

Soft skills acquisition for engineering undergraduates in Turkey: A soft skills course design

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Abstract

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In the ever-changing employment world, HR departments in all sectors are highly meticulous while hiring persons for all sorts of organizational positions. What they expect the applicants to possess is not only the technical skills they need to do their jobs but also the soft skills they will be using in the job environment, such as critical decision-making, team-leading, communication, and more, to be productive, efficient, and effective. Since engineering is a highly interdisciplinary field, graduates have the opportunity to work in many different professional contexts, and they must acquire soft skills for all sorts of professional settings. This study explores soft skills for professional life and determines the content of the soft-skills course that should be included in the curriculum of engineering faculties at Turkish universities that are in the top 10 ranking of University Ranking by Academic Performance (URAP) and offers a course design for a soft-skills course originating from academic discussions and the needs of the job market.

1. Introduction

Organisations try to be increasingly meticulous in their selection, recruiting, and hiring processes with the ever-evolving business ecosystems of today, but still, it is getting more laborious to determine which applicants to hire for a particular position. Would it be wise to hire bright new university graduates with precious technical skills and impressive potential to contribute to the company, even though they may look like they are just another one of those new university graduates in need of some of those subtle, but pivotal soft skills? In an organisation, for example, the communication process connects leaders, subordinates, co-workers, and members of the general public (Ghosh, 2012). Employees no longer work alone in front of a machine or on an assembly line, with little or no interaction with their co-workers or supervisors (Riggio & Tan, 2014). In today's workplaces, workers of all kinds are expected to be able to communicate successfully with others. Many service professionals, team workers, and the global community all require elevated levels of interpersonal skills because so much of their work is done remotely (Riggio & Tan, 2014). However, there seems to be a growing concern among more senior professionals about the appropriateness of new graduates for the already-established business practises of the present day.

Some senior professionals maintain that new graduates tend to voice incongruent things in the wrong settings, and they do not bother asking questions to learn, which is expected behaviour from novice employees. They even fail to comply with working hours. At work, they may seem to be spending a considerable amount of time on their gadgets instead of doing the things outlined by their job description. They allow their careers to "simply happen" or expect their employers to orchestrate them, and as a result, they are ultimately disappointed (Klaus, 2008). In areas that require one-on-one contact with already existing or potential customers, customer service scores may seriously suffer among new employees, resulting in misunderstandings and even confrontations with customers.

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In current business settings, responsiveness to customers is considered a soft skill that employees are expected to possess for the continuous success of customer relationships (Sain & Wilde, 2014). While hardworking and dedicated employees are more likely to perform well and generate a high profit for the organisation, lazy and uncommitted employees are more likely to exhibit poor performance, resulting in a low or no profit for the organisation (Ghosh, 2012).

For many senior managers having a workforce of increasingly young talents today, it would be quite common to have hands-on experience with this mounting management issue in recent years: there is a continuously looming gap in today's professionals, particularly among the new participants, in terms of the skills that are not acquired through formal school curriculum, which has been termed "soft skills". The growth of the soft skills movement can be viewed in the context of modernization in the sense that education should remain sensitive to the needs of a changing society, including changing labor market demands and cultural trends (Scheerens et al., 2020). Unlike "hard skills" that show an individual's technical competence, such as a diploma or certificate, making them capable of performing a specific task in a particular area or domain, "soft skills" are those that are intangible, referring to numerous non-technical skills focusing on individual and relational spheres such as "interpersonal communication", "self-awareness", "critical thinking", "time management", "stress management", "decision making", "teamwork", etc. (Dell'Aquila et al., 2017).

A diploma is proof of a university degree, which is a hard skill, giving an individual the right to work in a related field. Similarly, a certificate officially gives an individual the right to perform as "a certified professional" in that profession. The process of teaching and learning can be used to transfer hard skills from one person or organisation to another. As a result, doctors create doctors, and engineers create engineers (Ghosh, 2012). However, soft skills are less tangible and more difficult to identify and document but are essentially important for the career of an employee to thrive or get worse, thus resulting in a sustainable or deteriorating career. A discrepancy appears as to what and how important those so-called soft skills are in today's business life. In their 2018 study, Ansar et al. show that undergraduate students of tourism need to master certain soft skills for their particular industry.

When asked about the importance of soft skills in modern business settings, employers almost unanimously assert that soft skills are of utmost importance for organisations to thrive. Andrews and Higson (2008) compared four European countries—the UK, Austria, Slovenia, and Romania—in terms of the employability prospects of business graduates and found that the similarities in the demands and expectations that employers have of business graduates were considerably homogeneous. Soft skills may give candidates an extra advantage, even at the beginning of their career, in their selection process for a job. DeLong and Elbeck (2018) found that a candidate's soft talents were more important than their hard skills in determining whether or not they were invited back for a second interview. Employers hire new graduates based on their hard skills, but it is the new graduates' soft skills that assist them in building their careers and leading the organisation into a sustainable future. If you want to achieve a long-term professional reputation and success, you must combine your technical abilities with soft skills (Sethi, 2016). Whereas a hard skill enables you to be more effective in your profession, a soft skill enables you to be a more efficient person (Ghosh, 2012).

Look at it from the point of view of an employer. Investing in a new employee is a long-term commitment. When you recruit a new employee, you are investing both time and money. You want to see a positive return on that investment (Sonmez, 2020). A lack, or even a deficiency, of soft skills might have unpleasant consequences for both the employee and the employer. The soft skills gap not only hinders new employees' career growth but also makes employers frustrated and causes companies to waste their precious resources. Some scholars hold higher education institutions responsible for this gap by stating that young people are not learning a sufficient portfolio of general skills at university (Succi & Cinque, 2015).

In many selection and hiring cases, candidates are not shortlisted if they lack the required technical, i.e., hard, skills; the possession of soft skills in this process is often ignored or underestimated. As a consequence, both employees and companies suffer in real-world business settings due to the soft skills gap. Robinson (2009) reported that deficiencies in new graduates appeared mainly in the areas of motivation, problem solving and analysis, organisation and time management, visioning, creativity, innovation, and change, and lifelong learning. In another study conducted among recent management school graduates, Velasco (2012) drew attention to a widespread belief among university students that they must study diligently to earn high grades because employers seek graduates with outstanding academic records, concluding that this belief does not appear to reflect what is happening in organisations, where firms place a higher premium on personality and other personal characteristics of young graduates. According to a case study in the field of accounting, a large portion of the accountants interviewed

believed that businesses would become increasingly interested in hiring young accounting graduates with great soft skills (Cernuşca, 2020). Gale et al. (2017) conducted a longitudinal study (2006-2014) in the field of interior design and showed that soft skills were more frequently mentioned as favourable characteristics in situations where interns performed very well.

Furthermore, the willingness of employers to hire interns was influenced by their soft skills. Lyu and Liu (2021) analysed online job postings between 2010 and 2019 in the U.S. energy sector and found that job openings in the United States' energy sector are increasingly requiring a high degree of "soft" skills, indicating an "upskilling" trend over the last decade. In another study from Indonesia, Hendarman and Cantner (2017) indicated that both soft skills and hard skills are substantially and favourably connected with an individual's degree of creative thinking. Gruzdev et al. (2018) interviewed 36 employers from a variety of industries and sectors in their research and concluded that soft skills are highly appreciated today by employers as significant for the success of their activities. Lamberti et al. (2021) studied graduate students from a Spanish technical university in three categories: (1) higher-salary graduates, (2) lower-salary/lower-GPA graduates, and (3) lower-salary/higher-GPA graduates. They found that the perceived level of soft skills was crucial for the students earning higher salaries. These challenges generate some questions such as: what soft skills are required in the field of engineering? Is it possible to learn soft skills? Inevitably, the syllabus of the undergraduate and graduate engineering curricula will have to consider them to be a component of their education. Keeping these challenges and questions in mind, this study aims to shed light on soft skills acquisition in engineering education in Turkey by screening the curricula of some prominent Turkish universities.

2. Literature review

In many industrialised countries today, there is a growing need for employees with technical skills. This can be verified by looking at their requirements in their immigration processes. But the need for soft skills has grown much more in recent years because they are essential for people who already have hard skills as well as those without any technical skills. Rehman et al. (2017) studied the importance and impact of soft and hard skills on performance in both contexts and tasks and discovered a positive relationship between the variables. Fernandez and Liu (2019) commented in their research that adult employees without university degrees tend to have a higher occupational standing than university graduates if they use soft skills more frequently. In another study, Cheng and Hitt (2018) noted that students enrolled in career and technical education have greater levels of non-cognitive qualities such as conscientiousness, which are necessary for later life success. Yan et al. (2019) studied the feasibility of teaching soft skills to students at a Chinese university and showed a statistically significant positive impact on the assessed soft skill outcomes. Jones et al. (2016) surveyed recruiters at a regional university career fair and reported that factors demonstrating soft/social skills ranked highest in recruiter preferences. Sitompul et al. (2017) studied the importance of soft skills for the graduates of a tourism academy and found that soft skills significantly affected the working quality of the graduates. In their study at a Malaysian university, Abdullah et al. (2019) looked at the effects of soft skills acquired by graduates on their career opportunities and discovered that employability was favourably connected with leadership abilities, teamwork skills, and communication skills, among other characteristics.

Figure 1. Soft skill intensive employment in years



(Adapted from Deloitte's Soft Skills for Business Success Report, 2017)

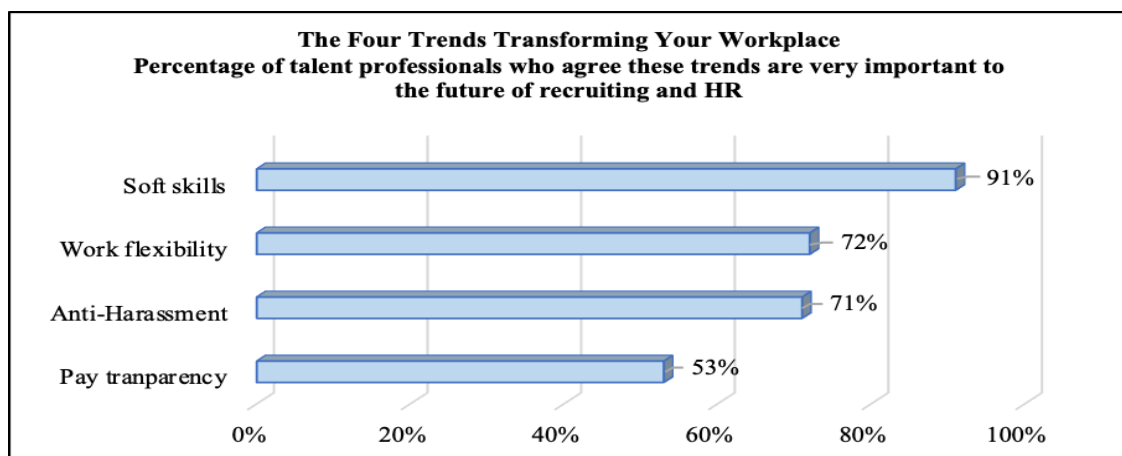
Towards the end of the first quarter of the 21st century, members of Generation Z have already started taking positions in the workforce of organisations. With the addition of Generation Z members to the present workforce, the soft skills gap has started making itself more visible, paving the way for mounting research in this field. Indeed, soft skill-intensive employment has been gradually increasing in the new millennium, and soft skill-intensive occupations are expected to have reached 63% by the year 2030 (Figure 1). Almost all the data coming from the research studying the soft skills gap in a wide array of sectors and occupations points to a steady lessening of soft skills among new graduates in organisations from Generation X to Y and Z successively. The newest employees of the present workforce increasingly tend to possess visible flaws in a minimum of one or a few soft skills that are crucial in modern business settings.

2.1. Soft skills making their way into current professional life

An employee's technical expertise may not guarantee a thriving career for a lifetime. To get to the top as an employee or a leader, one must possess a wide range of talents that are difficult to quantify yet essential to success. Often referred to as "soft skills," these are behaviours and personality qualities that contribute to a person's success in the workplace. They include things like teamwork, critical thinking, persistence, and communication. For example, the role of efficient communication and interpersonal skills for medical doctors was analysed by Duffy et al. (2004) and the results were published in *The Kalamazoo II Report*. According to their findings, effective communication between patients and physicians helps shape diagnoses, initiates therapy, and builds a caring connection. The success of these efforts is highly dependent on the physician's communication and interpersonal abilities. In another study from medical practise, more specifically from nursing, Ray and Overman (2014) concluded that soft skills may lead to a more positive work environment, which in turn can help the well-being of employees.

Employees with strong technical abilities might be derailed by a lack of soft skills, such as reliability, time management, and critical thinking. Good time management involves setting the right goals, dealing with interruptions and procrastination, prioritising, and scheduling effectively (Kumar et al., 2011). Of all the soft skills, critical thinking is gaining increased importance in professional settings. Critical thinking is the careful and considered process of choosing whether an idea should be accepted, rejected, or reserved (Butterfield, 2010). Typically, a critical thinker acquires and interprets information carefully and uses it to reach reasonable conclusions (Kumar et al., 2011). According to data coming from professionals, over 90% of HR experts feel that soft skills are the most important trend in reshaping the workplace, followed by work flexibility, anti-harassment, and pay transparency (Figure 2).

Figure 2. The four trends transforming your workplace



(Adapted from LinkedIn Global Talent Trends Report, 2019)

Many businesses, perhaps understanding this, are now placing greater emphasis on soft skills in the employment process. Among the most sought-after talents in today's workforce are those of reliability, cooperation, collaboration, adaptability, and problem-solving. This is not a surprise. At the beginning of their careers, people are hired primarily based on their technical capabilities. Nevertheless, their ability to maintain a profession over time is directly tied to their soft skills. They are driven to study and stay current in their fields because of their soft skills. As a result of constantly redefining themselves in the context of acquiring new information and abilities, they become more resilient and adaptable. In a crisis, emotionally resilient people can control their emotional

reactions, allowing them to navigate their way through it successfully (Tang, 2019). Since they are so adaptable, they can fit in well in most work situations.

The remarkable thing about soft talents is that they can be used in any job. Torres et al. (2020), for example, studied the Informatics Engineering master's students' perception of soft skills in their technical area and concluded that a collaborative and complementary strategy for developing soft and hard skills was deemed the most effective method for encouraging innovation among them. To prioritise the soft skills that workers need to improve, self-assessments and in-company feedback reports may be utilised in conjunction with one another. Employees may get valuable insight into how others see them. When assessing soft skills, it is equally critical for businesses to consider prejudice, gender inequalities, and cultural disparities. For example, a man's aggressive communication style may be considered more acceptable than a woman's aggressive communication style. When dealing with varied gender viewpoints, you must be compassionate while not holding individuals to dramatically different standards. Similarly, when cultural differences are encountered, the common attitude is rarely curiosity. Often, it involves judgement, and you are likely to view others' behaviour as improper, undesirable, or lacking (Gardenswartz et al., 2008).

The fact that certain individuals are born with the ability to demonstrate certain soft skills more easily is well recognised, but these abilities may also be developed with practise. Like a child learning how to walk and eventually run while catching and throwing, an individual will master a soft skill with more time spent and more practise, followed by increasingly complex skills (Bhatnagar & Bhatnagar, 2012). Treating soft skills the same way you would treat technical talent may have a significant impact on a company's success. Soft skills, like technical ones, may deteriorate if they are not utilized. That is why it is essential to keep practicing them. One-off webinars and panel discussions will not work in the majority of circumstances when it comes to improving one's soft skills. That is also not how people learn technical skills. Soft skills training approaches that are flexible, shorter, and more frequent tend to be the most effective. Companies should also provide a range of lifelong learning opportunities. Lifelong learning is a mindset, not something that can be readily reasoned away as 'nice to have but not required' or put off indefinitely (Ramesh & Ramesh, 2010).

Some individuals like to learn by reading, while others prefer to learn by doing. A heterogeneous group is likely to have a variety of interests, tastes, and biases, and you must be prepared to deal with these differences (Ramesh & Ramesh, 2010). Employees should be included in the process of determining what works best for them. When it comes to practical applications of group training or mentorship, a mix of larger groups and on-demand videos or podcasts may be the best way to go. Ganimian et al. (2020) studied a three-year mentoring program provided for secondary school students and reported that the program improved students' academic behaviours in general. Listening skills are considered one of the seven habits of effective people (Rani, 2012). Keeping this in mind, workplaces may provide opportunities for workers to discuss what is going well with their job and, more crucially, what is not going well. Walking through various scenarios, such as high-stress or time-sensitive circumstances, with everyone in a team could be a helpful exercise to work on strengthening communication and bonding within a group. The idea is that effective teams do not emerge automatically. Individuals frequently create groups, yet they may or may not operate well together. If they do, the group is considered to be working as a team—a collection of individuals who organise themselves to collaborate on a common goal (Butterfield, 2010).

To provide more in-depth training in soft skills, there are formats and technologies available to accommodate any budget or desired goal. However, in general, those that need reflection and engagement from workers are the most effective. As an employer, you have a duty to ensure that your employees are engaged and that you develop an atmosphere and goals that are stimulating, challenging, and productive (Fleming, 2016). If individuals just sit and listen to a presentation or watch an online video, they are not getting an opportunity to put the skills they have learned into practise. To get you started, here are some soft-skill training strategies to think about: Real-world experience is an excellent instructor, but not all organisations have the resources to create or recreate real-world events to educate their staff. Some organisations have turned to virtual reality approaches as the most realistic alternative to working in a real-world environment. They provide virtual reality simulations that are designed to mimic real-world circumstances, such as allowing staff to respond to a complaint from a client. It is critical to gain a thorough understanding of the environment in which your customer spends their day to better comprehend where you, your requirements, your recommendations, your requests, and your team fit into the picture (Belsky, 2019).

Companies may also use workshops as an easy-to-organise and easy-to-manage technique for soft skills training. For example, when working in a varied setting, understanding the wide range of cultural behaviours and

preferences, as well as the meanings that are behind them, is crucial to achieving emotional intelligence (Gardenswartz et al., 2008). Emotional intelligence abilities are best taught via hands-on, instructor-led courses since they are the most engaging and effective. It is a safe bet that workers will benefit from workshops that imitate real-world situations and provide them with meaningful feedback based on their replies.

Investing in tailored and professional training from coaches or specialised mentors may be a cost-effective way to satisfy the demands of soft skills development programs. Coaching is primarily about paying attention to the other person and assisting them in becoming more competent in their job (Brent & Dent, 2015). Because of the price, coaching is often reserved for upper-level management roles. However, organisations with significant levels of change and complexity, such as air travel, insurance, banking, and the car industry, are all examples of industries that might benefit from a prominent level of management (Cook, 2009). Following this, firms would be wise to invest in developing workers' leadership abilities from the beginning of their careers—especially when considering companies with a high percentage of internal hiring. Occasionally, people possessing leadership qualities may not be aware of themselves and never aspire to be leaders (Rani, 2012). Mentorship programs are one method of achieving this goal. Making use of the soft talents of corporate leaders, whether one-on-one or in groups, is a cost-effective and productive technique that can be implemented quickly.

There are profound theoretical consequences of providing soft skills education to engineering students. Historically, engineering curricula have focused primarily on developing students' technical abilities while paying little attention to helping them improve their interpersonal and communication skills. However, there are several advantages to providing engineering students with soft skills education as part of their formal education. First, it improves their ability to work in interdisciplinary groups by facilitating communication and collaboration. The result is solutions that are both easier to use and better suited to the specific circumstances in which they will be implemented. Engineers are better prepared for managerial jobs and project leadership through the development of their soft skills through training programmes. Finally, it encourages engineers to take a more rounded view of an issue, considering the social, ethical, and environmental consequences of their work. Students can grow into well-rounded engineers and citizens if we teach them the value of soft skills and encourage their development.

3. Method

Ethics committee approval. All responsibility belongs to the researchers. All parties were involved in the research of their own free will. The authors received no funds, grants, or other support for the submitted work. The authors certify that they have no affiliations with or involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this manuscript.

In compliance with what this study aims to achieve, the engineering faculties of 10 prominent Turkish universities were selected for screening. 10 universities (Istanbul Technical University, Hacettepe University, Middle East Technical University, Istanbul University-Cerrahpasa, Cankaya University, Bilgi University, Bogazici University, Sabanci University, Koc University, and Bilkent University) were selected because their curricula have a wide array of engineering departments, thus providing enough data to draw meaningful conclusions.

3.1. Data collection and analysis

URAP (University Ranking by Academic Performance) was used as a benchmarking criterion for the selection process. URAP is a non-profit institution that sees making Turkish and world university rankings as a social service. The team members working in the URAP Laboratory, among other things, voluntarily contribute to the university ranking studies. The URAP Research Laboratory was established in 2009 within the body of the Middle East Technical University Informatics Institute. URAP aims to develop scientific methods to evaluate higher education institutions in line with their academic achievements and to share the results of the studies with the public. Their goal is to help universities compare their academic performance with other universities' data obtained from the studies and to help them realize their openness to improvement according to the determined indicators (<https://urapcenter.org/>).

3.2. Findings

All the departments of the engineering faculties of the 10 prominent universities ranked by URAP were screened. Their curricula and course catalogs were scanned using their websites. These 10 universities have a total of 112 departments in their engineering faculties (Table 1).

Table 1. Top 10 Turkish Universities, Departments of Engineering Faculties, and soft skills courses

Name of University	Number of Departments in Engineering Faculty	Number of courses related to soft skills
1 Istanbul Technical University	30	1
2 Hacettepe University	16	0
3 Middle East Technical University	14	1
4 Istanbul University - Cerrahpasa	14	0
5 Cankaya University	9	0
6 Bilgi University	8	2
7 Bogazici University	6	2
8 Sabanci University	6	0
9 Koc University	5	1
10 Bilkent University	4	0
Total	112	7

(Ranking taken from URAP website: <https://urapcenter.org/>)

Among all the countless courses offered by these 112 engineering departments, only seven of them are either directly or somewhat related to soft skills acquisition. Some of these universities have their own career centres and try to create awareness and training about soft skills to a certain extent, but they have not made soft skills acquisition a part of their engineering curricula. For example, Koc University initiated a course named *Academic and Life Skills 100* in 2010 'with the purpose of helping young adults develop those basic competencies they will need in the university, their professional and personal lives' as they express on their website. This is a good example of acquiring soft skills, but it is not specific to engineering education; it is rather general and inclusive of all their students.

To cite another specific example, a course named *Career Planning* offered by Middle East Technical University can be mentioned. But again, soft skills constitute only the content of one week in the syllabus of this 14-week course. The rest of the syllabus focuses on such topics as college life, career journey, CV preparation, networking, entrepreneurship, interviews, etc. Considering so few soft skills courses available in engineering curricula, we could assume that there is a clear gap between what engineers are expected to possess and what they are offered in their education in terms of soft skills acquisition at Turkish universities. This gap indisputably points to the need for soft skills courses offered by engineering departments at Turkish universities to meet the needs of various sectors, with their graduates endowed not only with hard skills but also soft skills needed in current work settings.

4. Discussion

The benefits of teaching engineering students soft skills are substantial. The capacity to interact, collaborate, and adjust to different professional environments is just as critical as technical skill. Soft skills training helps prepare engineering students for the future's more complex and multicultural workplaces. Their ability to articulate complicated technical concepts to non-technical stakeholders is a key factor in the success of their teams and the projects they oversee. Engineers who have developed their "soft skills," such as empathy and active listening, can better meet the needs of their customers and the people who will be using their products. Engineers adept in negotiating and resolving conflicts are better equipped to handle complex circumstances and come to agreements that benefit all parties. In addition, students who participate in soft skills education develop their leadership skills, making them better able to assume managerial responsibilities and steer their teams to fruitful project completion. Training engineers in soft skills has far-reaching repercussions, improving their employability, career prospects, and capacity to make constructive contributions to both the technical community and society.

There are several ways that a higher education institution can benefit from a well-developed curriculum. Education curricula must be kept up to date in European institutions so that students graduate with a solid foundation of knowledge as well as a diverse set of soft skills. Developing abilities such as lifelong learning, interpersonal communication, and entrepreneurial and professional conduct ethics can help graduates improve their employability. Concerns about the employability of recent graduates are on the rise, as are the increasing number and diversity of student populations. As for students in the engineering discipline, the validity and applicability of soft skills have recently been recognized, particularly in the context of teamwork. Recent research has revealed the difficulty of determining which soft skills are required for engineers during the learning process. As a result, it is critical to add soft skills to the curriculum, particularly if students wish to receive degree certifications from foreign organisations. In this instance, such abilities are seen as professional abilities by the employer.

To comply with the European Higher Education Area Declaration, which was adopted on June 19, 1999, and in recognition of their importance in the development of a knowledge-based economy, European universities are required to produce graduates who can respond quickly and effectively to the constantly changing demands of the workplace (Andrews & Higson, 2008). As part of the European Higher Education Area, students, graduates, and higher education professionals will have unrestricted movement and a chance for fair accessibility to the best education available at universities in an accessible area. Achieving common standards for diplomas and other university education certificates is built on the foundations of transparency and collaboration across European quality assurance organisations. Since 2002, Turkey has been a member of the Bologna Process.

As is the case in all other countries participating in the Bologna Process, Turkish universities must benchmark all of their academic programs against the world's best institutions in their fields and design learning outcomes and curriculum structures in full accordance with international accreditation institutions, such as the American Board of Engineering and Technology (ABET) for engineering (<https://www.abet.org/>). Aiming to make a congruent contribution to the engineering profession in Turkey in light of all these facts, this study offers a soft skills course design that is versatile and modifiable according to the particular needs of universities and/or engineering departments. The related literature cites a wide variety of soft skills, and a typical list such as the one below can be utilised to incorporate into the design of the course, offering the prevalent content items for the course (Bhatnagar & Bhatnagar, 2012, p. 3):

- Listening skills
- Leadership skills
- Persuasion skills
- Conflict management skills
- Counselling skills
- Flexibility
- Communication skills
- Problem-solving skills
- Negotiation skills
- Assertiveness skills
- Presentation skills
- Self-awareness
- Team-building skills
- Time management skills
- Analytical thinking skills
- Feedback skills
- Mentoring

The proposed course will include a variety of authentic tasks, problems, and challenges designed to encourage students to put their newly acquired soft skills to use in the field of engineering, specifically. Students will leave the course with the necessary abilities that they will need in their future studies as well as in their professional lives after they have graduated from university. The primary goal of the course is to make students aware of the fact that while the hard talents they possess are important building blocks for their professional careers, it is the soft skills they will learn through this course that will distinguish them in a corporate environment. Student outcomes of the course were assessed against the criteria of the American Board of Engineering and Technology (ABET), a non-profit organisation that accredits university programs in engineering and engineering technology, as well as programs in other specific scientific subjects (<https://www.abet.org/>). As a result, the course establishes its suitability for inclusion in the engineering higher education curriculum.

As stated earlier, the course design is versatile and can be modified by changing or omitting the needed parts. The course was designed as a one-semester course with no prerequisites, but it is recommended that it should be offered to second- or third-year undergraduates who have studied and completed the basics in their discipline, making the content more accessible to more knowledgeable students. The course design can be seen in full detail in the appendix at the end of the article.

5. Conclusion and recommendations

The rate of employability in a country is described as a measure of the country's economic and social progress. With the rapid transition of the workplace into a more inclusive atmosphere and a highly competitive labour market, employability has taken on a whole new meaning in today's world. In addition to having technical expertise relevant to the work, job seekers must be proactive and adaptable in their approach to seeking career prospects. Recruiters have been looking for well-educated engineers who have learned more than what their schools offered them, training themselves to go beyond the school curriculum, for some time. Currently, there is a significant demand for non-technical talents, which allows for the flow of social information and engineering skills. Engineers' technical talents are highly valued by employers when hiring new engineers, but it is a candidate's ability to connect and engage with others in a range of professional contexts that truly distinguishes them and allows them to establish a successful lifetime career. It is because of this that the term "soft skills", which regulates business

and management models and is a critical element in companies around the world for the hiring, evaluation, and retention of positions, is a term that means the ability to execute a particular function that ends up going beyond technical expertise and market experience.

Engineers in today's dynamic and diverse business environment must be accountable for producing new information and expressing their views proactively, critically, and independently in today's dynamic and multidimensional business environment. The capacity to produce novel and creative solutions to real-world challenges is also emphasised by professional working practises for engineering undergraduates. As part of their education, students will learn about the importance of teamwork, how to lead multidisciplinary projects, and how to respond to public expectations, as well as the ethical and social ramifications of their activities. Currently, engineering graduates must not only meet high technical standards, but they must also possess a variety of soft skills that will increase their employability and assist them in maintaining their place in the sector, according to current recruiting practises. Consequently, the integration of soft skills courses into the technical engineering curriculum is necessary for students to acquire and improve soft skills.

As previously noted, the current engineering curriculum of the 10 prominent Turkish universities displays a clear disparity between the demand for soft skills and the hard facts of the engineering profession in Turkey. The existence of this gap allows this article, as well as the soft skills course design presented here, to be more in line with the current reality of engineering education in Turkey. The study does not intend to revolutionise the field of engineering education in the local community, nor does it offer a novel educational approach. As an alternative, it identifies an existing curricular gap and proposes a versatile and modifiable course design to close the gap for engineering undergraduates.

Because soft skills are acquired in higher education and are reflected in the human relationships that a professional forms, it is expected that the academic community would focus on continual improvement to satisfy the needs of the job market. Educators and employers alike must provide engineers with the resources they need to further their growth and development. Even if these tools can help professionals take control of their careers, it is ultimately up to the individual to use them to keep up with the latest technology and to focus on improving their weaknesses and skills. Turkish higher education institutions should be encouraged to better serve the demands of employers by providing courses in soft skills. Unlike the professional and graduate levels, four-year engineering programs in Turkish universities tend to place less emphasis on general soft skills applicable to a wide range of careers. With few engineering students opting to continue their study with a graduate degree, it is crucial that engineering faculties should focus much more on providing instruction in soft skills.

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Author contribution statements

The authors contributed equally to the research's design and implementation, analysis, and the manuscript's writing.

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Ethics committee approval

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APPENDIX

A Soft Skills Course Design Template

<p>This course will involve various authentic tasks/problems/challenges in order to make students use their soft skills specifically in the field of engineering. At the end of the course, students will be equipped with the necessary skills that they will need in their further studies and beyond their academic life. The main aim of the course is to make students become aware of the fact that the hard skills they have are building blocks of their professional lives, however, what makes them stand out in a business context is the soft skills they will be adopting via this course. Student outcomes of the course have been determined in the light of the criterion of ABET, which is a non-profit organization that accredits university programs in engineering and engineering technology and other specific scientific fields.</p>				
General Course Information				
Course details				
Course code	*			
Coordinating unit	Faculty of Engineering			
Term	Fall/Sophomore or Junior			
Level	Undergraduate			
Locations	*			
Contact	3 hours per week			
Restrictions	Only students of the Faculty of Engineering are allowed to register			
Course description	<p>This course will involve various authentic tasks/problems/challenges in order to make students use their soft skills specifically in the field of engineering. At the end of the course, students will be equipped with the necessary skills that they will need in their further studies and beyond their academic life. The main aim of the course is to make students become aware of the fact that the hard skills they have are building blocks of their professional lives, however, what makes them stand out in a business context is the soft skills they will be adopting via this course. Student outcomes of the course have been determined in the light of the criterion of ABET, which is a non-profit organization that accredits university programs in engineering and engineering technology and other specific scientific fields.</p>			
Learning outcomes (ABET Criterion 3)	https://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-engineering-programs-2021-2022/			
University graduate attribute	Valid if/when the university/faculty specify their own			
Learning resources	All valid scientific resources			
Online learning	If necessary			
Assessment	Essays, reports, scientific papers Case studies Story telling Projects Portfolios Interviews Observations Oral exams Self-assessment Surveys Multiple choice scenarios			
Assessment summary	Weightings will be specified.			
Weeks	Staging	Course Requirements/Details	Tasks/problems	Rationale
	*Introduction *Presentation of the course by the course instructor *Grouping, task delegation, planning	*All students need to a member of a group. If necessary, they need to convince the other members of the group to be accepted (communication) * Each group has to choose three problems among the list	*Make solar energy economical *Provide energy from fusion *Provide access to clean water	* The rationale behind the tasks will be identified according to the needs and subject areas.

<p>Weeks 1-7</p>	<p>*Each week students are required to give a short report to their groups and the instructor *Instructor screens the group discussions, answers students' questions and guides them. *In Week 7, students give their presentations and hand in their written work.</p>	<p>and by using their engineering skills, find a solution/solutions to it. In the process, using their soft skills such as lateral thinking, critical thinking is a must. * In order to find solutions, each group need to do re-search regarding the problem and become fully aware of the all the aspects of it in the past, now and future (background knowledge/knowledge of the history of problem is a must) * Task delegation is a must. All students are required to have a unique task in the process of finding a solution. In addition, they are required to inform each other on a regular basis. *All students need to show their leadership skills. *Goal setting, task delegation, planning, formulating solutions, presentation must be done via written correspondence. *Solutions to the problems are required to be delivered in the format of a research paper and full-fledged presentation. * Effective presentation making and academic skills such as citation, summarizing, paraphrasing, research techniques are not in the scope of this course. Students are expected to have presence regarding these. *Students get a pass or fail score. *Assessment is holistic. Criteria consists of two important aspects: providing a currently applicable solution to the problems as a group and solid evidence of each student fulfilling their task. *All written correspondence and the work the group have produced must be provided to the instructor of the course.</p>	<p>*Restore and improve urban infrastructure *Advance health informatics *Engineer better medicines *Reverse-engineer the brain *Prevent nuclear terror *Secure cyberspace *Enhance virtual reality *Advance personalized learning *Engineer the tools of scientific discovery *Develop carbon sequestration methods *Manage the nitrogen cycle</p>	
<p>Weeks 8-14</p>	<p>*New groups are formed for the second task/challenge/problem *Grouping, task delegation, planning *Each week students are required to give a short report to their groups and the instructor *Instructor screens the group discussions, answers students' questions and guides them.</p>			