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RESEARCH ARTICLE

Curricular feedback from technology-based workforce: Assessment of soft skills among CTU graduates

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ABSTRACT

In today's technology-driven industries, the demands placed on employees have become increasingly complex. Beyond mere technical proficiency, they are required to possess a diverse and dynamic skill set that empowers them to assess challenges, identify innovative solutions, and adapt strategies to overcome obstacles in diverse contexts. The purpose of this study was to analyze the experiences of Cebu Technological University (CTU) graduates employed in construction, design, and engineering industries in terms of their acquired soft skills. This exploratory-qualitative study purposively sampled 16 CTU graduates currently employed as engineers, architects, and drafters. Interviews were conducted to extract the narrative from CTU graduates about their experience while working in their fields. Narrative analysis indicated that leadership was the most essential soft skills that the CTU graduates should learn. CTU graduates are expected to cooperate with colleagues, create plans and designs, respond to client requests, and fulfill deadlines successfully. Leadership, innovative thinking, proactiveness, and communication enable them to take delegate duties and motivate team members to achieve common goals, consequently increasing their overall effectiveness and productivity at work. CTU graduates advocate for extensive industry collaboration to enhance internship programs and ensure alignment with academic coursework. Providing students with hands-on experience would expose them to theoretical learning, and opportunities for creativity and problem-solving, the curriculum can better prepare students for success in their chosen fields.

Keywords: creativity; curriculum design; innovativeness; leadership; proactive behavior; CTU graduates

1. Introduction

New prospects for integrating information technology and operational technologies are created by industries that are based on technology[1-3]. The transition of organizations to technology-based industries is long-term and may necessitate a major reorganization of human resources. Technological changes are adopted both within enterprises and throughout the supply chain.

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In the last twenty years, leadership has been recognized as a major factor in determining the success or failure of projects[4]. Researchers have explored the personal and interpersonal qualities of project managers that impact project performance to some degree[5-8]. According to Tabassi et al.[9], the leadership competence of project managers plays a crucial role in determining project success. In quantitative analysis conducted by Maqbool et al.[10] among Pakistani construction industries, the findings indicate that project managers who possess the necessary leadership skills are more likely to achieve higher rates of project success.

Having a strong sense of commitment to the organization fosters employee loyalty and is closely linked to improved job performance[11,12]. The level of commitment that employees have towards their organization is directly related to the quality of service they provide to consumers[12-14]. When employees are dedicated to improving the organization, they are more likely to generate customer satisfaction and good word-of-mouth recommendations by delivering excellent customer service[15].

From an organizational standpoint, possessing a proactive attitude is helpful and essential for enhancing creativity and generating innovative ideas that are profitable and useful[16,17]. Preceding research Cai et al.[18] asserts that each person possesses a unique and distinct personality, characterized by several personality traits. An individual with a proactive mentality exerts a significant impact on both innovative work behavior and organizational performance[19]. To anticipate and effectively handle a complicated environment, organizations aim to build and enhance proactive behavior, which subsequently enhances the affordability of their employees[16].

Incorporating engineering employability skills into the curriculum is essential for college students, especially because there has been a growing emphasis on the value of graduate attributes compared to the actual degree itself[20]. Furthermore, Institution of Engineering and Technology[21] revealed that companies have increasingly depended on higher education institutions to provide graduates with the necessary abilities for a job at the beginner level.

A 2023 survey conducted by American Association of Colleges and Universities (AAC&U) revealed that 80% of employers believe that higher education prepares graduates for success in the workforce, despite the time and financial investment students need[22]. The concept of "college and career readiness" aims to improve academic performance and provide students with opportunities for career prospects[23]. While academic measurements like transcripts and GPA are commonly used to evaluate students' knowledge, there are few metrics exist to assess essential attributes like employment preparedness and post-graduation issues[24,25].

Meanwhile in the Philippines, the Department of Labor and Employment (DOLE) identified job mismatch as a leading cause of employment loss among Filipinos[26]. According to a report, 21.60% of college graduates are currently unemployed[27]. Literatures noted that reasons might be the shift to online instruction causing challenges for laboratory activities, affecting students and their understanding of course topics[28], and disrupted internship prospects[29].

With its status as one of the largest state colleges and universities in the Central Visayas, CTU has developed a curriculum that caters to the demands of its students. CTU is currently employing several teaching and assessment strategies that aims to develop the life-long skills of students. These strategies involve blended learning[30], technology-based learning[31], and use of artificial intelligence technologies in learning[32]. Chavez and Lamorinas[33] suggested that institutions should consistently offer feedback to instructors and institutions, examining assessment practices during and after the pandemic, and to establish resilient policies and guidelines for assessments. Hence, this study aims to expand the knowledge about how CTU graduates perform in their respective fields to guide the following curriculum design initiatives.

Examining employment outcomes, leadership strategies, and the alignment between academic preparation and industry needs, this study seeks to inform narrative-based policies and guidelines that will further enhance the university's ability to prepare students for successful careers. Through ongoing evaluation and adaptation, CTU remains dedicated to empowering its graduates to thrive in a rapidly changing global economy.

2. Literature review

2.1. Essential soft skills for workers

Project failure can be attributed to the inability of project teams to reach a stable and established state within the given timeframe[34,35]. Therefore, it is crucial to place an emphasis on the efficient functioning of the project team in construction projects[36,37,34].

In today's technology-driven industrial environment, employees need a diverse set of skills to thrive. These include problem-solving abilities, technical expertise, analytical capacity, proficiency in IT systems, a commitment to lifelong learning, effective communication, teamwork skills, adaptability to change, proficiency in both technical and management areas, willingness to embrace automation, and openness to digitalization[38-40,1]. In a highly competitive global market, firms and organizations undoubtedly confront challenges to meet the demands of their industries [41,16]. With that, managers need to build firms that can quickly adapt to the challenges of highly competitive marketplaces[42-44].

Temporary project teams often consist of individuals with different levels of expertise and backgrounds[34]. Consequently, the project manager's capacity to inspire and engage team members has a direct impact on team performance[45-46]. Literatures highlighted that motivation and leadership were identified as the top skills for a project leader [47,48,34]. The project leaders and managers play a crucial role in shaping team motivation, particularly in the initial phases of the project[49,35].

According to Gehring[50], understanding the source of motivation and the demands of project team members is crucial for project managers to effectively lead their teams. In addition, empirical evidence has demonstrated that the ability of project managers to provide task direction to project team members has a major effect on overall project performance[41,49,51]. Previous studies have emphasized the importance of having leaders who excel at inspiring employees to exhibit positive behaviors that contribute to the stability and success of an organization, even when these behaviors are not explicitly outlined in their job descriptions [16,52].

2.2. Leadership, innovation and proactiveness at work

Leadership has been extensively studied by researchers worldwide, leading to a broad selection of qualitative and quantitative approaches[53,54]. Various scholars approach leadership from different perspectives, with some focusing on its behavioral and personality aspects, while others analyze it through the lens of social information processing[55]. For a long time, the significance of leadership in construction and project management was overlooked, as conventional researchers in this field of study primarily concentrated on the project technology[56-58,34].

From the earliest days of the 21st century, the essence of leadership has been established as a crucial skill for successful project leaders[48,59,34] and engineering management students[60,61], to particularly strengthen their technical abilities. It was discovered that the project leader's behaviors had a greater impact on predicting project performance compared to the characteristics of other team members[62,63].

Several studies have highlighted different factors that are necessary in understanding proactive work behavior among employees. For instance, research has indicated that employees' proactive work behavior

can be influenced by their personal motivation and eagerness to learn, which can ultimately enhance the reputation of the organization[64-66]. Workers who take an active approach are driven to accomplish their objectives[67]. Leaders who fail to foster proactive work behavior are more likely to experience reduced staff productivity and effectiveness[64,68].

Employees who possess a proactive personality are adept at handling situations that meet with the necessary requirements[69]. They anticipate potential scenarios and respond accordingly, demonstrating a proactive approach and a thorough understanding of the work setting or environment[16,70,71]. An individual with a proactive personality views the actual scenario as an opportunity that will lead them to perform well in a difficult circumstance[16].

A worker who is highly engaged in their work is very conscious of their responsibilities and acknowledges that going above and beyond the call of duty is necessary to complete a task[72,12]. Additionally, employees who appreciate the value of their work tend to exhibit higher levels of motivation, which can contribute to their ability to overcome challenges. When employees have their psychological needs fulfilled, they tend to feel a genuine motivation to invest greater time and effort into their job [73,12].

Studies investigated various factors that impact employee innovative work behavior, such as personality traits, servant leadership, and leader-member exchange. These studies have explored the influence of these factors within the behavioral context[16,74-77]. Exploring creative ideas and translating them into valuable solutions for the market or society is at the heart of innovation. Assessing the quality and effectiveness of creative ideas is an essential part of the innovation process[78,79].

In addition, it has been indicated by researchers that the driving forces behind innovative thinking are a proactive mindset and personality[80,81]. An employee with a proactive personality actively seeks out new ideas and approaches that improve results and drive innovation in their workplaces[82,83]. Previous studies have established that higher productivity is dependent upon the promotion of work engagement[16,84].

Work engagement is closely linked to the positive mindset and behaviors exhibited in the workplace, which in turn contribute to favorable outcomes in work[84]. An organization can create a conducive work environment by providing employees with job resources, social support, and training. Employees are impacted by leadership when they are provided with sufficient resources, which enables them to acquire new services and assets[85]. Work engagement is highly valued for organizational success, as it is seen as a valuable resource[86].

2.3. Education and student work readiness

Cotet et al.[87] realized that the skill profile that technology-based industries seek include creativity, perseverance, empathy, empowerment, intellectual curiosity, self-discipline, and strong interpersonal skills. Despite the crucial importance of these skills, they are often overlooked in the education system and curriculum development[88]. For instance, many educational processes restrict creativity, especially test-based assessment, or critical professors, where students make the decision to move out of socially appropriate tasks and not engage in creative activities[79].

Scholars in higher education emphasize the need of equipping students with the skills and motivation to succeed in a fast changing and uncertain employment environment[89-91]. The goal of higher education institutions should be empowering students and improve their self-perceived ability to successfully transition from the academic to the working world following their graduation. This happens when the university was able to build the competence of students to be work ready.

Professors suggested incorporating strategies such as group discussion, brainstorming, cooperative learning, and debate into teaching practice to improve students' critical thinking skills [92,93,79]. There is a continuous evolution of strategies in encouraging creativity and innovation as well as evaluating their effectiveness[94,95]. For instance, the utilization of video games is bringing about significant progress as instructional process that could potentially improve student's creativity and problem-solving skills. The process of developing ideas is an essential component in the process of motivating individuals to come up with innovative solutions and breakthroughs that are applicable in the real world[96].

CTU places a strong emphasis on providing experiential learning opportunities that help strengthen relationships between education and industry[97]. By participating in internships, co-operative education programs, and industry partnerships, students acquire practical experience, become familiar with workplace dynamics, and establish professional connections. For instance, Duhaylungsod[98] discovered that the BSIT graduates of CTU manifested expert level competency in Professional, Common, and Elective Courses as rated by the Academic sector.

CTU is committed to preparing students for success in the workforce by providing a comprehensive education that involves academic rigor with practical experience, professional development support, and a culture of innovation.

3. Objectives

In line with the effort of improving the CTU offered programs, this study assessed the soft skills of selected CTU graduates to develop critical curricular feedback for different CTU programs. This study explored the experiences of hired CTU graduates in terms of different soft skills *e.g.,* their leadership, innovation, and proactivity at work. Below were the specific objectives of the study.

1. Determine the soft skills acquired and applied by technology-based graduates of CTU graduates in their work.
2. Determine strategies to improve curricular offerings from the feedback of the technology-based CTU graduates in their work.

4. Methods

4.1. Research design

This exploratory study [99-101] was conducted to assess the soft skills of CTU graduates hired in technology-based workplaces. Exploring the experiences, narratives, and work life of CTU graduates enabled the researchers to establish curriculum feedback that widely contributes to the quality of education produced in the university.

In conducting this study, the researchers employed the process described by Brink[102]. This type of design is valuable in studies where the researchers has limited prior knowledge about the topic or when the subject is not clearly defined. Brink[102] noted that an exploratory researcher should look for "new knowledge, new insights, new understanding, and new meaning…" (p. 312). Using this principle of exploration, the insights gathered from small-scale interviews helped in shaping specific guidelines for curriculum development essential for the university.

4.2. Participants and sampling technique

The researchers employed purposive sampling[103] in selecting the participants to be interviewed. Purposive sampling, also known as purposeful or judgmental sampling, is a non-probability sampling

technique used in research to select participants based on specific criteria relevant to the research question or objectives[104,105].

The researchers made an online survey for CTU graduates. The survey asked open-ended questions about their experience, work nature, and years in service (*see* **Table 1.**). The researchers used the answers from these pre-interview questions to determine potential participants. In selecting the participants, the researchers analyzed the responses of participants considering how they respond to the questions, how concise and clear, their conviction, examples. These aspects were valuable for the researchers because providing a complete and insightful experience is essential for in-depth narrative analysis.

Table 1. Pre-interview questions for participant selection.

	Pre-interview Questions
Academic Characteristic	a. What year did you graduate in CTU? b. Did you receive any academic award while in CTU? If yes, what kind?
Work Nature	c. What is your role in your current job? d. Are you a public or private worker? e. How long are you working for that job? f. Do you feel competent when using technology?
Work Experience	a. Have you been a leader at your work? b. What is your favorite experience at work? c. Have you received any award? d. How important innovation in your workplace? e. Have you experienced a challenging task that you were able to do?

Additionally, the researchers considered other aspects *e.g.,* the length of service, awards received, noting these essential variables when selecting the participants. For instance, the researchers selected participants with varying length of service qualities to have comparison on their experience.

After identifying the potential participants, the researchers contacted them for follow-up interviews.

Instrument

The researchers developed open-ended questions for online interview. Open-ended questions allow participants to make thorough and elaborate responses, which helps researchers acquire a deeper understanding of their experiences, thoughts, and perspectives. Findings from open-ended questions can guide researchers in formulating more focused and specific research questions for subsequent phases of the study. **Table 2.** presents the interview questions used in one-on-one online interview with the participants.

Table 2. Open-ended questions during interview.

Objectives	**Interview Questions**
Determine the soft skills acquired and applied by technology-based graduates of CTU graduates in their work.	a. Being a graduate of your course in CTU, did you learn how to be a leader in your work? Provide situations. b. Being a graduate of your course in CTU, did you learn how to be an innovator in your work? Provide situations. c. Being a graduate of your course in CTU, did you learn how to be a proactive in your work? Provide situations. d. Are there any other soft skills you learned from CTU which you are now applying in your job? Elaborate
Determine strategies to improve curricular offerings from the feedback of the technology-based CTU graduates in their work.	a. What specific strategies do you suggest to the curricular offering of CTU to improve the leadership skills of the graduates? b. What specific strategies do you suggest to the curricular offering of CTU to improve the innovative skills of the graduates? c. What specific strategies do you suggest to the curricular offering of CTU to improve the proactive skills of the graduates? d. What specific strategies do you suggest to the curricular offering of CTU to improve the other emerging soft skills of the graduates?

4.3. Data gathering procedure

The researchers followed a systematic process in conducting the study. Conducting an online interview involves several steps, beginning with seeking permission from the school where the participants are enrolled. Below is a step-by-step process on gathering the data.

Step 1: Identify the Participants:

In selecting the participants, the researchers made a pre-interview survey that seek initial information from CTU graduates. Their responses to this survey served as a basis in selecting the participants to be interviewed. Out of 213 CTU graduates, only 16 had been selected to be interviewed considering certain qualities *e.g.,* variation in length of service, their work nature, and experience.

Step 2: Seeking Permission

After selecting the participants, the researchers contacted them through available channels. A letter of participation was sent to their email address seeking permission for online interview. In the document, it states the purpose, terms, confidentiality, and data use. The participants may attach their digital signature. The participants may choose which day they are available for interview.

Step 3: Online Interview

The researchers interviewed the participants using video conferencing channel available to them like Google Meet and Messenger. Before interview, the researchers discussed the privacy concerns and clearly communicate how participant data will be handled, stored, and anonymized, if necessary. The researchers emphasized the benefits of the online interviews, such as providing valuable insights, contributing to research, or enhancing the educational experience for the students involved. The participants were aware that their responses are recorded. The researchers asked questions presented in **Table 2.** with additional situational questions applicable based on the responses of the participants.

Step 4: Post-interview

After interview, the researchers assigned labels or codes to specific segments of the interviews. They also consider what insights and information were gained, and whether there were any unexpected findings, and note any patterns, trends, or common themes that emerged during the interviews. This step is essential for organizing and analyzing qualitative data effectively.

4.4. Data analysis

The primary data in this study was the coded responses from the participants. This exploratory study employed thematic analysis in analyzing the responses from interview. Thematic analysis is a qualitative research method used to identify, analyze, and report patterns or themes within a dataset. It emphasizes the importance of capturing the participants' perspectives and the rich complexity of qualitative data. Presented in **Figure 1** is the phases involved in thematic analysis.

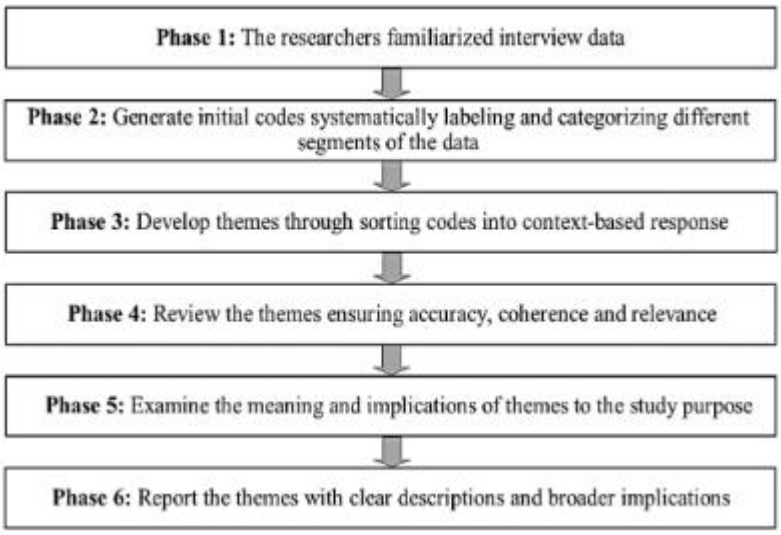

Figure 1. Flowchart of thematic analysis.

5. Results

5.1. Soft Skills in technology-based workplace

There were different essential soft skills that the CTU graduates noted. These soft skills enabled them to be productive and competent workers in 21st century workplaces. Technology-based workplaces require them to have effective leadership skills, be innovative and proactive, creative, and good at communication.

Theme 1: Leadership

Two (2) participants reflected on their experience about being a leader. For them, leadership is an essential skill for CTU graduates because it strengthens their competencies in responding to the needs of stakeholder, clients, members, and the public.

Jim was a graduate of drafting technology and was a student leader during his college days. Being in the design and construction industry opens him to a workplace that requires systematic leadership skill. In construction industry, workers should be able to communicate effectively to their clients, delegate for people, manage different demanding tasks, meet deadlines, etc. This industry expects him to be able to assist the clients and respond to their needs. With his leadership skills, he then now could initiate complex tasks that require effectiveness in communication, delegation, and management.

> "I became a team leader sometimes [at work]. I'm a student leader back when I was taking up my BS Architectural Drafting course. Also, during my on-the-job training, I was the draftsman and I sometimes lead our team and assist the clients and the people at the site especially in the construction field."
>
> **—Participant 3**

Similarly, Mina, a 36-year-old engineer, believes that leadership skills are essential in developing group projects at work. These skills enable a worker to be capable of delegating tasks to ensure collective actions and collaboration in workplace.

> "Certainly, during my time at CTU, I acquired valuable leadership skills that have proven instrumental in my professional endeavors. For instance, in group

> projects, I learned to effectively delegate tasks, ensuring each team member's strengths were utilized."
>
> **—Participant 7**

Theme 2: Innovative Thinking

Innovative thinking is a valuable soft skill needed in technology-based workplaces. Three (3) participants think that innovation could solve complex problems in workplace while ensuring collaboration and systematic workplaces.

Anthony, an automotive technology worker, believes that students should be innovative in making solutions to problems they encounter. Integration of theoretical concepts from school with the hands-on learning gained through professional endeavors is a steppingstone to complex work-related tasks involving their clients and the industry. For him, innovation helps a worker be competent and responsive to the needs of their industry. This implies a dynamic and adaptive learning process, indicating an ability to apply knowledge in real-world scenarios.

> "If you don't know something or if you need to know something like when your course does not align to your field of work, you do innovation especially like when you Photoshop. You do innovation with your skills to impress your client and makes you competent in your field of work."
>
> **—Participant 10**

Additionally, Jeric learned essential skills in CTU that enabled him to be innovative in his current workplace. Being a computer engineer, he realized that students should know how to adapt to the changes in workplaces by using the knowledge they acquired academically. For him, this is innovation because it forces someone to be effective at problem-solving considering their limited knowledge at work.

> "Somehow, we have knowledge we acquired that the school taught us that helped us be innovative in our workplace. In reality, it's 50–50 situation where we learn from school and expand it in our workplaces."
>
> **—Participant 5**

It also seems that communication in workplaces transcend innovative thinking. Jessica, an architect, thinks that collaboration fosters innovative thinking in workplaces because it develops novel approach to real-world problems and make solution to complex business processes. Effective workplace engagement among workers and members ensures sustainability in business processes and efficiency in management while solving industry problems.

> "Yes, during my time at CTU, the curriculum emphasized cultivating innovative thinking and problem-solving skills. One (1) notable situation was a group project where we had to devise a solution for streamlining a complex business process. Through collaborative brainstorming and applying learned methodologies, our team developed a novel approach that significantly improved efficiency, showcasing the practical application of innovation in a real-world context."
>
> **—Participant 1**

Theme 3: Proactiveness

CTU graduates emphasized the role of proactiveness in satisfying clients and fostering positive relationships with those in their professional sphere. Three (3) participants noted that being proactive could inspire others with the initiative required to excel in their responsibilities.

Ignacio, an electronics expert in service for 20 years, positioned proactivity as a fundamental attribute essential for success, not only for personal fulfillment and client satisfaction but also as a source of inspiration for others. Being an engineer, having initiative at work reflect someone's proactivity and willingness to respond to the needs of industry. Clients in their field value not just reactive problem-solving but also a proactive approach that anticipates and addresses their needs before they arise. Technology-based workplaces value not just technical proficiency but also a proactive mindset as a cornerstone of success.

> "Yes, in our field, you really need to be proactive for you to satisfy your client and the people around you. Also, it is a way for you to inspire others that you have the initiative to do your thing and do your work."
>
> **—Participant 6**

Erika added more about how proactiveness is essential in workplaces. Being an engineer, taking the initiative during a group project with tight deadlines, workers effectively organized team efforts, distributed tasks strategically, and established milestones for timely completion. Essentially, professional landscape considers proactivity as not just a professional skill but a cultural norm, shaping the dynamics of interactions, decision-making, and overall success in the field of work.

> "Absolutely yes, during my time at CTU, the curriculum emphasized cultivating a proactive approach in various professional scenarios. One (1) notable instance was a group project where we had tight deadlines. Instead of waiting for instructions, I took the initiative to organize team meetings, distribute tasks based on individual strengths, and set milestones to ensure timely completion. This proactive stance not only facilitated a smoother workflow but also showcased leadership qualities within the academic context."
>
> —**Participant 12**

Theme 4: Creativity

Creativity in workplaces emerged as an essential skill that every CTU graduates should learn. Vincent, a drafting worker, believes that creative mindset is versatile, involves adaptability and resourcefulness, encouraging individuals to think on their feet and explore unconventional solutions when faced with challenges. Workplace problems can spark creative solutions, turning challenges into a source of strength. This reflects the concept that creativity flourishes resourcefulness and can serve as catalyst for innovative thinking.

> "Creativity. Our creativity is not just limited to work, like being creative in making plans. We should know how to find alternatives, for example, when there's no pencil, what could be an alternative? That's the most important thing I've learned that you shouldn't just stick to what you have because sometimes, that becomes your strength. You don't rely on your comfort zone. You really need to think outside of the box so that at the end of the day, you will grow as a person and as a human being."
>
> **—Participant 2**

Theme 5: Communication

As an architect for 15 years in service, Rico believes that CTU goes beyond the theoretical understanding of curriculum which helped him enhance his ability to convey ideas clearly and concisely. He noted that the CTU equips individuals with effective communication skills and prepares them for collaboration and adaptability in diverse work environments.

> "The training at CTU emphasized effective communication, enhancing my ability to convey ideas clearly and concisely. This has proven valuable in my current role, enabling me to collaborate seamlessly with colleagues and articulate complex concepts to different audiences."
>
> **—Participant 4**

5.2. Analysis for curriculum feedback

Reflecting onto the curriculum, CTU graduates viewed some strategies that could enhance the soft skills of students. Through the integration of internships and collaborative projects, mentorship programs, and internships, the curriculum ensure that students gain practical experience and apply theoretical concepts in real-world situations. This practical experience enhances the cultivation of creative thinking, as students acquire a more profound understanding of industry standards and challenges.

Theme 1: Mentorship Programs

Implementing mentorship programs could develop the soft skills of CTU students. Participants noted that teaching and training students to be an effective leader and member of an organization helps them to be competent in their workplace. Five (5) CTU graduates valued mentorship opportunities for students because these enable them to be responsive to the industry needs.

Ali, a former member of department officers, is currently working as an engineer. For him, direct interaction with experienced professionals can provide valuable insights, guidance, and leadership lessons, ultimately enhancing the leadership skills of the graduates. Establishing a mentorship program would provide a dynamic connection between the academic components of the curriculum and the real-world problems experienced in professional settings.

> "To enhance leadership skills among CTU graduates, the curriculum could incorporate different strategies. They should establish a mentorship initiative connecting students with experienced leaders in their respective fields. This fosters a direct exchange of insights, guidance, and valuable leadership lessons."
>
> **—Participant 14**

David is a technology expert working in a local firm. He emphasized that establishing leadership qualities during with academics is essential to prepare students for workplace responsibilities they would undoubtedly experience in the future. To do this, the CTU should offer seminars to its students as early as first year in college.

> "Students should be more than just academically engaged; they need to develop leadership skills. It's crucial for them to learn leadership because, in the end, we'll be the ones in the field, given the responsibility to lead. What if we're not trained to be leaders? How can we address issues in a community or organization? Enhancing students' leadership skills through seminars emphasizing the importance of leadership is essential to ensure a smooth workflow in any organization."
>
> **—Participant 16**

Some participants gave several suggestions to improve the curriculum. Considering seminars, one (1) participant suggested courses centered on teaching ethical leadership to students. Jona [Participant 8], an architect, believes that these courses could teach the value of integrity, accountability, and responsible decision-making to students. Similarly, Miguel [Participant 9], also an architect, suggested workshops that focused on effective writing and verbal communication. While Steve [Participant 15], an engineer for 21 years, suggested to incorporate self-reflection and self-awareness activities to prepare them mentally aside from developing their fundamental skills.

> "The institution must introduce courses centered on ethical leadership that teach the importance of integrity, accountability, and responsible decision-making in leadership roles."
>
> **—Participant 8**

> "Implement workshops focused on effective written and verbal communication. These can include business writing, presentation skills, and interpersonal communication exercises to prepare graduates for diverse workplace interactions."
>
> —**Participant 9**

> "Incorporate activities that encourage self-reflection and self-awareness. These can include journaling, personality assessments, and goal-setting exercises to help students understand their strengths and areas for improvement."
>
> —**Participant 15**

Theme 2: Internship Opportunities

Some CTU graduates see internship opportunities for students as an influential and effective approach to teach them essential soft skills. Aubrey, a field engineer, emphasized the importance of facilitating internships by promoting practical experience in a real-world setting. This approach not only enriches the educational experience but also prepares students for the dynamic demands of leadership roles they may encounter in their future careers.

> "The institution must facilitate internships with organizations that emphasize leadership development. Practical experience in a real-world setting enhances students' ability to apply leadership principles."
>
> **—Participant 11**

Similarly, Christopher, a garments technology expert, believes that CTU could consider internship opportunities for students, giving them assigned tasks in their fields, prioritizing their expertise and enhancing their skills in that specific area. By being trained in tasks directly related to their field of study, students are better equipped to excel in their chosen professions, fostering a sense of relevance and competence.

> "Students should be given assigned tasks in their respective fields, prioritizing their actual field of expertise, and enhancing their skills in that area. Their work should align with their specific courses, ensuring that they are trained and can focus on honing their skills."
>
> **—Participant 13**

Theme 3: Practical Projects

Some participants believes that to enhance the innovative skills of CTU graduates, there is a need to integrate practical projects into the curriculum. Through the incorporation of project-based courses, the institution strives to cultivate graduates who possess both a skill for creative problem-solving and the ability to lead effectively in collaborative settings.

For instance, Jeric suggested giving students practical projects. For him, practical projects could help students apply theoretical knowledge in real-world scenarios, fostering problem-solving skills and encouraging creativity. Innovation is an operational skill that is most effectively nurtured through experience learning, preparing graduates to deal with complex problems in their future workplaces.

> "To enhance the innovative skills of CTU graduates, I propose to integrate practical projects which means to emphasize hands-on projects within the curriculum, allowing students to apply theoretical knowledge in real-world scenarios. This approach fosters problem-solving skills and encourages creativity.
>
> **—Participant 5**

Additionally, Anthony believes projects-based learning can be a strategic method to engage students actively in the learning process, fostering proactive problem-solving skills and competence.

> "I think project-based learning is important to students. In our workplace, we are tasked to make prototypes of our design, make simulations of our work, and others. I think, enhancing student's knowledge on how to use different tools and resources makes them competent at work."
>
> —**Participant 10**

For Jim, by including project-based learning, CTU could generate graduates who are not just creative thinkers, but also competent leaders capable of handling difficult tasks in a team-oriented environment.

> "The CTU may integrate project-based courses where students collaborate on projects. This approach promotes teamwork, communication, and effective project management – crucial aspects of leadership."
>
> **—Participant 3**

Theme 4: Industry Collaboration

CTU graduates also expect the university to tap those different technology-based industry. They propose the establishment of partnerships with industry leaders to create internship programs and collaborative projects as a crucial component of the curriculum. They suggested about improving the training and education of students by collaborating to different firms and companies. Through these connections, students can get a comprehensive understanding of their chosen field, blending the wisdom of experienced leaders into their academic background.

> "Networking opportunities enable students to build connections, learn from seasoned leaders, and gain insights into different career paths. This will provide a well-rounded approach, combining theoretical knowledge with practical experiences to nurture effective leadership skills among CTU graduates."
>
> **—Participant 6**

> "The curriculum should establish partnerships with industry leaders to create internship programs and collaborative projects. This provides students with exposure to current industry practices, fostering a culture of innovation."
>
> **—Participant 14**

> "Encourage collaboration between different departments or fields of study. This interdisciplinary approach stimulates creativity by exposing students to a variety of perspectives and problem-solving techniques."
>
> **—Participant 7**

> "Forge partnerships with industry leaders to provide students with practical exposure through internships. This enables them to develop proactive skills by working on actual projects and understanding industry demands."
>
> **—Participant 11**

6. Discussion

6.1. Essential soft skills in workplace

Soft skills in design and construction industries are imperative because they strengthen technical expertise of a worker, foster collaboration, inspire innovation, and improve overall effectiveness in managing the complex challenges in modern professional environments.

CTU graduates manifest competence in leadership, innovation, and proactiveness in their current workplaces. They noted that these skills enabled them to collaborate with their colleagues, develop plans and designs, respond to the needs of clients, and meet their deadlines.

Previous studies on leadership noted that leaders understand the importance of empowering their employees to maximize productivity while also prioritizing their needs and aligning with their goals[106-107]. Moreover, the literature highlights the importance of leadership in achieving organizational objectives and enhancing competitiveness by effectively coordinating resources and personnel[108-109]. Leaders carefully analyze and utilize organizational resources, while developing and carrying out effective strategies to secure a more promising future for their organizations [110]. This ultimately leads to enhanced performance and outcomes[111,110]. CTU graduates demonstrated their leadership skills through *"[leading the] team and [assisting] the clients and the people at the site" [Jim, Participant 3]* and *"delegate tasks, ensuring each team member's strengths were utilized" [Mina, Participant 7]*. CTU graduates generally reflect transformational leadership in workplaces as they guide their members and stakeholders when managing tasks.

Understanding innovation practices is essential for developing and implementing creative goods, services, and administrative processes in an organization[112,113]. The thoughts of creative workers can be effectively shared with other employees in the organization to enhance their skills and apply them in their work. This can contribute to the growth of organizational creativity and improve the general performance of workers[114,115]. These individuals not only generate creative ideas, but also strategize on how to implement them[116,113]. CTU graduates see innovative thinking as a valuable skill that every student should learn. Working for years, they learned to adapt to their workplace challenges by innovating coping strategies. Innovation like *"brainstorming and applying learned methodologies" [Jessica, Participant 1]* helps them to be competent when faced with challenging tasks. This emphasizes the practical use of innovative thinking in

solving real-world problems, as well as its importance in improving individual and organizational performance.

CTU graduates also developed their creativity when dealing with challenges and coping with workplace limitations. One participant explained that workers *"really need to think outside the box… [to] grow as a person and as a human being" [Vincent, Participant 2]*. In a scientific context, the term 'creativity' entails the generation of novel ideas and the ability to perceive new connections, while 'innovation' involves the transformation of these ideas into improved methods, practices, or products[117-119]. It was also described in this study that creativity and innovation are related. Hence, the ability to think creatively allows workers to develop creative solutions to challenges and adapt to changing conditions, promoting progress and advancement within organizations. The experiences of CTU graduates emphasize the usefulness of creativity in overcoming obstacles and adjusting to workplace limits, emphasizing its importance as an essential competency for a competitive professional setting.

In today's dynamic work environments, characterized by constant flux, minimal supervision, intense competition, and significant unpredictability[120-123], a proactive attitude appears to be necessary[124]. Due to the unpredictability and ongoing change that characterizes the business environment, individuals are required to demonstrate proactive behavior while on the job[125,126]. Furthermore, firms reap the benefits of proactive employees who promptly implement improvements[127]. Similarly, for CTU graduates, a proactive worker is someone with *"initiative to organize team meetings" [Erika, Participant 12]* because *"it is a way for [them] to inspire others" [Ignacio, Participant 6]*. Graduates who take initiative and solve challenges as they emerge position themselves as valuable workforce resources to their employers, capable of driving innovation and delivering outcomes in dynamic and competitive contexts. This highlights the necessity of instilling a proactive mindset in students, preparing them to thrive as proactive and adaptable professionals in their future employment.

Notably, there were emerging soft skills that CTU graduates demonstrated. For instance, communication enables them *"to collaborate seamlessly with colleagues and articulate complex concepts to different audiences" [Rico, Participant 15]*. Similarly, research has shown that communication is an essential component in increasing employee engagement in the workplace[128-130]. It is a social link that demonstrates how effectively management can establish relationships with internal stakeholders at all levels of the organization through communication[131,132]. CTU graduates that have exceptional communication skills not only effectively transmit information with clarity, but also actively engage in attentive listening, seek out feedback, and flexibly adjust their communication approach to adapt to the specific requirements for various audiences.

The proficiency of CTU graduates in soft skills *e.g.,* leadership, innovation, creativity, proactiveness, and communication is fundamental for workplace performance and competence. The soft skills of CTU graduates demonstrate their readiness to meet the demands of the design, construction, and engineering sectors, where teamwork, innovation, proactive problem-solving, and good communication are critical to success. Graduates who cultivate these skills position themselves as significant assets to their employers, capable of fostering organizational growth, instilling innovation, and achieving the objectives in dynamic and competitive professional situations.

6.2. Curriculum feedback and assessment

CTU graduates recognized the need to devise a curriculum that accelerates the learning of students and develop their soft skills. This curriculum empowers them to be ready for their future workplaces. They

emphasize the importance of a holistic approach that incorporates mentorship programs, internship opportunities, practical projects, and industry collaboration to provide an enriching educational experience.

Studies indicated that mentorship is frequently seen as an essential component in the process of gaining professional success[133]. Mentors offer learners various forms of help, including career and psychosocial assistance[134,135]. In this study, CTU graduates suggested that the university should help in *"connecting students with experienced leaders in their respective fields" [Ali, Participant 14]* and expand the *"students' leadership skills through seminars" [David, Participant 16]*. This provided a way to boost workforce performance and engagement, foster opportunities for growth, and promote collaboration across different disciplines[133,134,136]. CTU graduates believe that mentorship improves students' ability to meet industry demands and effectively prepare for their professional responsibilities. Integrating mentorship into the curriculum helps to connect academic learning with real-world challenges, promoting the growth of leadership skills and the ability to make ethical decisions.

Internship is embedded in the curriculum as part of student's final requirement for a program they take. The CTU graduates call for extensive industry collaboration to extend the learning of students while having their internship. For instance, the curriculum must *"'...establish partnerships with industry leaders to create internship programs and collaborative projects" [Ali, Participant 14]*. These internship programs should *"[stimulate] creativity by exposing students to a variety of perspectives and problem-solving techniques" [Mina, Participant 7]*. CTU graduates feel that the university could done more on *"[aligning student's] specific courses, ensuring that they are trained and can focus on honing their skills" [Christopher, Participant 13]*.

The narratives of CTU graduates were consistent with previous studies. The internship initiatives can offer a well-organized and valuable professional experience for students with expertise in the field[137,138]. The internship provides valuable experience as the field supervisor guides and supports the interns, offering coaching and advice to help them understand the work culture and adapt to their new environment[139]. By enhancing internship programs through industry collaboration and alignment with academic coursework, CTU can better prepare students for success in their chosen fields and equip them with the skills and experiences needed to thrive in the workforce.

CTU graduates also suggested the implementation of project-based assessment highlighting different strategies like *"hands-on projects" [Jeric, Participant 5]*, *"prototypes of design, make simulations" [Anthony, Participant 10]*. Project-based learning *"promotes teamwork, communication, and effective project management" [Jim, Participant 3]*. Similarly, numerous studies have demonstrated that when students actively participate in educational events, it increases their comprehension, strengthens their capacity to handle learning information, and aids in knowledge retention[140-144]. Given that students are required to engage in cooperative problem-solving with their peers, most projects inherently incorporate opportunity for collaborative problem-solving activities[145]. In project-based learning and assessment, the CTU could involve structuring projects requiring collaboration among students, encouraging them to exchange ideas, delegate tasks, and work towards common goals. Teachers should guide the students how to plan, organize, and execute projects efficiently focusing on how to develop their essential skills for future professional endeavors.

CTU graduates recognize the importance of a holistic approach that goes beyond traditional classroom learning. They emphasize the importance of mentorship programs, internship opportunities, hands-on projects, and industry engagement in providing a well-rounded education. Curriculum developers should

consider including these components into the curriculum to provide students with a comprehensive education that prepares them for their future workplace.

7. Limitations

Data for the study were gathered from a sample of CTU graduates. The viewpoints and experiences of these graduates could not accurately reflect the larger population of CTU students or graduates from other universities, which could lead to sample bias.

The findings of the research might not be generalizable outside of CTU or other educational institutions. The distinct curriculum, instructional strategies, and population composition of CTU can have an impact on graduates' experiences and viewpoints in ways that may not be applicable to other colleges or learning environments.

A cross-sectional design was used in the study to collect data at a certain moment in time. This design does not offer information on changes or trends over time. A more detailed depiction of how graduates' experiences and perceptions change over time may be provided by longitudinal studies.

8. Conclusion

Narratives from CTU graduates revealed that soft skills like communication, initiative, leadership, and innovation are critical for success in the engineering, building, and design industries. Graduates from CTU have proven to be proficient in these skills, which are necessary for handling the complexity of modern work contexts. Their capacity for teamwork, creativity, and problem-solving demonstrates how crucial it is to foster these abilities in educational programs to get graduates prepared to meet the demands of the workforce.

CTU graduates emphasize the necessity for a curriculum that promotes learning and helps students acquire soft skills. Mentorship programs, internships, practical projects, and industry collaboration can be incorporated into the curriculum to give students a comprehensive education that closes the gap between academic knowledge and real-world problems. These programs not only help students become more prepared for the workforce of the future, but they also provide growth, teamwork, and leadership development possibilities.

To prepare students for success in the workforce, soft skill development and a comprehensive approach to curriculum design were required. Mentorship programs, internships, real projects, and industry partnerships can all be incorporated into the curriculum at CTU to give students an educational experience that develops their leadership, creativity, inventiveness, initiative, and communication abilities.

Conflict of interest

The authors declare no conflict of interest.

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