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Researching the Dynamics of Collaborative Work: Insights from Student Experiences

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Abstract: Collaborative group work is a core component of English for Specific Purposes (ESP) courses in engineering-related degree programmes, yet relatively little is known about how first-year students in technical disciplines perceive and experience these collaborative tasks. Understanding their perspectives is essential for designing group-based assessments that promote equitable participation, effective communication, and the development of professional competencies. This study addresses this gap by examining first-year students' experiences of completing a collaborative research proposal in ESP courses embedded within Computer Engineering, Robotics, and Computational Mathematics degrees. A total of 117 students provided open-ended feedback via the Mentimeter platform, and their responses were thematically coded and classified by valence (positive, neutral, or negative). Quantitative coding revealed that 68.85% of comments were positive, highlighting perceived benefits, including shared responsibility, improved communication, greater efficiency, and opportunities to learn from peers. Neutral responses (15.57%) typically described mixed experiences or practical difficulties, while 11.48% of comments were negative, with students reporting unequal contributions, last-minute work, limited coordination, and challenges managing uncooperative team members. Thematic analysis across all clusters underscored communication quality, organisational skills, technological proficiency, and respect among teammates as

central determinants of successful collaboration. The findings indicate that while most students value collaborative work, persistent barriers — especially those related to inequitable participation and unclear task management — can undermine the learning experience. The study contributes novel evidence from under-researched ESP contexts in STEM programmes. It offers practical implications for designing group assignments, suggesting the need for explicit training in teamwork skills, clearer structuring of collaborative tasks and targeted support mechanisms to monitor participation and improve group functioning.

Keywords: Collaborative work, teamwork, productive collaborative environment, University English language subject.

Introduction

Collaborative group work has long been recognised as a valuable pedagogical strategy that promotes active learning, critical thinking, and interpersonal skills. However, the effectiveness of collaboration in higher education remains uneven, particularly in disciplines where teamwork and technical communication intersect, such as engineering and computer science. Despite a growing body of research emphasising the benefits of cooperative and collaborative learning, limited attention has been given to students' first-hand experiences and perceptions of teamwork in university English-language courses embedded within technical programs.

This study addresses this gap by exploring the dynamics of collaborative group work among first-year university students enrolled in English for Specific Purposes (ESP) subjects within computer engineering, robotics, and computational mathematics degrees. By focusing on learners at the beginning of their academic journey, the study aims to identify both the perceived benefits and challenges of group collaboration, emphasising how effective communication, technological proficiency, and mutual respect contribute to productive teamwork. The significance of this study lies in its contribution to understanding how early exposure to structured collaboration shapes students' attitudes toward teamwork—an essential skill for both academic success and future professional practice. Through the students' reflections, this paper seeks to inform educators about practical strategies for designing collaborative learning environments that enhance engagement, equity, and skill development.

Theoretical background

In the 1980s, interest in group work began to emerge among some researchers, and since then, cooperative work has been the subject of study by educators, researchers, and experts.

In the words of Fathman and Kessler (1993: 128), it is described as a meticulously organised form of group work that enables all students to actively engage, share information, and receive individual evaluations of their contributions.

According to Millis's (1996) findings, several key characteristics govern the practice of cooperative learning in achieving consensus and communal benefit. These include the need for students to collaborate on a shared task, work within small groups of two to five members, cultivate cooperative and pro-social behaviours to accomplish shared learning objectives, and foster interdependence. Additionally, students should be individually evaluated and take responsibility for their work and learning.

According to the findings of Williams and Burden (1999), cooperative learning is highly advantageous, as it enhances learning through practical experience, aids goal achievement, and fosters greater motivation by strengthening bonds and commitment among group members.

We would like to underscore the definition of cooperative learning provided by Johnson and Johnson (1997), which emphasises the significance of collaborative efforts in the teaching-learning process and their applications for enhancing the individual's role in society. According to Johnson and Johnson, the fundamental ability of all students to learn to work cooperatively with others is pivotal to establishing and sustaining stable marriages, families, careers, and friendships. While mastering technical skills such as reading, speaking, listening, writing, calculating, and problem-solving is undoubtedly valuable, their utility is limited if an individual cannot apply these skills in cooperative interactions with others in various life contexts, including work, family, and community settings. Johnson and Johnson assert that dedicating ample time to learning these collaborative skills is the most logical approach to emphasise the utilisation of students' knowledge and skills within a cooperative framework, preparing them for their roles as adult members of society (Johnson & Johnson, 1997, p. 62-63).

According to Johnson, Johnson, and Holubec's 1999 findings, there are three distinct categories of learning: cooperative, competitive, and individualistic. A notable contrast among these learning types lies in their methodologies. In cooperative learning, students collaborate in groups, fostering interaction and mutual assistance. This approach is adaptable across various disciplines, and assessments are conducted both individually and in groups. Conversely, the remaining two learning types, competitive and individualistic, involve independent student work, with individuals comparing their outcomes to those of their peers. In certain instances, this approach may hinder other students' success.

From Panitz's (1998) perspective, collaborative learning is grounded in constructivist pedagogical principles, in which students actively participate in the discovery and reconstruction of knowledge through the interrelation of concepts, thereby facilitating its dissemination across novel learning experiences. Central to this approach is the emphasis on interpersonal interactions among students and between students and educators. Panitz underscores that collaborative work embodies a consensus-oriented, interactive process in which all participants assume equivalent authority and an equal level of responsibility. Walters (2000) outlines four distinct models of cooperative learning: Jigsaw (Puzzle), Student Team Learning, Learning Together, and Group Investigation. The Jigsaw technique involves students researching and understanding specific parts of a topic individually, then collaborating with experts from other groups before finalising a comprehensive report as a team. Learning Together emphasises shared learning goals and positive interaction in smaller groups. Group Investigation involves students sharing their assigned tasks to create a collective report and presentation. Student Team Learning stresses the importance of high interdependence for achieving common group goals, as highlighted by De Vries, Edwards, and Slavin (1976).

According to Suárez (2008), effective cooperative learning teams function as the primary units of intersubjectivity, requiring positive interdependence, individual and collective accountability, dynamic interaction, internal management, and internal evaluation. These five requisites must be fulfilled in networked cooperative teams. Each team member is expected to commit to a common objective while fulfilling individual responsibilities. The key elements for successful cooperation include individual commitment and shared responsibility.

According to Ovalles (2007), the fundamental constituents of collaborative work groups include positive interdependence, individual accountability, facilitative interaction, the adept utilisation of social skills, and collective processing. These elements collectively contribute to the effective functioning of collaborative groups and serve as the cornerstone for their successful operation.

Lucero (2003) underscores the significance of collaborative learning in fostering environments that cultivate attentive listening skills. Before this, the notion of collaborative learning had predominantly revolved around the sharing of experiences, ideas, and thoughts. However, Lucero emphasises the pivotal

role of active listening in advancing the learning process, encouraging participants to engage with the concerns, inquiries, and elucidations raised by their peers. According to Lucero, collaborative work encompasses a comprehensive array of instructional methodologies that leverage strategies to foster the development of learning abilities alongside personal and social growth. Each member within the group assumes responsibility not only for their individual learning but also for the collective learning of their fellow group members.

In the assessment by Echazarreta et al. (2009), collaborative learning is characterised by the transfer of responsibility for learning to students, thereby positioning them as active agents in the construction and management of their own knowledge. The authors assert that collaborative work transcends mere group work, fostering robust interdependence among team members to achieve a shared objective. This pursuit necessitates individual accountability from each team member.

Cano (2011) synthesised preceding theories and formulated the subsequent definition of cooperative learning. Cooperative Learning is an instructional approach comprising a range of strategies for classroom organisation, wherein students collaborate in small groups under specified conditions to engage in a learning activity and receive evaluation of their attained outcomes. Merely working in small groups is insufficient for cooperative learning to occur; it necessitates constructive interdependence among group members, direct face-to-face interaction, the cultivation of social skills in group dynamics, ongoing supervision of the activity, and individual and group assessment.

Fernández-Rio and colleagues (2017) delineate three cooperative learning approaches: (a) Conceptual, which prioritizes the creation of comprehensive theoretical-practical programs and guiding principles for facilitating the model's implementation (Johnson & Johnson, 2014), (b) Curricular, which concentrates on producing specific, practical materials targeting the key subjects within various curriculum areas (Slavin, 1995, Slavin, 2014), and (c) Structural, which emphasizes the arrangement of the teaching-learning framework to foster student interaction (Kagan, 1992).

Cooperative learning, defined as "working together in small groups that are typically self-selected, self-managed, and loosely structured" (Davidson, 2021, p.12), encompasses various methods, all structured to ensure equal participation and individual accountability (Bruffee, 1995, 1999; Oxford, 1997; Sharan & Sharan, 2021). As we explore cooperative learning, it is essential to acknowledge its multifaceted nature, recognising its varied objectives and priorities while maintaining a common thread of structuring group interactions to promote equitable participation and individual responsibility. Collaborative learning is a pedagogical approach that involves the deliberate organisation of small student groups within the educational setting, under the guidance of an instructor. In this framework, students are encouraged to engage actively with one another, exchanging information, ideas, and insights as they work through designated tasks or activities. The overarching objective is to foster a collective pursuit of knowledge acquisition, ensuring that each participant comprehends and completes the assigned task. A fundamental tenet of this approach is the recognition that the concerted efforts of all participants are integral to the realisation of the common educational objective. Moreover, the implementation of collaborative learning in the classroom stimulates critical thinking, enhances communication skills, cultivates a collaborative mindset, fosters receptiveness to diverse perspectives, encourages mutual respect, and instils a sense of discipline and order, among other notable educational values (Barrón, 2019).

Guerra (2008) delineates three key distinctions and similarities between cooperative learning and collaborative learning. Firstly, cooperative learning aims to lay the groundwork for novel ideas through peer contributions, thereby supporting students facing difficulties while elevating the more adept ones. Conversely, collaborative learning focuses on individual students' development of new ideas and joint creation with their peers, with the ultimate objective of each student's optimal contribution to a shared

goal. Secondly, the teacher shoulders significant responsibility in cooperative learning, where they introduce a problem and assign roles to each student, who then takes charge of specific aspects of task resolution. While initially guiding the activity, the teacher transitions to a supportive role, with the students assuming responsibility for the outcome. Thirdly, collaborative learning demands more extensive preparation for working with heterogeneous student groups. Before adopting this methodology, assessing the group's composition, including levels of responsibility, motivation, and preparedness, is crucial for determining whether to opt for cooperative or collaborative learning strategies.

Guerra (2008) highlights collaborative learning activities that underscore the significance of students' contributions in attaining collective success. These activities revolve around the idea that aggregating individual knowledge and experiences is vital to the group's overall advancement. The suggested activities encompass a diverse range of engagements, including the enactment of a play, the collaborative development of a story, the specialised exploration of topics for a research paper, the sharing of experiences in a pedagogical forum, the joint creation and dissemination of a publication, and the comprehensive exploration of topics through puzzles, fostering comprehensive learning and teamwork.

All educators and researchers are aware that the emergence of Information and Communication Technologies (ICT) in our classrooms has ushered in a new landscape for teaching and learning. While traditional methodologies persist, novel approaches to teaching and learning are gaining substantial traction, coexisting alongside the established methods.

In the classroom, technology assumes a supportive role, particularly in collaborative learning (Valverde, 2011; Area Moreira, 2010; Brito, 2004; De la Mata et al., 2009; Gros, 2008; Hernández and Olmos, 2012; Rubia et al., 2009).

García-Valcárcel et al. (2012) assert that integrating new technologies into the educational environment fosters opportunities to consider novel learning approaches. The authors endorse methodologies that cultivate student relationships, amplify motivation, enhance interpersonal skills, equip students with conflict-resolution strategies, nurture tolerance and respect, instil a sense of shared responsibility, facilitate collective problem-solving, and enable educational innovation by integrating Information and Communication Technology (ICT) into teaching settings. In brief, drawing from our classroom experience, the effective utilisation of technology and social media to encourage collaborative work hinges on all team members possessing prior technological proficiency, aligning with shared objectives and measurable milestones, fostering a respectful attitude towards peers, embracing individual responsibility for collective welfare, and demonstrating problem-solving capabilities for both personal and team challenges. When delving into innovative methodologies, an indispensable aspect to consider is cooperative learning. This study illuminates best practices in which educators leverage group work and cooperative learning. Cooperative learning, an instructional strategy in which students collaborate in small groups to achieve common objectives, has evolved through the pioneering efforts of influential figures in educational theory. Since the 1970s, Johnson and Johnson have been at the forefront, championing the Social Interdependence Theory. Their emphasis on positive interdependence and individual accountability is evident in models such as "STAD" and "Jigsaw." Aronson (1978), known for the Jigsaw Classroom technique, encourages small groups to become subject "experts" and teach their peers. Notably, in 2021, Aronson successfully applied the jigsaw method with fifth-grade students, fostering an appreciation for differences, promoting friendliness, and cultivating a positive attitude toward the school. Kagan's Kagan Structures, developed in the 1980s, provide specific interaction frameworks to nurture positive interdependence. Sha

(2014) significantly contributes to Cooperative Learning in small groups, emphasising positive interdependence and social skill development. Together, these theorists have profoundly influenced the

landscape of cooperative learning in educational settings, acknowledging its dynamic nature with the potential for continued evolution and additional contributors in the future. While cooperative learning is commonly acknowledged as the educational application of group work, it is crucial to recognise that not all group work aligns with cooperative learning principles (Baines et al., 2017; Ghahraman & Tamimy, 2017; Kutnick & Blatchford, 2014). Presently, instructional approaches centred on collaboration are increasingly utilised to promote teamwork, allowing students to acquire collaborative skills, enhance performance, and foster interpersonal development (Gottschall and Garcia-Bayonas, 2008; Gaudet et al., 2010; León et al., 2015; Mendo et al., 2016; Baena-Morales et al., 2020). The ability to work effectively in teams is a highly sought-after skill (Cavazotte et al., 2012; Dyson et al., 2021). According to the dominant social interdependence theory, widely regarded as the most influential theory of cooperation (Johnson and Johnson, 2017a, 2017b), the organisation of interdependence shapes individual interactions, dictating the outcomes of situations (Johnson and Johnson, 2017b). In this context, Mendo et al. (2021) assert that cooperative learning cultivates interpersonal skills, heightens student engagement, enhances narrative paragraph skills, emphasises understanding, leading to improved learning, and positive behavioural changes (Khair et al., 2021). Sudirman et al. (2023) highlight that cooperative learning effectively incorporates democratic ideals, attitudes, and principles in writing contexts. It serves transformative purposes, enhancing global writing competence, facilitating the expression of transformational values through in-class activities, and contributing to global cooperative learning.

The present study aims to explore the value and challenges associated with collaborative work among first-year university students. The research is prompted by students' concerns about teamwork, particularly after completing a collaborative research proposal under specific guidelines. This research also investigates the role of effective communication in fostering a conducive and productive collaborative environment, with an emphasis on its impact on knowledge acquisition, teamwork improvement, and coordination skills.

The following Research Questions arise from the stated objectives:

RQ1: What are the perceived benefits and challenges of collaborative work among first-year university students?

RQ2: How does effective communication contribute to a conducive and productive collaborative environment, and what impact does it have on knowledge acquisition, teamwork improvement, and coordination skills?

Method

The cohort under investigation in this scholarly inquiry consists of first-year university students currently enrolled in the English language subject within the academic domains of computer engineering, robotics, and computational mathematics. Despite a total enrolment of 145 students within this academic purview, the study, through judicious sampling, gathered opinions and insights from a subset of 117 individuals. The deliberate selection of first-year students ensures a targeted focus on a cohort at the initial stages of their academic journey within these specialised disciplines. The discerning approach to participant inclusion is geared towards capturing a representative cross-section of this academic demographic, enabling a nuanced exploration of opinions and insights relevant to the English language subject.

It is noteworthy that the study, while encompassing the broader landscape of potential participants, selectively engaged with a subset to distil a concentrated and meaningful dataset. This strategic sampling methodology underscores the meticulousness with which the research endeavours to glean a

comprehensive understanding from a substantial yet purposefully narrowed participant pool, thereby enriching the depth and relevance of the insights obtained.

In the Computer Engineering, Computational Maths, and Robotics degrees, an integral facet of the assessment paradigm, constituting a substantial 60%, is dedicated to both a written examination and the formulation of a research proposal. This evaluative framework is designed not only to gauge students' mastery of academic English within the theoretical underpinnings encapsulated in the dossier but also to scrutinise their ability to craft a comprehensive academic proposal. The research proposal segment of this assessment framework is distinctive for its collaborative nature, necessitating students to engage in collective endeavours within groups comprised of 3, 4, or 5 individuals. Paramount to the success of this collaborative initiative is the meticulous adherence to the structural and content guidelines delineated in the dossier. Additionally, adherence to the instructor's explicit instructions during class sessions is imperative. Emphasising the synchronous nature of group collaboration, the engagement predominantly unfolds during designated class sessions. Facilitating this collaborative process is the use of shared files on Google Drive, epitomising a contemporary, technologically driven approach to academic teamwork. This reliance on digital platforms underscores the imperative for students to uphold a stringent commitment to punctuality and adherence to defined deadlines, ensuring the timely completion of collaborative tasks. In essence, the multifaceted assessment structure of this academic program reflects a nuanced evaluation of students' linguistic proficiency in academic English and their ability to articulate intricate theoretical concepts cogently through a research proposal. The collaborative dimension, coupled with the integration of digital tools, accentuates the program's commitment to fostering not only individual academic prowess but also effective teamwork within the dynamic realms of Computer Engineering, Computational Maths, and Robotics degrees.

To gather insights from students about their group work experiences in writing research proposals, we strategically utilised the Mentimeter app. The app's collaborative wall feature played a pivotal role in facilitating this process:

1. Selection of the Mentimeter App:

We opted for the Mentimeter app due to its versatility and user-friendly interface. Recognising the importance of engaging students collaboratively, we specifically leveraged the app's features to enhance the interactive element of the data collection process.

2. Use of Collaborative Wall Feature:

The Collaborative Wall feature of Mentimeter served as a virtual canvas for students to share their thoughts and experiences. This feature allows for real-time contributions from multiple users, fostering an inclusive and dynamic environment.

3. Formulation of Targeted Question:

The success of the data collection process hinged on the formulation of a well-crafted and focused question. In this case, we posed a specific query to the students about their first-hand experiences working in groups while composing a research proposal.

4. Presentation of the Question:

The app enabled us to present the question to students in a visually appealing, easily understandable format. The platform's interactive nature encouraged active participation, resulting in a diverse range of responses.

5. Real-Time Data Gathering:

As students provided their responses, the Collaborative Wall feature captured and displayed the input in real-time. This instantaneous feedback not only enhanced overall engagement but also enabled immediate reflection on the diverse perspectives shared by the students.

6. Anonymity and Privacy Considerations:

Recognising the sensitivity of personal experiences, we ensured the platform offered an option for anonymous responses. This approach aimed to encourage students to share their genuine thoughts without worrying about privacy.

7. Data Analysis and Interpretation:

Following the data collection phase, we conducted a systematic analysis of responses collected via Mentimeter. This involved categorising and synthesising the information to derive meaningful insights into the students' collective experiences with group work in the context of research proposal writing.

In essence, the integration of the Mentimeter app, specifically its Collaborative Wall feature, played a pivotal role in fostering a collaborative and interactive environment for collecting valuable student contributions. This approach not only streamlined data collection but also enhanced the quality of insights, contributing to a more comprehensive understanding of students' perspectives on group work in the context of research proposal writing.

Results and Discussion

Below is a comprehensive table of our students' contributions. Table 1 presents the opinions of all 117 students enrolled in the English subject during the academic year 2023-2024. Concluding the table, we offer a summary that encapsulates the collective sentiment.

Table 1

Students' insights into the collaborative learning experience

1.	There haven't been such things as a group.
2.	One of my teammates did nothing, but the other was kind and hardworking.
3.	It has been a good experience, even though sometimes each member has their own ideas, and it is necessary to reach a common point.
4.	I think my experience working with groups has been good, interesting and interactive.
5.	It was a great experience. I think more or less everybody does the same amount of work, and they are all nice teammates.
6.	We worked well together, but it was hard to meet because our schedules didn't align.
7.	It was a nice experience. My teammates did a good job, and we communicated well.
8.	It was good. Every member has contributed and worked for the team without copying exactly from the internet, and we have understood each other well.
9.	It was good. Every member has contributed and worked for the team without copying exactly from the internet, and we have understood each other well.
10.	My experience working in groups has been very constructive. Doing the research proposal with Ruben and Victor made me realise how important each part of the group is to reach our goals.
11.	My experience working in groups has been very pleasant, as all my teammates have collaborated with me to create a great research proposal and optimise its various aspects.
12.	It was good. Every member has contributed and worked for the team without copying exactly from the internet, and we have understood each other well.

13.	My experience working in groups was fairly positive. All the members were hardworking and delivered their work on time, even though it was a little too close to the deadline.
14.	We worked well together, but it was hard to meet because our schedules didn't align.
15.	It was enjoyable.
16.	It has been good, everyone did their part, and we got to finish the work.
17.	Working with my group was a very exciting experience, mainly because I didn't know my group members before starting the multiple activities we did. I hope we all keep working in groups!
18.	I liked working in a group because it was a way for all of us to help each other, and the work was not too difficult.
19.	It was a good experience because we planned well.
20.	We have all collaborated in coordination
21.	Good Team Environment
22.	Well, the experience was really great. We felt more united
23.	It was the best experience ever. The group project made all of us realise that, rather than separated individuals, we were united as one and loved every moment.
24.	By working in groups, we have improved our writing skills by drawing on each other's strengths and applying them to our own work.
25.	It has been a delightful experience.
26.	My experience working in groups was really enjoyable. In our case, we had a well-organised approach to the work and a high level of originality, as the plagiarism percentage was quite low.
27.	A useful way to appreciate different perspectives on working
28.	It was a nice idea to start university with this project because it introduces you to new people and helps you find what you have in common with them.
29.	I liked it, and there has been good cooperation between all the team members.
30.	It was a nice experience to get to know my classmates.
31.	My experience working as a group was very gratifying. There was chemistry between us, and we had the work very well planned.
32.	The experience has been very good because we distributed our work among all the members in the group. All members participated the same, and we helped each other.
33.	Working on this project with my friends was a great experience, and we have understood each other very well.
34.	My experience has been very positive, with good communication and coordination.
35.	All members of the group have worked well and have been very collaborative.
36.	I am the best leader in all groups because I plan everything very well.
37.	Working in groups was something I was used to (and did not like), but working on this topic and with these groupmates improved the experience.
38.	It was hectic and a little bit overwhelming, but I learnt how to manage my time and the workload with all my group mates.
39.	Personally, the experience of working in a group was new to me and something fresh, as I had never done a group project as ambiguous as this.
40.	Great coordination between the members and a good working atmosphere
41.	Working in groups has been an enriching experience throughout my life.
42.	Collaboration and teamwork have allowed me to leverage the diverse skills, knowledge, and perspectives of my peers.
43.	It has been easy to work together with my colleagues; the only difficulty has been getting us all together.
44.	Working in a group was a very good experience because we were able to divide the work among all the members, which made it much easier.
45.	Working in groups was a very effective method; we distributed the tasks equitably and completed all the work without any difficulty, making it a very easy and pleasant experience.

46.	My experience was a positive one. Working in groups was efficient, and we had good organisation because we communicated everything, which made it easier.
47.	Working in a group has been a good experience, because we have understood each other very well. We have indeed had some conflicts due to not understanding each other well at times.
48.	My experience working in groups has been very positive; the group has worked very well, and we have understood each other perfectly, which has made the work easier.
49.	My experience working in groups was productive.
50.	Sometimes, it was stressful as it was impossible to organise how we were going to work. After that, it was dynamic to work on this research.
51.	My experience working in groups with my colleagues was very good. One of the things that highlights their responsibility in doing their job, thanks to which we have not had any problems working.
52.	Working in a group was an amazing experience for a variety of reasons, and I learned a lot.
53.	The experience I had was interesting, as I got to learn about teamwork and the help they provided.
54.	From my point of view, our team felt very coordinated; everything that had to be done by each individual was done. The only trouble I had was that Jorge was bossy.
55.	Being honest, I was very comfortable in my group, and there were no problems with the reported speech. So, if we had to do a new project in groups, I would like to do it again with them.
56.	Honestly, I think we have done a really good job, but some members of the group have not done their part. I do not want to say names.
57.	Just a few partners worked seriously; the rest started working the night before and using AI. Awful experience.
58.	My experience has been positive, but I think the teacher should have explained more about what the task entails; the instructions were not clear.
59.	It's been okay. I didn't love it, but we did manage. In these types of assignments, there are always people who leave everything to the last day and then someone has to correct it.
60.	My experience was pretty good. My partners did their job very well and on time.
61.	We just finished the Research Proposal a week ago.
62.	My experience working in my group was great; however, I had many difficulties writing all the information for the research proposal from the sites.
63.	My experience was mixed because do not know anyone in class, and saw myself forced to meet people, and because the group was very nice
64.	My experience working in a group on the research proposal has been positive because it is always better to distribute the work among several people rather than do it alone, and my group was good.
65.	The experience in my group has been gratifying, since everyone has worked responsibly in their parts.
66.	Everything has turned out as we expected.
67.	Everything was fine, except we didn't know how to cite correctly because no one had explained it.
68.	My experience in the group was positive because everyone in my group was very hardworking.
69.	I have a great experience with my team; they always want to work to finish as early as possible. I'm grateful to have such great workers in my team.
70.	Working in groups hasn't been a bad experience, although I would have preferred to do the research paper individually. I prefer my marks to reflect my work, not my teammates'.
71.	At first, it was positive as everyone was working together. But after sending the project, we realised one of the members had copied his part, and we had to come together and fix it.
72.	Working as a team with my classmate has been very positive, because we understand each other. But we do not know how cite correctly.
73.	The experience of working in a group has been quite good, because although each person has done their part of the work, we have helped each other make each part perfect.
74.	My experience working together was enjoyable because we had a few laughs, but at the same time, it was not perfect because we left the work until almost the final day.

75.	We got along so well that working in a group was a great experience for me. We were able to divide the task and finish it because we communicated very well with one another.
76.	I believe that working in groups was an enriching and positive experience because the students I've worked with were very hard workers, and we helped each other.
77.	The group experience has been very good; all members have done their part, and we have supported each other.
78.	My experience working in groups has been positive because we distributed the work correctly and learned how to make a good redaction and how to search for scientific information.
79.	The experience of working in groups could be great if I could work only with 3 members, because the fourth member was procrastinating. He/She did not come to class, so we couldn't communicate with him.
80.	Working in groups has been a good experience because it has made me see multiple points of view about my topic. It also helped me communicate with my teammates, and that has helped me express my ideas.
81.	My experience was satisfactory; I would have appreciated a little bit more information and clarity regarding the project, a total epitome of well-done work, and a superb collaboration.
82.	My experience of working together was filled with positive aspects, such as our growth as a team, and negative aspects, for example, our limited and slow cooperation at the beginning of the project.
83.	My experience working in a group has been positive because I had a great time with my classmate and learnt many things while we worked together.
84.	My experience working in groups has not been the best. That happened because one of the members didn't follow the instructions we decided on and didn't come to class either.
85.	The experience was so good because it had been a long time since I did group work. At BAC, we only had individual work, and in the third and fourth years of secondary, there was the pandemic.
86.	I do not like working in groups. Especially if three of the group work daily and two others end up doing the work with artificial intelligence the day before, and the rest of us have to correct it.
87.	My experience has been quite positive because I enjoyed working with my friends, but it is true that sometimes. Got stressed out because they did their part a bit later than we said.
88.	The experience of the work has been positive because I have learned to work in a team with my classmates, I learned information about the topic and last but not least I enjoyed writing the research
89.	My experience with the group has been very good since I have learned to work as a team, which is very important in any job and in team communication.
90.	My experience in the group for the research proposal was good because all members worked on what was asked, and during the analysis, everyone participated.
91.	Group work is highly recommended to improve others' and self-English, and to help each other and connect with other people.
92.	I don't like working in groups. Especially if three of the group work daily, and two others end up doing the work with artificial intelligence.
93.	I have really enjoyed it. At first, it was easy, but while we were doing the RP, we noticed that writing 6,000 words on a topic would be hard. Finally, we did it as well as we could.
94.	My experience in this job has been good because I have learned a lot about AI, and my colleagues have worked very well as a team.
95.	I think we worked well in groups; we divided the different topics of our project to make the work easier, but we didn't decide beforehand who would do each part.
96.	From my experience, our group worked well together and structured the work equally. Each of us did their part, and when someone asked for help, we would help them.
97.	My experience working together was very positive and helped me learn more about teamwork. Additionally, now have more knowledge about Artificial Intelligence, which will help me in my career.
98.	Not happy, one teammate didn't work as expected, and we had to fix (do) his work.
99.	In general, my experience has been good; the work has been distributed very well both in terms of time and quantity. The most remarkable part has been learning more about a topic of interest, such as robotics.
100.	It was a great experience to do the RP, but when we had to write the summary of the RP, it was almost impossible because we were 6 in the group.

101.	I have faced problems with my group members, as you have noticed.
102.	It was a good experience; each member did their part alone, but then we reviewed all the parts so the project was perfect.
103.	I have enjoyed it because of the help different members can provide to others.
104.	In this case, I must say that working in groups was not new to me, as I have 2 years' experience in the International Baccalaureate (IB), where working in groups was essential.
105.	My experience working in a group has been amazing! Not only did I acquire knowledge in new areas, but I also had a lot of fun!
106.	In our group, there was a very good atmosphere, and we worked very well together.
107.	Very good experience
108.	It wasn't so bad because three of four members of the group worked hard and did their part, but the other member did it the previous day and did parts that were not for him/her.
109.	My experience working in groups has not been as good as expected. We struggled with some team aspects, such as time management. However, we managed to finish the whole research proposal on time.
110.	My experience working in a group was great because my group was a working one. All the members have done their part. Ten out of a ten.
111.	I had a good experience doing the project.
112.	Quite stressing
113.	It has been a pleasure to work with Marc, Edgar and Toni.
114.	Every member completed their part of the research proposal on time. And nobody used AI or copied from other websites, we rewrite every sentence.
115.	My experience working with my group was mostly very calm. Overall, there was a lot of organisation, and everyone did their part when they were supposed to.
116.	Good experience
117.	Working in a group is a good way to learn, since each member contributes different ideas, which helps improve coordination, teamwork, organisation, and understanding with colleagues.

To analyse the information provided, we have created a bar chart showing the distribution of opinions expressed by students while working in groups. We have categorised them into positive, neutral, and negative. This provides a visual representation of students' overall sentiment.

Table 2

Responses and percentages classified in positive, neutral and negative

Opinions	Number of Responses	Percentage
Positive	84	68,85%
Neutral	19	15,57%
Negative	14	11,48%

Here, we have condensed the key viewpoints and feelings our students expressed about their experiences of collaborative work. The provided percentages represent the distribution of students' opinions regarding their experiences of collaborative work.

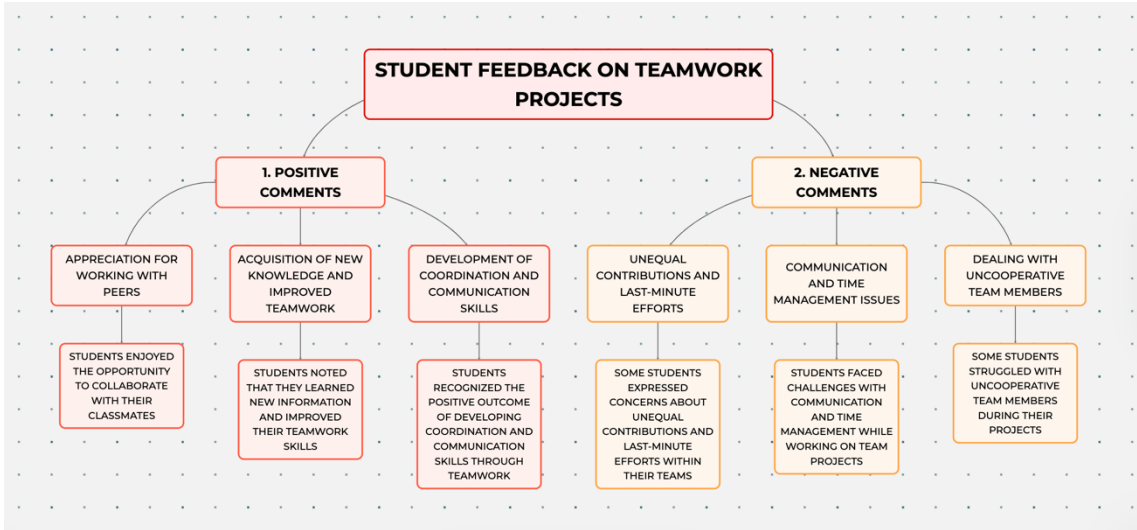
68.85% of positive comments indicate that a significant majority of the students expressed positive opinions about their collaborative work. Positive comments likely include appreciation for teamwork, the acquisition of new knowledge, and improved skills. About 15.57% of the responses fell into the neutral category. These responses suggest that a portion of the students did not express positive or negative

opinions strongly. Approximately 11.48% of the students expressed negative opinions about their collaborative work. Negative comments may involve concerns about unequal contributions, communication and time-management issues, or challenges with uncooperative team members.

In summary, most students had a positive experience with collaborative work, while a smaller percentage had neutral or negative sentiments. These percentages provide an overview of the distribution of the overall experience among student responses.

Figure 1

Positive and negative comments on teamwork projects



Here is a list of the keywords, frequent phrases and most repeated words in the students 'responses:

Table 3

Keywords, frequent phrases and most repeated words

Keywords	Most Repeated Words	Frequent Phrases
- Group - Teammates - Experience - Good - Work - Communication - Collaboration - Coordination - Positive - Project	- Good - Experience - Worked - Group - Members - Positive - Team - Communication - Part - Project	"It was a good experience". "Working in groups". "Every member has contributed". "Positive experience" "Communication and coordination" "Enjoyable experience" "Group project" "Teamwork" "Collaborative learning" "Worked well together".

In analysing the students' responses, several key themes and expressions emerged, revealing the prominent keywords, frequent phrases, and most repeated words associated with their experiences. The terms "Group" and "Teammates" stood out as pivotal elements, highlighting the collaborative nature of

their endeavours. "Experience" was a recurrent concept, often paired with the descriptor "Good," indicating a positive overall sentiment. The words "Work," "Communication," and "Collaboration" underscored the significance of effective teamwork. The phrase "It was a good experience" resonated frequently, encapsulating the students' overall sentiments. Expressions such as "Working in groups," "Every member has contributed," and "Positive experience" reiterated the cooperative nature of their projects. "Communication and coordination" emerged as a critical aspect, emphasising the importance of effective interaction within the teams. The recurring phrases "Enjoyable experience," "Group project," "Teamwork," and "Collaborative learning" collectively portrayed a shared sense of satisfaction and achievement. Additionally, the phrase "Worked well together" encapsulated the successful synergy among group members, reflecting a positive collaborative learning environment.

The articulated research objectives prompt the formulation of specific research questions aimed at uncovering valuable insights into the dynamics of collaborative work among first-year university students, seeking to explore the perceived benefits and challenges associated with collaborative efforts within this particular academic cohort and delving into the intricacies of teamwork and the crucial role of effective communication in fostering a conducive and productive collaborative environment (Baines et al., 2017; Ghahraman & Tamimy, 2017; Kutnick & Blatchford, 2014).. This question further probes into the multifaceted impacts of communication on knowledge acquisition, teamwork enhancement, and the development of coordination skills (Gottschall and Garcia-Bayonas, 2008; Gaudet et al., 2010; León et al., 2015; Mendo et al., 2016; Baena-Morales et al., 2020. By addressing these research questions, the study aims to deepen understanding of the factors influencing collaborative work among first-year university students, with potential implications for educational practices and student success. In brief, our students' feedback offered various perspectives on their experiences of group work, highlighting both positive and negative aspects of collaboration and providing a comprehensive understanding of the complexities and dynamics inherent in collaborative work. It illuminates the multifaceted nature of cooperative endeavours, showcasing the interplay between their constructive and adverse characteristics. While some students appreciated the opportunity to work with their peers and appreciated the division of tasks, others expressed concerns about unequal contributions and last-minute efforts. Issues with communication, time management, and dealing with uncooperative team members were recurrent themes. However, positive aspects were also highlighted, such as the acquisition of new knowledge, improved teamwork, and the development of coordination and communication skills. Despite the challenges, many students recognised the value of teamwork and the benefits of learning from their peers' diverse perspectives and insights. While acknowledging the benefits of shared responsibilities and teamwork (Sudirman et al., 2023), they also underscore the challenges arising from unequal contributions, communication difficulties, and managing uncooperative team members.

Furthermore, the students' insights emphasise the crucial role of effective communication, technological proficiency, goal alignment, and mutual respect in fostering a productive, harmonious collaborative environment. This underscores the significance of not only individual commitment but also a collective dedication to achieving common goals in a collaborative setting. Drawing from our classroom experience, the effective utilisation of technology and social media to encourage collaborative work hinges on all team members possessing prior technological proficiency, aligning with shared objectives and measurable milestones, fostering a respectful attitude towards peers, embracing individual responsibility for collective welfare, demonstrating problem-solving capabilities for both personal and team challenges, and exhibiting unified dedication and motivation.

The analysis of students' responses reveals a rich tapestry of experiences that underline the pivotal role of collaboration in their academic accomplishments. The recurrent and positive use of keywords emphasises the collective nature of their projects, where individuals contribute to a shared goal, suggests an overwhelmingly positive sentiment, indicating that students derive satisfaction and fulfilment from

their collaborative efforts, and underscores the multifaceted aspects of effective teamwork, highlighting the necessity of not only individual contributions but also seamless interaction and coordination within the group. Moreover, expressions like "Communication and coordination" further illuminate the cooperative dynamics at play during group projects, reinforcing the idea that successful collaboration hinges on effective interaction and collectively paint a picture of shared satisfaction and achievement (Slavin, 1991), illustrating the value students place on collaborative learning environments. Finally, the assertion that they "Worked well together" encapsulates the essence of successful synergy among group members, highlighting the importance of fostering a positive collaborative atmosphere for enhanced learning outcomes.

In summary, the findings of this study offer clear answers to the two research questions and provide insight into how first-year students in technical ESP courses perceive collaborative group work. Regarding RQ1, the results indicate that most students (68.85%) reported positive experiences, describing group work as motivating, efficient and conducive to shared learning. These sentiments align with predictions from social interdependence theory, which posits that positive interdependence fosters supportive peer interactions, collective responsibility, and improved learning outcomes. Students' emphasis on mutual help, shared responsibility, and collective problem-solving reflects precisely the kinds of cooperative behaviours described in cooperative learning scholarship. At the same time, the notable minority of negative responses (11.48%) mirrors widely documented challenges: unequal contributions, free-riding, last-minute workloads and coordination difficulties. These issues are consistent with prior research on peer dynamics and highlight ongoing limitations in group-based assessment design, particularly in first-year cohorts where teamwork skills may be underdeveloped.

Turning to RQ2, the results underscore that communication quality, organisational skills, technological proficiency and mutual respect strongly influence students' collaborative experiences. These themes resonate with ICT-enhanced learning research, which emphasises the importance of digital literacy, clear communication channels and structured task management for effective online or blended collaboration. Students who reported strong communication and consistent coordination tended to view group work as enriching, whereas communication breakdowns were frequently associated with negative experiences. This pattern supports existing evidence that communication and social presence are central mediators of successful teamwork.

Although the overall findings are robust and consistent with theoretical expectations, several limitations temper their generalisability. The reliance on self-reported data, the specific institutional context, and the snapshot nature of the data collection constrain the extent to which the results can be transferred to other ESP or STEM settings. These limitations suggest caution in overinterpreting the findings and underscore the need for continued research using longitudinal or comparative designs.

Conclusion

In conclusion, the diverse perspectives shared by our students shed light on the intricate nature of collaborative group work, revealing both the challenges and benefits of such work. While certain students embraced the opportunity to collaborate and appreciated the distribution of tasks, others highlighted concerns surrounding disparities in participation and last-minute contributions. Issues related to communication, time management, and managing uncooperative team members emerged as recurring themes in their accounts. Nevertheless, their experiences highlighted the significance of collaboration, emphasising the valuable outcomes of knowledge acquisition, improved teamwork, and enhanced communication and coordination skills. The students' insights underscore the pivotal role of effective communication, technological proficiency, goal alignment, and mutual respect in fostering a conducive, productive collaborative environment. The findings emphasise the need for collective dedication and an

environment that fosters problem-solving and teamwork, highlighting the pivotal role of technology in enabling effective collaboration among team members.

The study is subject to several limitations that warrant consideration. Firstly, reliance on feedback from a specific group of students raises concerns about sample size and representativeness. This limited scope may not accurately reflect the diverse perspectives of the entire student population, thereby limiting the generalizability of the findings to a broader context. Secondly, the inherently subjective nature of student feedback introduces a potential source of bias, given the influence of individual perspectives and experiences. This subjectivity may compromise the study's overall reliability and validity.

Furthermore, the study's focus on a specific timeframe raises questions about the temporal relevance of the findings, as experiences within that period may not fully capture the evolving nature of collaborative dynamics over a longer period. Lastly, the assumption that all team members possess prior technological proficiency, a key factor in the study's exploration of technology in collaborative work, may not hold for all students, affecting the applicability and generalizability of the research outcomes. Acknowledging and addressing these limitations is crucial for a more nuanced interpretation of the study's findings.

Several avenues for further research emerge from the insights of the current study. Firstly, a longitudinal study could offer a comprehensive understanding of collaborative dynamics by tracking their evolution over time, providing valuable insights into the long-term impacts and challenges associated with group work. Secondly, exploring the influence of diverse backgrounds and perspectives on collaborative experiences would deepen our understanding of how inclusivity contributes to or hinders effective teamwork. Investigating specific interventions or strategies to address identified challenges, such as unequal contributions and communication issues, stands out as a practical research direction that could yield valuable solutions for educators and students. Additionally, a comparative analysis evaluating the effectiveness of different collaborative tools and approaches across diverse educational settings holds promise for identifying best practices to encourage successful group work. Lastly, assessing the impact of training programs focused on teamwork skills, communication, and conflict resolution would provide valuable insights into how targeted interventions can positively influence collaborative experiences, offering tangible guidance for both educators and students seeking to enhance their collaborative capabilities. These research directions collectively contribute to a more nuanced and practical understanding of the dynamics of collaborative group work in educational settings.

Suggestions for Future Research

Future research should further explore the dynamics of collaborative group work using both theoretical and intervention-based approaches. From a theoretical standpoint, longitudinal studies would be valuable to track how students' perceptions, behaviours, and collaborative skills develop over the course of their degree programs. Such studies could offer deeper insights into how early experiences influence long-term attitudes toward teamwork. Additionally, research could examine how diversity, inclusivity, and differences in students' academic, linguistic, and cultural backgrounds impact collaborative processes. This type of research would help clarify how group composition affects communication patterns, role sharing, and perceptions of fairness within teams.

From a pedagogical and intervention-oriented perspective, further research should evaluate specific strategies to address challenges identified in this study, such as unequal contributions, last-minute workloads, and communication difficulties. Experimental or quasi-experimental designs could assess the effectiveness of structured teamwork training, conflict-management workshops, or explicit instruction on collaborative writing practices. Comparative research examining different collaborative tools—such as shared digital platforms, AI-assisted writing environments, or synchronous versus asynchronous communication tools — would also help identify which technological supports most effectively enhance

coordination and accountability. Finally, evaluating targeted interventions that promote transparency, individual accountability, and equitable task distribution would offer practical guidance for educators seeking to improve the quality of group work.

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Conflict of Interest

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