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Development of Soft Skills among Computing Students in Online Task-Based Learning: Insights from Technical Communication Course

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Abstract

Soft skills development, such as communication, teamwork, and problem-solving, is critical for computer students as they enter the profession. Students may be able to practice these skills in a virtual setting through an online task-based course. In this study, we investigated how successfully an online task-based course encouraged the development of soft skills among computing students. The course was designed to give students real-world challenges that required them to work in groups and communicate effectively with their classmates and instructors. The inquiry was based on a qualitative examination of the students' final reports. It gave data from two semesters (Fall 2020 and Spring 2021) of students who studied a course named Technical Communication. In total, 216 students' final reports were ready for investigation. A sample of 97 reports, representing 45%, was selected based on certain criteria to ensure a high-quality investigation. According to the findings of our study, the online task-based course helped boost the development of certain soft skills among students. Students noted an improvement in their ability to communicate effectively, cooperate successfully with team members, and identify professional responsibilities, as well as a rise in their self-confidence. Overall, this study emphasizes the necessity of introducing online task-based courses into computing students' curricula, giving them a valuable opportunity to develop critical soft skills. The present design of the Technical Communication Course is believed to be efficient regardless of the education delivery method (traditional/online).

Introduction

In order to make a seamless transition into the industrial field, graduates with a bachelor's degree are required to develop a mix of technical and soft skills (Ritter et al., 2018; AlGhamdi, 2019). Generally, a planned curriculum concentrates mostly on the technical requirements of a specific graduate. Based on a recent research investigation, soft skills are crucial for freshly graduated IT students (AlGhamdi, 2019). Communication skills (oral and written), the ability to work in teams, a willingness to learn new skills, and flexibility or adaptability are among the top five skills required in the computing and information technology industry in Saudi Arabia (AlGhamdi, 2019). It is clear from the research that the significance of these skills is not confined to the environment of Saudi Arabia alone; rather, it is significant all over the world (Aasheim, 2012; Alsafadi, 2012; Matturro et al., 2015;

Chung et al., 2016; Kovac & Sirkovic, 2017; Hirsch, 2017; Isa, 2018). This is evidenced by the fact that these skills have been cited in various publications. At King Abdulaziz University's Faculty of Computing and Information Technology (FCIT), the undergraduate curriculum is further enhanced to develop students' soft skills by injecting more soft skills assessments into the courses that mainly focus on teaching technical content. This is done in order to develop students' ability to communicate effectively and work well with others (FCIT, 2018a). The FCIT undergraduate curriculum has a dedicated course for soft skills that mainly focuses on technical communications (FCIT, 2018a). The Technical Communication course is taught to first-year students at FCIT, irrespective of their major, as it is the basis of delivering the message to everyone (FCIT, 2018a). Over the past years, this course has been taught traditionally by delivering lectures, submitting assignments, and conducting two or three exams (FCIT, 2018b). Since the start of the 2019 academic year, a decision was taken with the full support of the IT department to transform this traditional teaching method to be more effective. The whole course was totally restructured and has become a 100% tasks-based course that heavily relies on the students' performance in accomplishing the assigned tasks. As a result, the course did not have tests or exams.

The COVID-19 pandemic has been frightening the world since the middle of 2019. Because of this, educational institutions have shifted to online learning. Currently, the technical communication course is taught online and has been for about a year and a half. Since the course's goal is to help students develop their soft skills, there may be a question here about how online learning affects the development of these skills. The research was conducted to understand better how soft skills were developed in the newly created online Technical Communication Course. The inquiry provided empirical support through a qualitative analysis of the students' final reports over two semesters.

The Course Background, Design, and Related Studies

Background

The Technical Communication Course focuses on three key areas: proficient oral and written communication, efficient team collaboration, and professional responsibilities recognition. These areas, together with other technical subjects, are necessary outcomes for students in any computing program according to the Accreditation Board for Engineering and Technology (ABET). ABET sets a standard that demands computing program graduates possess the capacity to (ACM, 2020):

1. "Analyze a complex computing problem and apply computing principles and other relevant disciplines to identify solutions."
2. "Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline."
3. "Communicate effectively in a variety of professional contexts."
4. "Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles."
5. "Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline."

These five outcomes were adopted in our IT program in addition to one more (FCIT, 2020):

6. "Identify and analyze user needs and take them into account in the selection, creation, integration, evaluation, and administration of computing-based systems."

As can be observed from the students' outcomes listed above, the objectives of the Technical Communication Course contribute to enabling students to achieve outcomes 3, 4, and 5. These three components are known as soft skills (called non-technical skills, people skills, social skills, generic competencies, or human factors). These three students' outcomes were highlighted during our curriculum evaluation for 2019 ABET accreditation. They should be improved more in our curriculum. The industry always needs skilled graduate students equipped with technical and soft skills (Ritter et al., 2018; AlGhamdi, 2019). These skills are not just about the base knowledge in their field of expertise but also about transforming them into practice (Dirksen, 2015). Building and developing skills among university students is vital for a future profession (Anthony & Garner, 2016). However, the process of imparting such a skill-based course can be challenging for the instructors as well as the students. The traditional teaching method of lecturing and delivering information does not provide much-needed impetus among students. Therefore, making the course learner-centered is effective for developing students' soft skills (Berkhof et al., 2011; Dirksen, 2015; Ritter et al., 2018).

The redesign of the Technical Communication Course operates on the premise that students who enter the course from their foundation year may lack certain skills that are essential to succeed. These skills are as follows:

1. Communicate technical topics confidently to one or a group of people.
2. Write technical issues/reports/proposals clearly.
3. Engage effectively with groups to perform related technical tasks.
4. Act in accordance with professional responsibilities.

The gap mentioned in the context is a skills gap. The objectives listed are related to skills such as communication, collaboration, and professionalism. Therefore, it is not enough to provide students with information on how to perform these skills; they need to practice and develop these skills (Al Kandari & Al Qattan, 2020; Umar & Ko, 2022). The course has been designed to be task-based, where students will be coached and assessed through the performance of tasks and feedback provided. This approach will enable students to learn and develop their skills through practice, similar to how one learns to swim by being in the pool. In this way, students are coached, and their competencies are assessed throw having them perform the tasks and providing feedback (Dirksen 2015; Saad & Zainudin, 2022; Umar & Ko, 2022).

As previously mentioned, the Technical Communication Course was redesigned to be entirely task-based. The author of this paper collaborated with the course coordinator to develop a plan for restructuring the course to enhance the development of three essential student outcomes: effective communication, teamwork, and professional responsibility recognition. These outcomes and skills necessitate hands-on practice, which can be achieved through active participation in tasks (Dirksen, 2015; Walker, 2018). Consequently, the course was designed based on Project-Based Learning (PBL) principles.

PBL is a student-centered learning pedagogy. In contrast to traditional teacher-led classroom activities, PBL

requires students to organize their work and manage their time (Willis & Willis, 2007; Rodríguez & Bonces, 2010; Saad & Zainudin, 2022). This approach allows students to explore real-world problems and challenges, leading to better retention of skills and concepts (Allen, 2016; Walker, 2018; Belwal et al., 2020). PBL is particularly effective in developing soft skills such as communication skills (Rahman, 2010; Al Kandari & Al Qattan, 2020) and is widely used in second-language curriculum development (Rodríguez & Bonces, 2010). It has been used since the mid-eighties and has been proven to be effective in learning a second language (Rahman, 2010).

Since the course under investigation involves developing communication skills for students, this approach is believed to be typical for adoption. In the Technical Communication course, English is a second language for students. The aim is not to teach English in this course, but rather on how to use the language as a tool for professional communication and collaboration. Since the PBL is a learner-centered approach, what are the roles of teachers? Teachers should pay high attention to designing well-defined and meaningful student tasks. This is the key to adopting such an approach (Rodríguez & Bonces, 2010; Roessingh, 2014; Walker, 2018; Saad & Zainudin, 2022). In PBL, teachers become organizers of discussions, facilitators of group or pair work, motivators to engage students in activities and tasks, and providers of feedback (Willis & Willis, 2007; Rodríguez & Bonces, 2010). Students take the lead in their learning, and teachers play a supportive role. (Van den Branden, 2006; Rodríguez & Bonces, 2010; Saad & Zainudin, 2022).

Covered Topics

The Technical Communication Course is organized on a weekly basis, with learning modules posted on the blackboard each week. The course covers various topics, including writing fundamentals, message structure, proposals and reports, capturing and convincing, visual design, teamwork and communication, presentation, note-taking, and self-presenting. The course material is derived mainly from three books: Markel (2016), Fowler and Aaron (2016), and Last, Neveu, and Smith (2019). Each week, students are expected to achieve two goals: one at the knowledge level and the other at the action level. The students are required to comprehend the given information and guidelines and put them into practice to achieve their objectives (Dirksen, 2015; Walker, 2018; Umar & Ko, 2022). Table 1 below demonstrates the covered material within 12 weeks.

Table 1. The Covered Study Material in the Technical Communication Course

Week	Study Material	Description
1	**Introduction**	In the introductory section, technical communication is defined, and its purpose is determined. Additionally, the characteristics of technical communication are examined to distinguish it from other forms of communication and avoid limiting the course to academic writing. The section also discusses the skills and qualities that successful communicators possess.
2	**Document Express Itself**	Clear writing is a crucial element in making a message powerful. This material introduces the obstacles that hinder clear writing and how to avoid them. It also highlights the importance of small parts/words, commonly known as signs, in making a sentence clear or unclear.

Week	Study Material	Description
3	**Maintaining the flow**	In this situation, it is essential to remember that as a technical communicator, the primary goal is to clarify the message to the readers or listeners, enabling them to act accordingly. It is not about showcasing intelligence or demonstrating creativity by playing with vocabulary. Technical communication is distinct from academic or creative writing, and its primary focus is on conveying information accurately and clearly.
4	**Visual Design**	Visual design in technical communication is akin to the initial attraction one feels towards a potential partner when considering marriage. As a technical communicator, it is crucial to pay close attention to visual elements that please the audience's eyes, making them more likely to be attracted to and engage with the message. Therefore, the message should be visually appealing to enhance its effectiveness.
5	**Teamwork and Communication**	Working collaboratively in groups is a critical component of almost every workplace, particularly in engineering, computing, and software development environments, where large projects require the input and collaboration of multiple individuals. Therefore, learning the skills of group dynamics and teamwork is not optional but essential for success in these fields.
6	**Structuring The Message**	The structure of a written or spoken message plays a vital role in how effectively it convinces the intended audience. Therefore, it is critical to structure the message in a cohesive and logical order, facilitating the audience's understanding and reception of the intended message. By organizing the message in a flowing and coherent manner, the audience can precisely grasp the information and meaning intended to be delivered.
7	**Proposals and Reports**	Reports and proposals are specific documents designed to serve a particular purpose and target a particular audience. Both types of documents involve analyzing a situation or problem and providing recommendations. However, reports tend to emphasize presenting and analyzing the case in more detail, while proposals focus more on suggesting and presenting potential solutions. In other words, reports are typically more analytical and descriptive, while proposals are typically more persuasive and prescriptive.
8	**Capturing and Convincing**	There are many successful individuals who have traveled the world through their successful proposals and work. Along the way, they have likely achieved numerous accolades, won various competitions and earned prestigious positions. However, it is also important to recognize that they may have encountered struggles and failures at certain points in their lives. By learning about their journey through their own experiences, we can gain valuable insights and further explore the path to success.
9	**Presentation**	Students learn how to connect with their audience and engage them through storytelling, body language, and vocal variety. They also explore strategies for

Week	Study Material	Description
		managing nerves and handling difficult questions. The course may incorporate both individual and group presentations, with opportunities for feedback and evaluation from the instructor and peers.
10	**Notes Taking**	Effective individuals know how to manage overwhelming amounts of information. They take note of critical points, organize their thoughts, and stand out. In meetings, those who take notes are preferred by managers because they are capable of producing excellent results based on their notes.
11	**Writing Instructions, Descriptions & Manuals**	A technical communicator has a critical role in guiding their colleagues, customers, and end-users, not just reporting to management. This guidance can take the form of manuals, instructions, descriptions, and definitions. To effectively produce these documents, technical communicators must master the skills of clarity and effectiveness.
12	**Present Yourself**	Professional self-presentation is key to advancing one's career or business prospects. To stand out among hundreds or thousands of other candidates, individuals must present themselves in a way that is both unique and impressive.

Teaching Method

The presence of effective teaching can greatly impact the development of students' soft skills (Tusyanah, at el., 2023). The teaching method of Kovac and Sirkovic (2017) was adopted. The course was taught by two instructors; both were associate professors. One was an international expert and the other one was local. The international professor has more than 20 years of rich experience teaching technical courses in different universities in different countries including Germany, Saudi Arabia, Turkey, Nigeria, Malaysia, India, and Brunei. The local professor has a pedagogical background and more than 10 years of experience in developing educational technology, delivering lectures, seminars, and workshops about topics, including online learning, e-learning course design, research, writing, and presentation skills. The professors divided the teaching load based on their strengths, with the international professor focusing on writing and assessments, while the local professor focused on speaking, presentation, and visual design. Additionally, since the local professor was an expert in online learning, he was responsible for managing the course design and content on the blackboard.

The course had synchronous classes that took place once a week for 90 minutes, for a total of 13 weeks. Additionally, students had access to two hours of virtual office hours per week. All sections for the semester were combined and presented as one merged section on the blackboard to encourage collaboration among students. Students were given the opportunity to attend any class they wished, regardless of their original section. Virtual class schedules and links were posted on the course page on the blackboard, and there was no attendance list. Instead, students were expected to be responsible and mature enough to decide whether or not to attend the synchronous classes. The classes were designed to be motivational and aimed to encourage participation and collaboration among students. The course material was organized on the blackboard in a way that made it easy

for students to access information. They could refer to recorded classes, well-designed lecture notes, and video clips related to the topic of the learning module.

Content Design

The course content on the Blackboard was meticulously structured according to the guidelines of the FORCE strategy (AlGhamdi & Bahadad, 2018). This approach focuses on five key elements, represented by the acronym FORCE: Focus, Organize, Reduce, Communicate, and Enrich with graphics. To ensure that the course content was easily accessible and organized, the course side navigation bar was divided into four distinct sections: getting started and contacts, about the course and learning material, communication and interaction, and students' calendar and grades. No additional tabs were included, and the side navigation bar remained standardized throughout the course, as illustrated in Figure 1. All course material was organized and presented under these four blocks, ensuring that students could easily locate and access the content they needed.

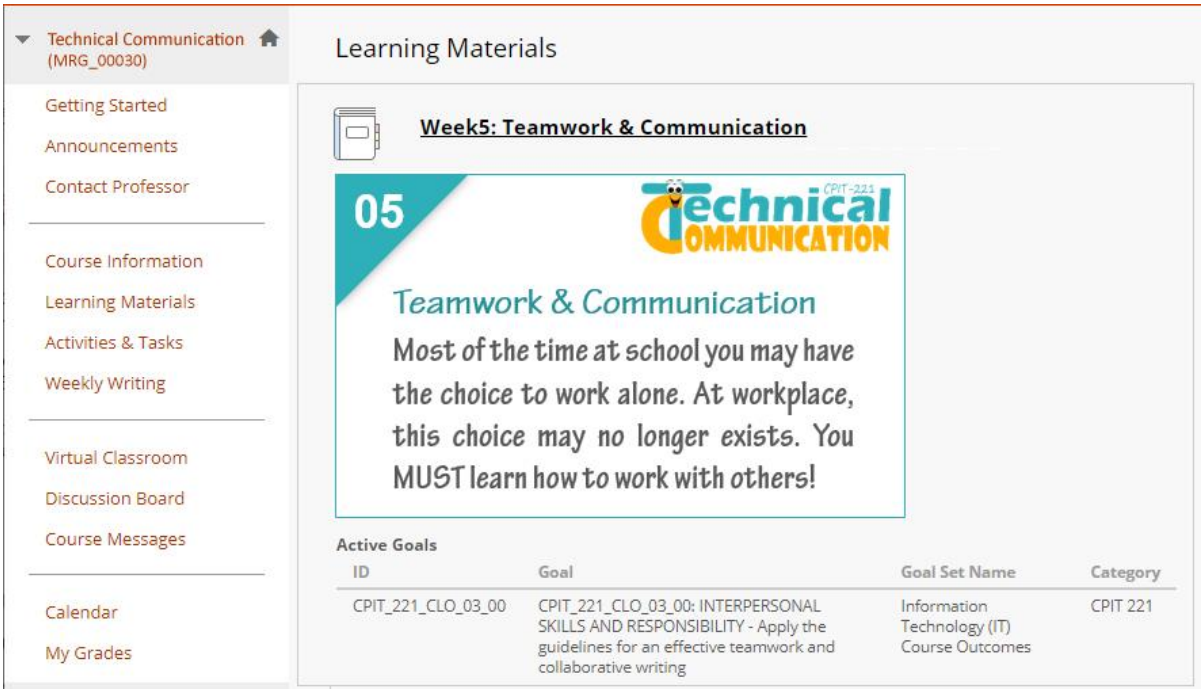

Figure 1. The Blackboard Course's Side Navigation Bar along with a Sample of the Content

The students accessing the course page on Blackboard for the first time can easily find the course's journey explained in detail. This information includes the course description, objectives, teaching plan, and assessments. The learning material consists of twelve modules, each covering a specific topic. Each module is broken down into five sections, including an introduction, objectives, lecture notes, discussions, and activities or tasks. The activities and tasks are accessible through a dedicated tab, and each week the relevant activity/task is viewed. There is a distinction made between activities and tasks, with tasks being graded and performed out of class, while activities are not graded and can be performed in class. The weekly writing also has its own dedicated tab linked to the Blackboard blogging tool, where instructors manage and create blogs that are only accessible to enrolled users. This allows students to engage in reflective learning by reading, writing, and commenting on each other's

blogs (Allen, 2016; Stoszkowski & Collins, 2017; Garcia et al., 2019; Martin et al., 2019). “Instructors create and manage blogs on Blackboard, and only enrolled users can view and create entries and comments in them” (Blackboard, n. d.). The same learning concept applied to the discussion board (Tai et al., 2018). The discussion board was actively used by students to share their individual speaking and presentation work, comment, and support each other. For group tasks, grouping tools are used, and all group pages are made publicly available to all students. This encourages reflective learning, where students reflect on their work and benefit from others' work (Allen, 2016). Reflective learning is a form of self-education where learners become aware of their learning experience. It helps students to evaluate their understanding and approach to learning, identify areas for improvement, and develop critical thinking skills (Colomer et al., 2020; Petrovićand & Pale, 2021).

To further enhance the learning experience, the course page on Blackboard and the PowerPoint slides were made more visually appealing by using graphics and complementary colors. The complementary coloring harmony scheme, which involves selecting two colors that are opposite to each other on the color wheel, was used to achieve this (Yang et al., 2019). The chosen colors were cyan and orange, but other color schemes were also considered. The concept of coloring harmony schemes was taught as a sub-topic in the fourth week under the visual design learning material. The use of a unified color scheme and graphics helped students understand the impact of visual design on communication, providing a real-life example of its influence. This approach to teaching is in line with research by Schloss et al. (2018) that emphasizes the importance of visual design in effective communication.

Assessments

Students in this course were assessed based on their performance in achieving 10 various tasks, as demonstrated in Table 2. The tasks were centered around writing, speaking, presenting, and group work. They were designed to take students step by step. The first tasks seemed easier and less challenging compared to the later ones. The main goal here is to help students come out of their comfort zones and build their self-confidence. Table 2 below presents the description of these ten tasks and the allocated points for grading. For a thorough explanation of these tasks, it is recommended to refer to the course book (AlGhamdi, 2022).

Table 2. The 10 Graded Tasks in the Technical Communication Course

Tasks	Description	Point
10 weekly writing	Weekly, students were expected to write a reflective piece on a previous week's learning material or task. They are encouraged to articulate their thoughts on the given topics using clear, concise, and coherent language.	2% / week
Self-Introduction on YouTube	Students were requested to record a video for about 2 minutes to introduce themselves and tell what they expect to learn from the course. They need to show their face and speak naturally without editing/montage the video. They need to upload their videos on YouTube and share them on the course discussion board. They were encouraged to like, comment, and subscribe to each other YouTube	3%

Tasks	Description	Point
	channels.	
Restructure the visual design	Students were given poorly designed documents/reports. Based on what they have learned in the visual design material, they need to identify weaknesses and restructure design to improve the layout and make them visually appealing/acceptable.	5%
Group online conversation	Groups of five students were randomly assigned and tasked with conducting online meetings to discuss faculty and study-related topics. Each discussion should last approximately ten minutes, with all members participating and appearing on camera. The session should be recorded, uploaded to YouTube, and shared on Blackboard.	5%
Make Me Buy	Students were asked to identify something they love or are passionate about, such as a product, service, idea, or hobby. They were then required to create a 3–5-minute video to deliver a persuasive message to a specific audience. The students were encouraged to use creative ways to make their message more powerful, such as incorporating humor or acting skills. Students were also urged to edit and montage their videos in order to highlight their strengths and hide their weaknesses.	10%
Peer review assessment	Students were instructed to submit their written assignment on a given topic. Each student received two reports to assess, using a rubric. The evaluation was anonymous, and the entire process was facilitated through the "Self & Peer Assessment" feature on Blackboard.	10%
Group Proposal: written	Students were allowed to form groups of their choice of five members in each group. The groups were required to identify potential problems, issues, or areas for improvement related to given topics about the university. They had to prepare and submit a proposal.	10%
Group Proposal: presentation	The group was instructed to hold an online meeting and record a video presentation. A PowerPoint slide highlighting the key points and proposals from their written submission should be included. The completed video presentation should be shared on the Blackboard group page.	10%
Formal Report Writing	Students were required to write a formal report about their journey in the course in approximately 1500 words. They were encouraged to write in a way similar to a nice-to-read story. The things that they like & dislike were both welcome to be reported.	20%
CV writing using Latex	The aim was for students to familiarize themselves with LaTex by using it to write their CVs. To facilitate this, an instructional video lasting 25 minutes was made available to assist students and ensure a smooth task completion process.	10%

The Complete Picture

To aid students in comprehending the connection between the ten course tasks and the course objectives, a visual illustration was generated and displayed on the Blackboard course page, accessible via the course information tab. The graphic, displayed in Figure 2, portrays the course as a thriving plant, with students as seeds planted in fertile soil, symbolized by the key component of "self-confidence." Using self-confidence as the soil is crucial since it serves as the initial step for students to strengthen themselves, and without it, no one can genuinely assist them (Şar et al., 2010; Bárkányi, 2021).

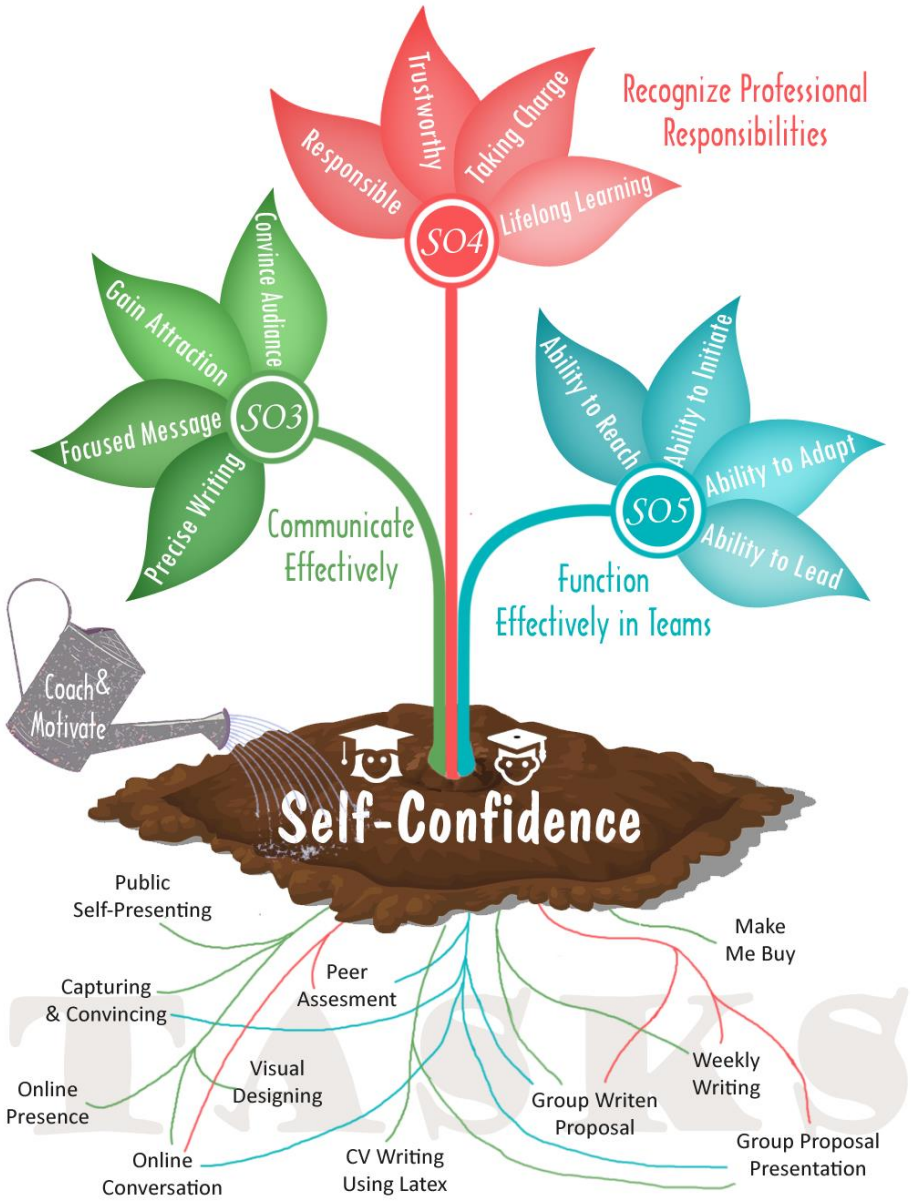

Figure 2. CPIT221 Student Outcomes (SOs) Linked to the Course Material and Tasks

The tasks in the course are represented as roots, which, like the roots of a plant, need to be deep and strong in order for the plant to thrive. The role of the professor is represented by a watering bucket, which symbolizes the need for coaching and motivation to help the plant grow and stay healthy. The plant has three flowers, each representing a different outcome that students are expected to achieve upon successful completion of the course.

The use of three different colors helps to show which root/task is linked to each flower/outcome. This visual graphic provides students with a clear and easy-to-understand representation of how the various elements of the course are interconnected and work together to achieve the desired outcomes.

Methodology

This study aims to examine the impact of the Technical Communication course on students' soft skills during the COVID-19 pandemic when all students were shifted to e-learning mode. The study includes data from two semesters (Fall 2020 and Spring 2021) of students who took the Technical Communication course. Based on the students' final reports, the impact was studied qualitatively. Therefore, this paper can be named "Students' Voice". The final report of the Technical Communication course is one of the main tasks. At the end of each semester, students are requested to report their journey studying the course. The course book contains full examples of these reports (AlGahmdi, 2022). Table 3 below presents the statistical data of the enrolled students in the course in two semesters: Fall 2020 and Spring 2021. All the covered sample is 100%, male students. They were placed in seven sections in the first semester, and four sections in the second semester. Most of them were fresh students joining the faculty in their first year. The numbers of submitted final reports in semester one and semester two were 160 (93.57%), and 56 (88.89%) respectively. These reports were submitted on Blackboard. After evaluating all the tasks, 92.4% successfully passed the course in the first semester and 87.3% in the second semester.

Table 3. Statistical Data of the CPIT221 Enrolled Students for Two Semesters 2020/2021

Info		Semester 1 (Sep - Dec 2020)		Semester 2 (Jan - April 2021)	
		Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)
Enrolled Students		171	100	63	100
Gender	Male	171	100	63	100
	Female	0	0	0	0
Age Group	18-19	103	60.23	12	19.05
	20-21	61	35.67	43	68.25
	22+	7	4.09	8	12.70
Final Report Submission	Yes	160	93.57	56	88.89
	No	11	6.43	7	11.11
Course Result	Pass	158	92.40	55	87.30
	Fail	13	7.60	8	12.70

In total, 216 students' final reports were ready for investigation. However, it is quite difficult to do a qualitative analysis of all of these reports. As a result, a sample of these reports is required to do the qualitative analysis at a high level of quality. Because these reports were rated using a rubric, it is preferable to base the sample criteria on this rubric. The following rubric components are more appropriate to be chosen as sampling criteria: (1) message clarity; (2) information flow; and (3) significant results and recommendations. Students who received full marks for these three elements are more likely to have their final reports included in the current study's sample. A clear message with a pleasant flow emphasizing important findings and recommendations appears to be a factor

that identifies good writing that is truly the outcome of strong ideas. In semester 1, 41% (66 reports) of students received full marks in these three categories, while 56% (31 reports) received full grades in semester 2. The total number of reports is 97, representing 45% of the overall sample. The 97 reports (in Docx and pdf format) were loaded into nVivo software. nVivo is a computer tool that assists in organizing, analyzing, and finding insights into qualitative data (Feng & Behar, 2019). Two cycles of coding were used to analyze the reports. The first cycle was open coding. The list of codes was categorized into themes. The research performed the second cycle to find the common themes and reorganize the content (respondents' quotations) under these identified common themes, making them ready for reporting.

At the time of completion of the course, further quantitative data was collected at the end of each semester. The data was collected using an online questionnaire instrument. The questionnaire collected students' opinions about the study material and the 10 tasks. Students were asked to rate the importance of the study material and tasks for improving their skills. A five-point Likert scale ranging from strongly agree to strongly disagree was used to rate each item. The total number of students who opted to participate in filling out the online questionnaire is 149 (87.13%) in the first semester and 52 (82.54%) in the second semester. Table 4 below shows the ranking of the importance of the study material and tasks for skills improvement as perceived by students.

Table 4. Rank of the Importance of the Study Material/tasks for Skills Improvement as Perceived by Students

Rank	Study Material	Rank	Tasks
1	Present Yourself	1	Weekly writing
2	Teamwork and Communication	2	Final Report Writing
3	Presentation	3	Make me buy
4	Proposals and Reports	4	Group Proposal (written & presentation)
5	Styles in Technical Writing	5	Self-Introduction on YouTube
6	Writing Instructions, Descriptions & Manuals	6	Group online conversation
7	Capturing and Convincing	7	Restructure the visual design
8	Visual Design	8	CV using Latex
9	Notes Taking	9	Peer review assessment

Findings and Discussion

In this paper, we aimed to explore and analyze the qualitative document analysis of the students' reports. The objective was to identify the themes that were prevalent in the reports and that fulfilled the scope of this paper. Based on the analysis, we were able to identify five themes that were deemed to be the most significant. These themes were writing, speaking, teamwork, recognition of professional responsibilities, and self-confidence. Hence, the structure of this section is arranged based on these themes. To make our discussion easier to follow, we organized the following sections as questions. For each question, we presented evidence as quotes from the students' reports to support the expressed argument. By doing so, we hope to provide a clear and comprehensive understanding of the themes identified in our analysis.

In what ways has the course improved students' writing skills?

The course was rich with writing material and tasks. Among the tasks were weekly writing, final report, and proposal writing. For the proposal writing, it will be mentioned under the teamwork heading. For the final report, what is presented in this paper is based on the final report. Therefore, this is proof of the students writing level.
According to quantitative data presented in Table 4, the weekly writing task was ranked as the most useful task by the students. The literature has widely documented the benefits of regular writing practice (Graham, 2019). One student described the weekly writing as "*an opportunity of bliss and peacefulness that cut through and blocked out all outside interference one would face at that time.*" The weekly writing was challenging for some students at first, but they quickly realized its benefits. As one student noted, "*Now my writing skills have significantly improved.*"

Despite the task being limited to 100 words, students found the weekly writing challenging. However, they acknowledged the benefit of developing their writing skills. One student noted, "*Writings kept coming and going and my ability to write kept getting better and better.*" The weekly writing task significantly impacted the improvement of students' writing skills. As one student noted, "*The weekly writing has improved my writing a lot more than I could have imagined. I have noticed a great development in my writing without my feeling.*"

The topic of writing was also important. Students were asked to write about the study material of the previous week in a storytelling form. This helped students organize their thoughts and opinions about the course material and express them in a written format. One student noted, "*The storytelling method helped me to cover all the topics, it made me able to show the experience from my own perspective and make it more interesting to read.*" Storytelling can be a powerful tool in promoting learning and memory retention. Writing in a storytelling form can help students to better organize their thoughts and present information in a compelling and engaging way (Moradi & Chen, 2019; Landrum et al., 2019).

Feedback was critical in improving students' writing skills. Regular feedback on writing can help students to identify their strengths and weaknesses and to develop a better understanding of what constitutes effective writing (Graham 2019). One student recalled receiving comments from the professor to avoid writing long sentences and to write simple sentences. The student noted, "*Now, I am proudly writing this report in a simple and clear way.*"
Regarding the final report and how it helped improve students' writing skills, the students' comments quoted in this paper prove the effectiveness of these tasks in improving their writing skills. One student quoted in the paper admitted, "*I admit that one of the important skills that I neglected and was bad at is writing.*" The same student also said, "*At first, I didn't give it much attention but as days and weeks went by, I was so embarrassed by my writing.*" The student also acknowledged that "*The professors taught us some writing skills, but they won't make us better without us practicing.*" This is quite obvious; practice is the key to improving in any field (Zanini, 2021).

In what ways has the course improved students' speaking skills?

The course has significantly improved students' speaking skills through various activities and tasks that challenged

them to get out of their comfort zones. Students were required to tweet short videos about themselves, record a longer video talking about themselves, have online conversations with random classmates, and produce "Make Me Buy" videos. A student explained the course's structure and how it helped gradually overcome his fear of public speaking: "*The course was not intended to throw you quickly out of your comfort zone, as your father would throw you in the pool without learning the basics of swimming… They take you step by step to reach a professional level.*" The gradual progression of speaking tasks, from shorter and simpler to longer and more complex, can help students build confidence and develop skills over time (Al Kandari & Al Qattan, 2020; Bárkányi, 2021).

Students shared their initial feelings about the first activity where they were asked to tweet a video introducing themselves. One student expressed, "*We were asked to make a tweet on the spot! I was very nervous to post a tweet with my face in it!*" Another student added, "*I was amazed why [is] that? So, I was embarrassed, and I couldn't share that video!*" A few students even felt insecure about their speaking skills and chose not to complete the task. However, after the activity was announced, the purpose behind it was explained, which was to help students identify their weaknesses and step out of their comfort zones. As one student reflected, "*I was shocked at first! However, I overcame my fears and uploaded the tweet after I saw a couple of students did it, so I felt that it is okay to do so.*" The professor's attention to detail also surprised students, as one mentioned, "*after I uploaded my video on Twitter, [the professor] mentioned exactly my behavior and I was surprised how he noticed that! I concluded that this course is not a normal one as it carefully studied the behavior of students.*" Using social media creatively and focusing on student-centered approaches in educational settings can promote and improve students' engagement, motivation, interactivity, soft skills, communication, and collaboration (Lampropoulos et al., 2021). Another speaking task was announced and graded, the self-introduction video. This time, students were given time to complete the task at home. Many students shared their experiences, describing the task as simple but difficult due to their lack of experience in presenting themselves. One student said, "*Although the task was very easy, I got used to being in a comfort zone, so it was difficult for me.*" Another student spent almost four hours recording his video, saying, "*I recorded my video exactly 127 times!*" Similarly, another student expressed, "*Every time I record, I get nervous, stutter, and stop recording! I never experienced something like that before, I was nervous [that] other people would watch my video and laugh or even just not find it good!*"

The strategy of encouraging students to share their videos on the relevant blackboard page proved beneficial in motivating reluctant students to participate (Dirksen, 2015; Allen, 2016). Some students watched their classmates' videos and gained the courage to submit their own. A Student noted "*I was very scared and very shy… I was confused about this task and what I should do. After a couple of days, I watched some of the videos that my classmates published so I got the courage to do it.*" Overall, the purpose of the task was to help students realize their weaknesses and areas for improvement, and many students were happy to have stepped out of their comfort zones to complete the task. A Student reflected "*I did publish my video. In my opinion, the video was bad, but I was very happy that I got out of my comfort zone.*"

The third speaking task, known as "Make Me Buy," was found to be the most impactful and beneficial speaking task based on both student feedback and quantitative data presented in Table 4. One student who struggled with the initial speaking task described his success in the "Make me Buy" task: "*For me, the best is the task of 'Make*

me Buy'… Amazingly I achieved my 'Make Me Buy' task with others in a gym. No more hidden business or shyness." Another student found the task challenging but rewarding, stating, "*Without CPIT221 I do not think I would post a video of myself online, learn how to edit videos, or even learn how to do the voice-over. I really liked the make-me-buy task.*" Many students reported a positive experience with the task, with one student stating, "*I really enjoyed 'Make Me Buy' task. This task helped me build my confidence which I enhanced my speaking by talking to the audience*." Another student said, "*The make-me-buy task was my favorite task of the course and I believe one of the most beneficial ones. It was simple and fun and taught me a lot.*" Another student appreciated the task's flexibility and ability to choose their topic: "*The idea of letting us choose anything to talk about without any pressure was great… Making a video about something you love encourages us to overcome shyness and being reluctant to talk to a camera*." Assignments that allow students to choose their own topics can increase motivation and engagement, leading to greater success in public speaking tasks (Zhang et al., 2020).

In what ways has the course improved students functioning in teams?

In this course, students were given three main group tasks, each serving a different purpose. The first task involved online conversations in randomly assigned groups of five members each. Many students were initially apprehensive about working with "strangers" and being graded for group work. The purpose of putting students in a random group to work together is to provide them with an opportunity to work with individuals whom they may not know or have interacted with previously. This can help them develop their communication, teamwork, and adaptability skills, as they work towards a common goal. It can also help break down barriers and promote a sense of inclusivity among students, as they learn to work with people from different backgrounds and with different perspectives. Additionally, it can help students overcome their fear of working with strangers and develop positive relationships with their peers (Whillans and Turek, 2021). One student remarked, "*Our professors planned this whole task for breaking fears between students and letting them communicate with each other to get improved and more motivated. In my opinion, this was the main purpose of this task.*"

Despite initial discomfort, many students found that the first group task helped them build new relationships and overcome their fear of working with strangers. One student stated, "*I used to prefer working alone because I had a bad experience with my previous group work. Now things start to change!*" Another student shared, "*I was nervous and don't know how to interact with other students. But actually, it helped me to be better and I actually made new friends with these groups. I didn't expect that at all!*"

Following the first task, students were taught about group and teamwork fundamentals. They were then given the option to form their own teams for the second and third group tasks, which involved writing proposals and conducting presentations. The purpose of this was to allow students to compare working in randomly assigned groups versus working with their own chosen teammates (Whillans and Turek, 2021). One student reflected, "*The group proposal was a huge turn for my group working skills development. I had great friends that helped me develop that skill. The way of sharing thoughts and ideas, meeting timings, and accepting another point of view, are all skills that I almost lacked.*"

According to feedback from students, they were enthusiastic about completing more group work tasks after experiencing the benefits of collaboration during the production of their proposals. One student stated, "*The teamwork aspect of this course had a significant impact on me, teaching me valuable lessons and transforming me into a new person.*" Another student enjoyed the group proposal process, "*I really enjoyed our group proposal. I felt like we are experienced people discussing serious matters that would make a real impact*." Finally, another student expressed "*no doubt that students would benefit from more graded tasks that focus on teamwork skills*". Overall, the group tasks helped students develop valuable skills such as communication, teamwork, and adaptability. Many students were pleasantly surprised by the positive impact that working in a group had on themselves. As one student put it, "*I wonder to which maximum level those tasks are important in my life!*" The comments highlight a shift in mindset and attitude towards teamwork, as well as personal growth and professional development.

In what ways has the course contributed to the recognition of professional responsibilities?

The approach taken by the professor in this course is student-centered, which gives the students the freedom to decide how they want to learn and be responsible for their own learning (Umar and Ko 2022). This approach is reflected in the students' comments, as they appreciate the trust given to them by the professor and recognize their professional responsibilities. A student commented, "*I would like to thank our professors, you gave us the freedom to be ourselves and never tied us to some academic standards like all other courses, we appreciate that*." Another student stated, "*The current pandemic affected the learning process massively, but I believe you did a great job focusing more on the tasks than the attendance and the lectures*." When students are given the opportunity to choose their own learning experiences, they become more invested in their education and are more likely to engage in the learning process. This increased engagement can lead to greater motivation and a greater sense of responsibility for their own learning outcomes (Martin et al., 2019; Colomer et al., 2020; Umar & Ko, 2022). A student reflected, "*There are no exams to force you to cram all the information last second and no attendance to force you to come to class. This is your job and your responsibility; you must try to learn and develop your skills.*" The tasks given in the course have a significant impact on the students, as they help them recognize their strengths and weaknesses, develop their skills and personality, and learn how to manage their time effectively. The tasks also provide opportunities for students to interact with their peers, learn from each other, and develop their communication and critical thinking skills. Inviting notable ex-students to speak to the class provides inspiration and motivation for the students. A student reflected on such an event, "*The influence of our peers is strong. When you see someone at same of your age succeed, it significantly motivates you to do the same or better. I felt like I have to take the lead myself; no one can change to be better unless I take the lead and change myself*."

As one student commented, "*The most important is successfully achieving the tasks on time. The ball is thrown to our side.*" This shows that the students are responsible for their own learning and success, which is a valuable lesson for their future professional careers. Another student reflected on the impact of the movie shared in the course saying "*When I watched Taare Zamen Par movie, I felt like the movie was purposely meant for me. Indeed, change begins from within.*" This demonstrates how the course not only provides academic learning but also helps students develop personally.

The peer review assignment is a unique task in the course, as it teaches students about the importance of professional responsibilities. One student noted that "*When the task of assessing each other writing comes, I thought that all of us will be granted the full mark. To be honest, everyone in our WhatsApp group kept saying the same. We must support each other. But I asked myself: why did the professor simply give everyone the full mark for this task and that's it?! Here is where I started thinking about the reason behind this task. It's not about grades or about writing. It's about teaching us how to be honest and responsible. This made me evaluate my peer's work honestly, I graded 7 out of 10.*" This highlights how the task teaches students to recognize the importance of their work and the impact it has on others. A student stated, " *That peer evaluation task gave me the power of an evaluator! I felt how much effort teachers put into evaluating each student's work and providing feedback.*"

Overall, the student-centered approach and the tasks given in the course have a positive impact on the students' learning experience and professional development. The students appreciate the trust and freedom given to them, as well as the opportunities provided to learn from each other and develop their skills and personality.

In what ways has the course contributed to building students' self-confidence?

The concept of self-confidence was emphasized from the beginning of the course. Students were encouraged to believe in themselves and trust that they can go for challenges. This has helped them to digest the concept of believing in themselves and raise their confidence in order to perform well in skills mastering. A motivational statement promoting self-confidence was displayed on the Blackboard course landing page. The statement encourages individuals to avoid comparing themselves to others and instead focus on self-improvement over time by comparing themselves to their past selves, see Figure 3. The act of comparing oneself to others can lead to a decrease in self-confidence while focusing on personal growth and improvement over time can increase it (Bruno and Njoku, 2014; Casale, 2020). A student reflected, "*I was captivated by the sign that advised against comparing oneself to others and instead, focusing on comparing one's current self to one's past self. It enabled me to rediscover my potential and have confidence in my ability to achieve more.*" Another student noted, "*When I see my recent videos or writing and compare them to my earlier ones, I am so proud of the progress I have made and the level I have achieved*."

The course learning material itself has helped students become more confident in themselves. As one student stated, "*The unique material of this course defines the student, making him more confident in himself.*" This is because the course has challenged students to get out of their comfort zones and be the ones who believe in themselves. For example, one student said, "*This course has taught me many things, such as how to get out of the comfort zone and be the one who believes in himself*." Students were challenged from the beginning to get out of their comfort zones. They were challenged to tweet themselves in videos, which many students found to be a weird and terrifying activity. However, this helped them to understand the concept of the comfort zone and why they have to fight to reach their learning zones every time they feel uncomfortable. As one student said, "*Getting out of my comfort zone is a thing that I always thought I was doing but apparently, I wasn't... they [professors] actually made me believe in myself even more than ever*."

Figure 3. A Motivational Statement Displayed on the Blackboard Course Landing Page

The course has also helped students to be confident with their public speaking skills. While they did not have any in-person public speaking assignments due to COVID-19, they had online assignments such as the make me buy task, which made them more comfortable with their online presence. As one student stated, "*This course made me better at socializing. This course made me better at speaking in front of people... [the professors] trained me to be more confident and not to be nervous.*"

Overall, the course has helped students to believe in themselves and grab every opportunity presented to them. One student advised future students: *"do not be afraid of facing new stuff... Do not waste opportunities because you find them outside your comfort zone*." I was so impressed with the advice given by that student! I decided to create a visually appealing card with complete advice and email it to future students at the beginning of each semester. I strongly believe that it can inspire newly incoming students to this course. You can find the full advice presented in Figure 4.

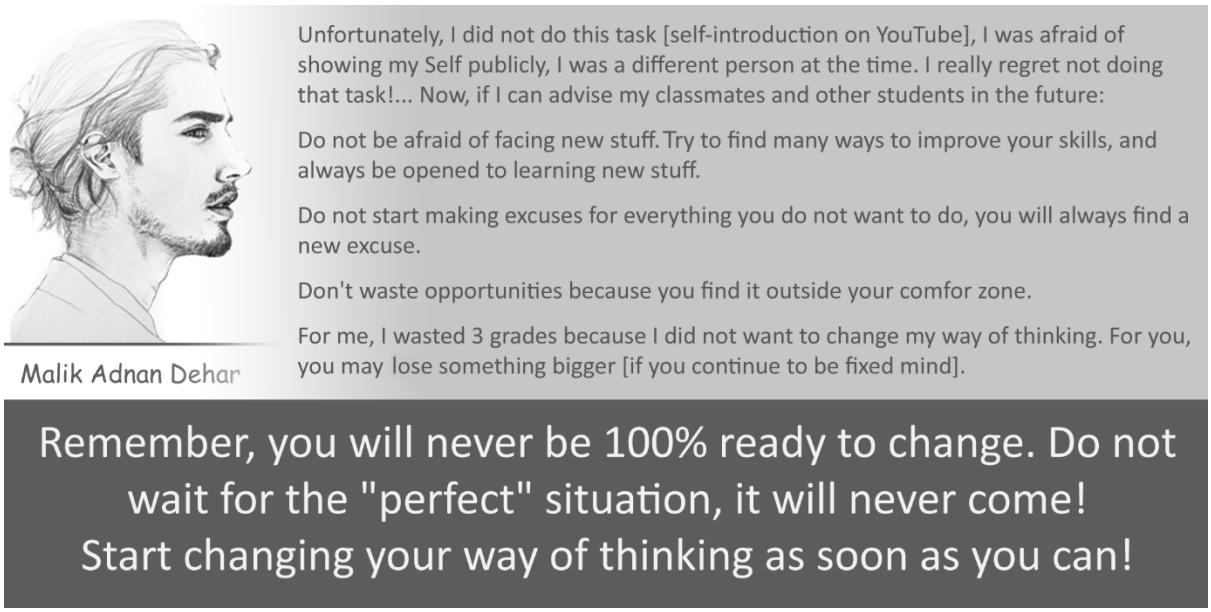

Figure 4. Advice Provided by a CPIT221 Student as Documented in his Final Report

Implications for Higher Education Instructors and Directors

Instructors in higher education institutes need to consider how their course designs and teaching methods can help students develop soft skills online, as they are important for academic and workplace success. There are several ways that instructors can design their courses to help their students develop such soft skills. Some approaches that can be effective include the following.

- Students must be able to apply their knowledge and skills in a practical setting. Providing opportunities for task-based learning, where students are required to complete tasks rather than being assessed through exams, is an effective way to develop such skills. Task-based learning can be more authentic, reflecting the types of tasks and challenges students may encounter in their future careers or personal lives. By providing students with opportunities for task-based learning, instructors can help develop a range of important skills relevant to various situations.
- Building tasks in a way that allows students to gain confidence. One way to do this is to start with easy tasks and gradually increase the difficulty as students progress. It is also helpful to link tasks to real-life scenarios, as this can help students see the relevance and importance of what they are learning. This can be especially effective for engaging students and helping them to retain what they have learned.
- Providing feedback on students' completed tasks can be an important way to help them improve their skills and become more confident in their abilities. There are a few key things to consider when providing feedback:
    a. Make it timely: Try to provide feedback as soon as possible after the task is completed, so students can use the feedback to make improvements.
    b. Be specific: Instead of giving general feedback like "good job," try to be specific about what the student did well and where they can improve.
    c. Focus on the process: Rather than just evaluating the final product, try to focus on the student's process to complete the task. This can help them understand what they did well and where they can improve in the future.
    d. Use positive language: Even if the student made mistakes or there are areas for improvement, try to use positive language to encourage them and help them feel motivated to continue learning.
- Creating a supportive and inclusive online learning environment helps students feel comfortable participating and sharing their ideas.

By incorporating these approaches into the course design, instructors can help students develop these important skills and be better prepared for success in their future careers. However, it's important to acknowledge that implementing these approaches can place a heavy workload on both students and instructors. Instructors may need to reduce the number of tasks or slightly move the course towards exam-based assessments to manage their workload. Similarly, students may struggle to balance the workload of multiple courses and may find it challenging to complete the tasks given to them.

To make such courses successful, the cooperation of directors of higher education institutes is crucial. Directors

can increase the credit hours for the course to satisfy the requirements of instructors' teaching loads. They can also limit the number of students in each section to a reasonable number, such as 15 maximums, to ensure that students receive appropriate attention from their instructors. Effective coordination between courses can also help to encourage students to give more weight to the given tasks. For example, the same submission can be accepted in two courses, such as a written assignment in a technical course and a technical communication course. It is also important for the directors to recognize that developing soft skills is a continuous process and cannot be achieved in a single course or semester. It requires ongoing support and reinforcement throughout the student's academic journey. Therefore, it is important to consider how to incorporate these approaches into their courses over the long term and how to work with other instructors to create a consistent approach across the institution.

Conclusion

In this paper, the focus was on investigating how computing students developed soft skills in a 100% task-based online course during the COVID-19 pandemic. The investigation showed that task-based learning is an effective approach in engaging students in online learning and that students were able to acquire and develop necessary soft skills. The results of the qualitative document analysis suggest that it is important for students to have practical opportunities to apply their knowledge and skills, which can be achieved through task-based learning. Moreover, using this approach can allow students to work on more complex and open-ended tasks, which can further develop their creativity and problem-solving skills.

It is important to note that while the current paper presents enlightening outcomes, it is limited in that it does not include raised concerns by students regarding the design and delivery of the course. These concerns mainly relate to the lower ranking tasks, such as peer assessment, and time management. To maintain the paper's scope and appropriate length, the raised concerns were not included. However, future work will report on these concerns to give interested parties a broader view.

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