering students, as they have a subject in their syllabus titled *English for Communication*. The strength of the class is 62. The study adopts a qualitative design. Data are collected through classroom observation, the researcher's diary, and student artefacts (posters and persuasive talk performances).

B. Tasks

1) Task 1 – Poster Making

The first task given to the students is poster making. The teacher-researcher has divided the class into eight groups, and each group has to choose one topic. The topics for the posters are proverbs, viz, 'a stitch in time saves nine', 'forbidden fruit is the sweetest', 'strike while the iron is hot', 'a pen is mightier than the sword', 'good wine needs no bush', 'procrastination is the thief of time', 'appearances are deceptive', and 'actions speak louder than words'. The rationale of the task is to enhance the collaboration and communication skills of the students. Since it is group work, the onus is on collaborative learning, where the students work in groups and find a solution to a problem. Posters provide limited space for content, demanding creative and critical thinking, prioritising information and presenting concisely through visual/verbal media. Students, hence, could bring different themes and contexts to the proverbs chosen. For example, the game of cricket has been selected as a context to explicate the proverb, 'actions speak louder than words'. Similarly, the proverb 'good wine needs no bush' is illustrated through the story of Rolex watches. The teacher-researcher has asked the students to present their posters in the classroom, and the teacher-researcher has provided feedback.

2) Task 2 – Persuasive Talk

The next task administered is a persuasive talk. The task has been selected owing to the topic of persuasive communication in their syllabus. The rationale of the task is to assess the persuasion skills, which form an important part of rhetoric. The task is intended to enhance effective communication and persuasive expression. As the task has been assigned individually, the teacher-researcher has assessed students on persuasive talk on the parameters of fluency, persuasiveness in expression, and content. The students can choose a product or a service in order to persuade their audience. The products and services that students have taken up ranged from daily-use products to high-end devices and automobiles. However, there have been some students who have taken up the sales of services such as Netflix and Spotify Premium. Sunglasses, notebooks, perfumes, alarm clocks, and fashion and beauty products are some of the daily-use products that students have chosen. The teacher-researcher has asked the students to present the talk in the classroom, where peers and the teacher-researcher provided feedback.

V. DISCUSSION

A. Need for Pragmatic Competence in STEM Disciplines

The first research question investigates the importance of integrating pragmatic competence into STEM disciplines. Developing pragmatic competence among STEM professionals is crucial in tailoring communication to different contexts and different audiences. STEM professionals often need to explain complex concepts to diverse audiences, including those without a technical or professional background. Moreover, pragmatic competence bridges the gap between theory and practice, facilitating interdisciplinary collaboration. The changing role of engineers in working life calls for a more holistic approach to the university curriculum to provide students with an understanding of the social and ethical responsibilities entailed by their roles in work communities (Alpay et al., 2008). As STEM fields are garnering relevance globally, having a workforce skilled in pragmatic competence helps maintain and enhance a country's competitiveness. The study here discusses the case of engineering students in particular, where the course is titled *English for Communication*. The need to integrate the elements of pragmatic competence in the English syllabus for Engineering students underscores the importance of avoiding misunderstanding in the professional circle. Being aware of the different meanings that an utterance can have will allow professionals to produce clear messages, understand the intended meaning, and communicate effectively. The life of an engineer is different from that of an engineering student. As working professionals, they will engage in discourse with individuals from diverse domains, which includes non-technical experts. English will be the means of communication. O'Rourke (2007) and Rontu (2009), through their studies, reveal that while technical knowledge and expertise are vital during recruitment, interpersonal skills gain significance as one advances within the corporate hierarchy. Hence, linguistic knowledge combined with pragmatic competence will facilitate communication. This further becomes clear with the second research question, as it answers how communication and collaboration are developed in the classroom via the implementation of tasks.

The recent shifts in Engineering education have demanded strengthening the capacities of students in technical streams to include in-depth humanistic and social skills. These include developing capacities such as communication, human-centred design, problem-solving, team dynamics, and ethical reasoning, as these are demanded from engineering professionals in the 21stcentury technological society. In this regard, broadening the engineering skill set becomes more demanding. In the Engineering industry, there are several levels of positions, such as designers, developers, and testers. They need both domain-specific knowledge and situation-relevant information to design according to user needs. So, there is a need for social consciousness in practice in such a context. The pragmatic tasks administered by the teacher-researcher further indicate the need to impart pragmatic competence in the classroom. Through the task, the students have not only interpreted the literal meanings of the proverbs, but they could also explore the implied meanings, an aspect that fosters pragmatic competence.

B. Pragmatic Competence in the Language Classroom: An Interdisciplinary Approach

The second research question deals with developing collaboration and communication skills through pragmatic tasks based on rhetoric. Two tasks have been administered in the classroom, namely, poster making and persuasive talk. The poster-making activity has engaged the students in understanding and applying the proverbs within the context of their chosen themes. The task has exposed the students to the cultural and social significance of the proverbs, instilling an appreciation for the underlying wisdom and values. The tasks have been predominantly language-focused and have been aimed at enhancing communication and collaboration by fostering pragmatic competence. This integration of pragmatic competence and language learning into the Engineering discipline has offered the students an interdisciplinary approach. The students could bridge their technical skills with linguistic expression. The materials they selected and the themes they chose for expression in the visual-verbal medium reflect this. They have used various formats such as sketches, collages, and drawings, demonstrating their ability to employ multiple modes of expression, an important interdisciplinary skill. Since the students belonged to Instrumentation and Control Engineering, they have applied their technical backgrounds in designing aesthetically appealing and logically structured posters, augmenting technical precision with creativity. Certain students have opined that administering such an activity in the English classroom has allowed them to think differently, discuss various ideas, and conduct meetings.

For example, a group has created a poster on the proverb 'a stitch in time saves nine'. The group has represented every word of the proverb on paper. The poster has been torn and stitched at the centre. To give a vintage look to the paper, they have poured coffee on the paper and have burned the edges. The students have come up with nine things related to time, and each of these has been hung with a string. The students have even remarked that since the stitch has been seen predominantly, they have hidden it to give the poster a good finish. They have used LED lights that run through the strings that indicate a ray of light (Fig.2).

Fig.2. Students' representation of the proverb 'a stitch in time saves nine'

For another poster titled 'actions speak louder than words' (Fig.3), the group has used the cricket scenario to prove the point. They have made a collage of two images wherein the first image features Australian team captain Pat Cummins making a statement about silencing the crowd on the day of the Finals - a

statement that invited immense criticism. The second image in the collage is of Cummins taking the wicket, where he proved his words through his action.

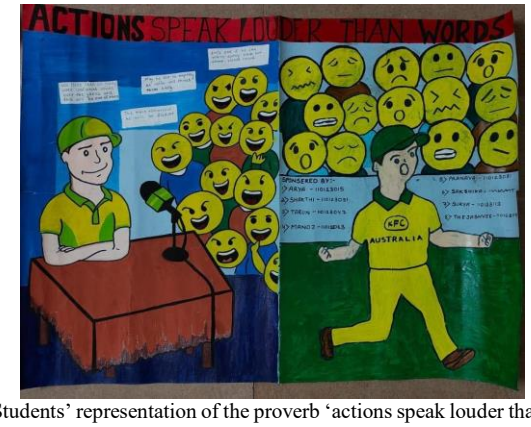

Fig.3. Students' representation of the proverb 'actions speak louder than words'

C. Developing Collaboration with Pragmatic Competence

As a team, this poster-making activity demonstrates the ability of problem-solving, which cultivates pragmatic competence. Designing the posters demands innovative thinking, combining visual appeal with intellectual depth, and encouraging creative solutions to represent abstract concepts. Besides, this encourages critical thinking as the students are required to analyse and synthesise their understanding of the proverbs, connect with the theme and express them through posters. Certain posters have addressed contemporary issues, indicating students' ability to relate abstract ideas to their daily lives and even challenges in academia. The task has actively engaged the classroom, augmenting creativity, critical thinking and problem-solving, and leading to increased participation and enthusiasm.

Collaborative learning is a very important outcome here as it has allowed the students to learn from each other's strengths, driving mutual growth in communication and innovation. This enriches the pragmatic thinking in the students as they form schemas which allow them to act in a social situation. This ability of thinking pragmatically is the foundation of pragmatic competence. The task has created a room for them to think critically about how language functions in diverse contexts, preparing them for professional scenarios where pragmatic competence is essential. Kim and Taguchi (2016) have found the usefulness of collaborative learning as a method of instruction in promoting the co-construction of pragmatic knowledge among learners. Learners can thus co-construct meaning, reflecting on each other's thoughts. Kim and Taguchi's (2016) findings highlight that collaborative tasks provide opportunities to pool learner knowledge and experiences, thoughtfully consider alternate approaches and linguistic forms, negotiate the strengths of each form or phase, provide feedback and correction, and scaffold each other's work. Hence, key elements of learning – input, output, and feedback are generated in the process of collaborative task-based interaction, and the process can lead to a deeper understanding of form-function-context mappings and strengthen pragmatic knowledge. The findings can also be read along the lines of Vygotsky's sociocultural theory, where social interaction plays a key role in learning and development. The zone of proximal development (ZPD) reveals "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). Collaborative activity brings scaffolding as the learners support each other's development through shared dialogues and peer modelling.

The students have been asked to present the posters, and feedback has been given by the teacher-researcher. Real-time feedback has paved the way for an interactive dialogue in the classroom, which has given the students a floor to explain and defend their conceptualisations. The feedback session has strengthened the students' ability to articulate their ideas and respond to the critique. The feedback from their peers has helped the team understand how their work has been perceived by the audience, creating an awareness of audience-specific communication strategies. The feedback has prompted students to critically evaluate their work and to hone their skills. The positive reinforcement has boosted students' confidence and motivation. It has helped them fine-tune both creative and pragmatic skills, bridging the gap between theoretical understanding and its applications. The iterative process of feedback has led to positive reinforcement.

D. Developing Communication with Pragmatic Competence

One of the major aspects of pragmatic competence is the ability to tailor communication to the audience and context. In the task of persuasive talk, we observed that the students could demonstrate various levels of audience awareness through their presentations. They have adjusted the tone and style to suit the professional situation. Moreover, some students have anticipated the audience's questions and addressed them in a proactive manner. However, there have been some students who struggled to balance technical knowledge and their persuasive skills because of factors such as fear of facing the audience and the fear of speaking in English, especially when speaking in a persuasive manner to the targeted audience, underscoring the need for instruction in audience analysis. The task has highlighted the significance of rhetorical strategies such as ethos, pathos, and logos. All the students have relied on either one or two of these strategies or have used all three in their talk. Students who have based the credibility of their products and services on research and data have been more persuasive. Another effective way the speakers have connected with their audience is through emotions by narrating an experience or an anecdote. Some students have emphasised the real-world impact of their solutions, such as cost-cutting and environmental benefits. The use of logos has been seen more in sales talk on electronic devices and automobiles. For example, a student who has presented on Lego Mindstorms, a line of educational kits to enable users to build programmable robots using Lego bricks, mainly relied on the element of logos. The student could use logical reasoning effectively throughout the talk. On the other hand, in the case of a student who presented on a microcontroller kit, the logical organisation and clear presentation of evidence have been significant in building strong arguments. Since this topic belongs to the context of

engineering, it demonstrates analytical rigour. Pragmatic competence involves not just linguistic skills but also the ability to solve problems and present feasible and innovative solutions. The task has encouraged the students to think critically about real-world challenges and to develop feasible and creative solutions, and more importantly, to communicate these solutions to the audience. This alignment with problem-solving scenarios makes the task highly relevant to their future careers.

Pragmatic competence extends beyond verbal language to include non-verbal cues such as body language, eye contact, and visual aids. This task has given them the confidence to speak and engage the audience, which most of the students have lacked in class. The teacher-researcher provided timely feedback on students' body language and eye contact. Some students in their talks have used PowerPoint presentations as a tool. They could reinforce their verbal persuasion with well-designed slides and prototypes. Students who chose fashion and beauty products as their topics physically held the products in their hands, which added credibility to their speech. The demonstrations reflected their confidence and enthusiasm. In the classroom, we also observed that a lack of non-verbal cues detracted from the overall effectiveness of otherwise strong content.

The task has also seen good peer evaluation, enhancing reflective learning. The persuasive talk task administered in the engineering context has underscored the need for integrating pragmatic competence into STEM curricula for the following reasons: interdisciplinary communication, innovation, solutions, professional growth, and global competence. The task has highlighted that skills such as persuasion, audience adaptation, and clear articulation are critical for career growth as engineers. They must possess the ability to translate the technical details into narratives that resonate with varied audiences. Raising their pragmatic awareness helps them navigate interactions, negotiate appropriately and reduce miscommunication.

In essence, both the tasks administered in the classroom simulate real-life communication scenarios that require contextual relevance, social awareness, and effective language use. Students, through these activities, practice interpreting and responding appropriately to social cues, crafting meaningful messages, and reflecting on the impact of their communication. They develop a strong social schema, which ignites their pragmatic thinking. This pragmatic thinking lays the foundation for the development of pragmatic competence.

CONCLUSION

The integration of pragmatic competence in STEM fields is crucial as it helps create well-rounded professionals who possess technical expertise and the capacity to clearly navigate the complex social dimensions of their work. Pragmatic competence focuses on understanding language in a social context. In STEM disciplines, professionals need to interact with diverse teams and explain complex concepts to people who do not have similar expertise. This involves interdisciplinary collaboration. Pragmatic competence can promote better interaction, negotiation, and conflict resolution among team members. A significant requisite of STEM fields is understanding the user's needs and applying the knowledge in real-world scenarios. Pragmatic competence prepares students to navigate problems within their social, cultural and ethical contexts, leading to more innovative and socially responsible solutions. Moreover, understanding and appreciating language and cultural nuances can enhance negotiations, partnerships, and the dissemination of research findings. For STEM educators, pragmatic competence is crucial for adapting teaching methods to the needs of diverse learners, making complex concepts more accessible, and building a supportive learning environment. Teachers themselves need to be pragmatic thinkers in order to build a positive rapport with students in the classroom. Two tasks have been administered in the tertiary-level classroom. The first task of poster making and its presentation deals with precise and visually engaging communication. The persuasive talk has effectively demonstrated how pragmatic competence can be developed and assessed in STEM disciplines. By engaging in persuasive communication, students have enhanced their skills to adapt language and strategies to specific contexts, skills vital for their professional roles. Both tasks have demanded choosing the right diction and tone to convey a message. The pragmatic use of non-verbal cues has been crucial in the interactions. These tasks stimulate their pragmatic thinking, which can be used as a foundation to develop pragmatic competence. It lays the groundwork for making practical judgments in real-world situations, and pragmatic competence applies these judgments to language use. Also, developing pragmatic competence in learners often involves enhancing their pragmatic thinking to better navigate linguistic and social expectations. Learners develop the ability to express complex technical ideas effectively and appropriately for different audiences, such as peers, teachers, and non-experts. The improved communication skill set facilitates better teamwork and collaboration, essential for group projects and professional environments. They gain improved problem-solving abilities, and with a better understanding of the cultural differences and ethical implications of their work, learners can make more responsible and informed decisions. A metacognitive awareness is created among the learners, where they become aware of their own communication styles and how it affects others, leading to more thoughtful and reflective practices.

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