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ENGINEERING STUDENTS' PERCEPTION ON DEVELOPING COMPLEX PROBLEM-SOLVING SKILLS

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Abstract: The present paper aims to present the results of testing ProCESS methodology by identifying, analyzing and discussing the implications of a group of 6 workshops on developing the sensorial, emotional and spiritual skills of 16 students from TUCN, which were organized during the second year of ProCESS project's implementation. Based on a qualitative research, the results emphasize the value of developing some soft skills to use along with rational thinking for both students' personal development and for increasing efficiency and effectiveness of organizations in general and in leadership in particular.

Key words: Engineering challenges, soft skills, qualitative research, complex problems, engineering education.

1. INTRODUCTION

In recent years, the development of technologies in the field of engineering comes with a need for competitive production which requires multidisciplinarity [18, 4]. This means that knowledge from different professional fields is needed for solving multifaceted problems. In this case, engineers need to be adept at integrating diverse perspectives and methodologies [5]. As engineering continues to evolve in response to global challenges, the integration of multidisciplinarity and soft skills becomes paramount. This ensures that solutions are not just technically sound but also socially responsible and adaptable to rapidly changing contexts [16]. The current world characterized by volatility, uncertainty, complexity and ambiguity – VUCA world – requires additional skills for engineers, such as collaboration, enhanced communication, debating, empathy, balancing, creativity, critical and analytical thinking, problem-solving abilities and so on [1; 13]. Companies are looking for engineers which can solve complex real-world problems, with a deeper understanding of various aspects in a dynamic field of innovation so they need to step "out of the box" and have flexibility and adaptability [19]. In a rapidly transforming global ecosystem, engineers work in tandem with experts from other domains and their solutions must be technically robust, socially conscious, and globally adaptable. As a result, technical prowess alone no longer defines the efficacy of an engineer and soft skills need to be added for success.

In this context, the article aims to present a research based on the experience the team from the Technical University of Cluj-Napoca (TUCN) had during the second year of implementing Erasmus+ ProCESS project, focusing on the aspects related to the involvement of TUCN students in this project.

The paper is structured into six parts. Following the introduction, the second section consists of literature review and problem description, emphasizing the need for engineering students to develop soft skills to complement their technical competences. ProCESS project and its relevance in this context are also presented in this section. The third part details the methodological dimension of the conducted research, whereas the main research results are presented in the fourth part. The article concludes with two sections dedicated to discussing the results and highlighting the conclusions.

2. BACKGROUND AND PROBLEM DESCRIPTION

2.1 Literature review

Technical skills have always been essential for success in engineering careers. However, recent years have brought many significant changes that emphasize the importance of soft skills as well for those working in technology-related fields. Globalization, rapid advancement of technology, including the increasing reliance on automation and artificial intelligence, complexity of workplaces nowadays – all these factors contribute to an engineering landscape that requires engineers' technical competences to be augmented by their soft skills, for increasing individual and ultimately organizational performance [9].

Within the context of rapid technological advancements, technical or hard skills are subject to change, but soft skills remain relevant for the entire duration of one's career, including in the engineering field, mainly because these soft skills are relevant, transferable from one working context to another and enhance an individual's employability [2].

The need for engineers' soft skills is further emphasized by the emergence of Industry 5.0, the next industrial revolution, which has a human-centric focus and is centered around the collaboration between humans and robots, thus underlining the essential role of the human factor [13].

The engineer of the 21st century should therefore possess a strong set of soft skills in addition to his technical multidisciplinary competences. Soft skills become more valuable than ever as there are still tasks that cannot be performed by robots and ultimately, engineers are working for and with people [9]. Therefore, the soft skills that were previously considered "nice to have" by employees in technology-related fields are now moving to the "must have" area [9].

An important research thread in the literature review focuses on identifying various sets of soft skills based on bibliographical studies and empirical research surveys.

One study in this direction revealed that the soft skills considered most critical by business executives were, in order, integrity, communication, courtesy, responsibility, social skills, positive attitude, professionalism, flexibility, teamwork, and work ethic, but it drew attention to the importance of hard skills as well (technical and knowledge) and emphasized that the two categories of skills, hard and soft, "must complement each other" [15]. In another study [12], highlighting the importance of soft skills in leadership and teamwork, the authors proposed a set of main soft skills to be developed in employees (communication, problem solving, teamwork, creativity, leadership, strategic thinking, customer service, innovation management) and reached the conclusion that weak soft skills lead to poor organizational performance.

Soft skills gained a special focus in the context of increasing employability as well. According to a study of Ruiz (2015), as cited in [3], which explored skills that are considered essential for an individual to be hired, meaning that the applicant is unlikely to be hired if he is not highly skilled or knowledgeable in this area, the most essential skills to be hired were teamwork/ collaboration, problem solving, ability to work with others of diverse backgrounds and critical thinking, whereas science, technology, engineering and mathematics (STEM) skills and technical skills were considered much less important. Similar results are revealed by Chinotti (2015), as cited in [3], showing that the skills employers required the most when hiring new employees were working in a team, competences related to decision making and problem solving, processing information, data analysis, technical knowledge, computer skills, written communication ability, ability of influencing the others.

Turning now to the impact of soft skills on individual and organizational performance, studies attest significantly higher percentages, between 75% and 85% in the favor of soft skills over hard skills, whose contribution to performance is limited to 15% - 25% (Tang, 2018; Klaus, 2010; John, 2009, as cited in [6]). Moreover, El-Tabal's study [6] completes the range of impact factors on organizational creativity identified in previous studies (the ability to generate new ideas, sensitivity to problems, risk tolerance, acceptance of change),

by adding the following soft skills: critical thinking, self-management, problem-solving, communication, teamwork, individual innovation.

2.2 Problem description

In this context, soft skills have become necessary for university students and graduates that are entering the labor market as well. Engineering education programs need to support engineering students to further develop these skills, such that they become more employable and better equipped for tackling the challenges and solving the complex problems of the 21st century.

2.3 ProCESS project

ProCESS (Processing Complexity with Emotional, Sensorial and Spiritual capacities) is an Erasmus+ educational project that addresses the problem above, as it advances an innovative method for training students on how to solve complex organizational problems, based on the development of a specific sub-category of soft skills, namely Sensory, Emotional and Spiritual (SES) skills. The project proposes an innovative methodology to deal with complex management cases by alternating sequences of mobilization of sensory, emotional and spiritual (SES) intelligence, in addition to rational capacities and to test this methodology on real business cases [7, 17].

In the context of ProCESS project, SES skills are considered a sub-category of soft skills. When these skills are trained, they lead to increasing awareness, alignment and connection to oneself, to others and ultimately to something greater than us [14]. By developing these skills, the project aims to support students, future managers, to not just better understand the complex problems they are facing in business life, but also to feel and sense these challenges [10].

Nine organizations from four different countries – France, Finland, Latvia and Romania – are taking part in the project: four higher education institutions (HEIs) and five partner companies. Four of the partner companies prepare complex business cases to be analyzed by students and the fifth one is a soft skills evaluation company which assesses students' SES skills [7, 10, 17].

Over a three years period, starting with 2021, the four company partners prepare 12 complex management case studies based on their current business challenges and a total of 192 students from the four HEIs take part in solving these cases, using their SES skills in addition to their rational capacities for this purpose.

3. METHODOLOGY

3.1 Testing ProCESS approach on engineering students

Students' activity of analyzing complex management cases is structured in three rounds, one per year. This means that every year each of the four partner companies advances one complex case study to be solved by 64 students, 16 from each of the four partner HEIs.

Projects' activities and results based on the first round of students solving complex case management studies have been previously published [7, 17, 19]. Therefore, this paper focuses on the experience the team from TUCN had during the second round of complex company case analysis, in the fall semester of 2022.

The 16 students from TUCN that took part in the second round of the project were students of the *Faculty of Industrial Engineering, Robotics and Production Management*, ten of them being bachelor students and the remaining six master students. All the Romanian students were students in the *Engineering and Management* field of study, being registered in one of three programs: *Industrial Economic Engineering* bachelor program, *Entrepreneurship* or *Business Management and Engineering* master programs.

The 16 students were divided into groups of four students and each group was assigned one of the four company cases to analyze. Each company presented its complex case to students during enterprise meetings that took place in October 2022. The students next attended a series of six SES skills workshops organized in TUCN, between October and December 2022, which were facilitated by local SES skills trainers, who are authors of the present paper. In accordance with ProCESS methodology, the goal of these workshops was to support students to develop their SES skills and to actively use

them for solving the company cases they were working on. Various artistic tools were used during the workshops – music, dance, movement, poetry, drawing, collage, plasticine modeling and other types of artistic creation, with the aim of encouraging students to explore and use more their emotional, sensorial and spiritual sides and to develop out of the box solutions and recommendations for the company cases.

In addition, students' SES skills were tested by the partner company specialized in soft skills assessment at three different time points: before the beginning of SES skills workshops, after the first three workshops and after the last one. Students were also asked to provide their feedback regarding the six workshops.

Following all the mentioned above phases, each student team prepared a report regarding its own analysis of the complex case, following a required structure: (1) Summary of the company's main features, case and previous plans for action; (2) Presentation of key features of SES skills workshops; (3) Global contribution of workshops on case treatment; (4) Final plans for action. Finally, the students presented their main solutions and recommendations for the companies during a winter school in Riga, Latvia, in January 2023.

3.2 Research design

This subsection presents the main coordinates of the qualitative research that was conducted based on the four student reports mentioned above with the aim to discover to what extent the ProCESS approach was successful.

According to Strauss and Corbin methodology [20], the core of the qualitative research relies on an elaborate coding approach. In doing so, the researcher is searching from the outset for possible categories answering a certain research question. These categories, along with their proprieties and dimensions, are subject of a refining approach and of identifying relationships among them, aiming to conceive a narrative with explanatory value for a social phenomenon.

In line with the above general methodology, the authors, after a first reading of each of the four reports of the students, in order to identify their general structure, searched in a first stage

for possible categories related to the development of the sensorial, emotional and spiritual skills, starting with a pre-defined set of key words, as but not exclusively, (I/we) learned [what/ how/ why/ etc.], developed, increased, enhanced, discovered, realized, become, understood, and so on.

In a second stage, the authors analyzed students' answers on a pre-defined set of questions the students had to answer, that allowed a more in-depth insight on several topics, as: (1) how the SES skills workshops led them to discovering oneself; (2) the practical meaning of SES skills in daily life; (3) the contribution of SES skills for a better dealing with case studies; (4) how are SES skills related to business organizations; (5) SES skills as a supporting mean for effective leadership.

In a third, and last stage, the authors propose a rational for understanding if, how, and to what extent developing SES skills by the ProCESS methodology may add value to developing efficiency and effectiveness on an individual, group, organizational and leadership level.

4. RESULTS

Of the four sections of students' reports on the complex cases, only two were relevant for the purpose of present analysis: presentation of the key features of the SES skills workshops and the global contribution of the workshops on case treatment.

For facilitating the review and analysis, and ensuring both a good balance among the groups and confidentiality, the authors coded the four reports corresponding to the four student teams as groups A, B, C and D.

4.1 Engineering students' perception on practical meaning and impact of SES skills

In students reports' section related to workshops' contribution to case treatment, students had to answer a set of five predefined questions, which were reformulated during the analysis process, to gain a more concise structure, as: (1) How SES skills workshops led to discovering oneself; (2) The practical meaning of SES skills in daily life; (3) The contribution of SES skills for a better dealing with case studies; (4) How are SES skills related

to business; (5) SES skills as a supporting mean for effective leadership.

The results obtained in reviewing the students' statements contained in the four reports are presented in Tables 1 to 5.

Table 1

Students' perception on how SES skills workshops led to discovering themselves

Group	Students' statements
Group A	•„*I managed to* do a self introspection and point out some of the soft skills I will need to improve: empathy, patience, creativity, tolerance"; •„The workshops ... *helped me* to become more self-aware by *encouraging me to reflect* on my thoughts and emotions, as I tend to suppress or ignore some of them, which can lead to negative consequences in my personal and professional life."
Group B	•„*I learned* about myself that I can control my negative emotions and turn them into something positive"; •„*I discovered* that I could work in a team with different types of people than I was used to and that I can be patient and adapt to a multitude of changes"; •„*I realized* that in many cases my level of listening to the other person is very low, always waiting for my turn to come in order to speak. *I learned* to acknowledge my problem and to try to work with it".
Group C	•„*I discovered* ... how to manage important situations, my emotions in relation with reality"; •„*I was able to get to know* myself and others better"; •„We can use these senses *to figure out* who we are, spiritually ... *[to] discover* what grounds us, what alters our mood, what makes us happy".
Group D	•„*I discovered* a lot of good but also bad habits I have and how to use them positively to make me a better person".

Table 2

Students' opinion on the practical meaning of SES skills in daily life

Group	Students' statements
Group A	•„The synergy between the three skills is extremely useful in daily life"; •„I try almost every day to be more self-aware and anchored in the present moment"; •„Awareness might be the one I find myself using way more often than before";
Group B	•„Through the six workshops, I realized the importance of applying SES skills in everyday life";

	•„I believe that in everyday life I use both sensory skills, as well as spiritual and emotional ones"; •„After realizing more and more about the importance of the SES skills, I started applying awareness and connectedness in daily life".
Group C	•„We discovered other ways of thinking, other emotions, other possibilities which have opened for us, and we can look at our lives a little bit different"; •„I think each of us applies a mix of all three skills: awareness, connectedness and alignment in our day-to-day lives".
Group D	• „In my daily life I use connection and awareness ... if you are not ok with yourself you cannot create a healthy connection with others"; •„I think that awareness is the skill that I use most in my daily life".

Table 3

Students' opinion on the contribution of SES skills for solving the case studies

Group	Students' statements
Group A	•„For ... the case study we used various ideas obtained at the workshops starting from the need to pay more attention to the aspects of the environment"; •„Trying to resolve the company's case study ... I realized that logical analysis instruments cannot resolve anything if they're not accompanied by SES skills".
Group B	•„In solving the case study, I combined analytical thinking with emotional and spiritual thinking to reach the result"; •„Emotional, sensorial and spiritual skills helped me see this problem from another perspective and I was surprised to discover that I can find very good solutions for the case study".
Group C	•„Based on the insights we received ..., we developed a wide range of ideas for the case"; •„I discovered new and interesting information that sparked some ideas for the case".
Group D	•„We found new perspectives, ideas in the evaluation of [our study] case".

Table 4

Students' opinion on how SES skills are related to business

Group	Students' statements
Group A	•„There is no business without people as there are no people without these feelings"; •„The business world can't operate without strong relationships, and great relationships can't exist without people and their SES skills".

Group B	•„SES skills are required in every business"; •„SES skills can be used in absolutely everything we want to decide about a business".
Group C	•„I realized that if you want to build a business ... you need a connection between you and people ... because is mandatory to have the same purpose in that direction"; •„Connecting with us and the others [by] writ[ing] down our thoughts and feelings, ... in my opinion can be used in every kind of business"; •[Non-formal activities related to] „both emotions and sensorial skills ... should be used by every company"; •„Organizations, I think, can and should implement SES skills, if they haven't already".
Group D	•„Business is psychology, and all of the sensorial, emotional and spiritual skills are having a very big effect on the business results"; •„By applying SES skills, organizations will gain a lot".

Table 5
Students' opinion on how SES skills support effective leadership

Group	Students' statements
Group A	•"Leaders can learn ... how to understand, how to communicate and how to use such skills for the benefit of the company they work for"; •„Leaders should cultivate their soft skills in order to build meaningful human interactions that would drive value in their companies"; •„Leaders can learn how to perceive, process and respond to the world around them through their senses, emotions, and spiritual beliefs".
Group B	•„All leaders should have these SES skills to lead the team to success"; •„Although from the outside SES skills might not find their place in a business, it is important for leaders to be aware of their importance"; •„Every company leader should use SES skills, in combination with analytical thinking, in solving all problems that arise, regardless of their severity".
Group C	•„This type of activities [worked out during the workshops] are crucial for a leader because he needs to understand the human behavior"; •„Not only are the skills important for us, but for world-wide leaders as well".
Group D	•„Connection with people, understanding problems, but also gratitude, are some of the skills that can be acquired by leaders"; •„If a leader possesses SES skills, his value is undefined [probably hard to assess]";

	•„I believe that a leader with SES skills is the key to success in a contemporary organization."

4.2 Students' overall feedback regarding the SES skills workshops

In addition to the reports mentioned above, in which students had to present, among others, their opinion on the usefulness and practicability of what they have learned and experienced during the SES skills workshops, they also had to provide anonymous questionnaire-based feedback about the workshops. The questionnaire included both open questions, to allow students to freely express what they enjoyed most about the workshops and to provide suggestions for improving the learning experience, as well as a closed question, based on a 5 point Likert scale, anchored by "strongly agree" and "strongly disagree", which was used to enable students to express their opinion related to four aspects of the workshops: practical arrangements of the training, content, training's contribution to improving skills or knowledge and willingness to recommend to workshops. Almost all Romanian students, 15 out of 16, provided this feedback.

The results obtained based on this feedback revealed that students were satisfied with the SES skills workshops. 86,7% of the students strongly agreed or agreed that the training improved their skills or knowledge and the same percentage corresponded to those that would recommend the training to their friends. Moreover, all 15 students considered that the practical arrangements of the workshops were good, and that the training's content was interesting [11].

Students were also asked to point out what they enjoyed the most during the workshops. The aspects that were mentioned in this respect were the interactivity and creativity of tasks, working in groups, the development of their skills, the new things they were able to learn, the opportunity to freely express their thoughts and feelings, the pleasant atmosphere during the workshops. Some of students' opinions include: "I enjoyed the most the interactive activities we did in groups"; "Working in teams, getting to know each other better. Also the fact that I could voice my opinions and thoughts without being

judged. I overcame my fear of talking in public"; "The fact that I learned a lot of new things, the fact that I made new friends and created connections with them, the fact that I'll be much more responsible for all my actions and the fact that these workshops gave me more power about all my thoughts and made me feel stronger and opened for new activities like this"; "I realized how human we all are…. I feel like I am surer about who I am than before"; "The interaction with other students and with our coaches and trainers and the development that comes with it. Getting to know that even if we are different from some point, that makes us special, we have many points in common on emotional, sensorial and spiritual areas"; "I enjoyed the most about the workshops the fact that we were together, we were able to learn from each other and develop new skills" [11].

5. DISCUSSION

From the perspective of the main objective of this research, namely testing of the ProCESS methodology, which is the subject of this article, it was of interest to identify:

a) how students perceived the combination of formal training, with which they are more accustomed (based on teaching new notions, consolidating the existing ones and discovering relationships between these notions) and the nonformal one, used less in our technical higher education system (based on using music, fine art, dance, poetry, meditation, etc.);

b) how they assimilated notions related to sensory, emotional and spiritual skills;

c) the ways of practical application of the three types of skills that students identified, and which aimed at the five directions related to self-knowledge, practical meaning of SES skills in daily life, the connection with business life, with a good leadership, as well as solving the case studies they received.

5.1 Evaluating the way of delivering ProCESS methodology

In terms of non-formal methods, students' assessments refer either to an entire workshop or only to a particular exercise. Students' formulations are either implicit (e.g. almost unnoticed passage of time) or explicit, and in the latter, the degrees of intensity (dimensions) of these appreciations vary from "pleasant", "different from the others", „very useful", to those containing superlatives such as "extraordinary experience", "unforgettable", "fantastic group activity".

5.2 Acquiring sensorial, emotional and spiritual skills

In relation to the development of their sensory skills, students consider that the exercises in the workshops led to: (1) increasing awareness of how each sensory sense contributes to understanding the environment; (2) acknowledging the importance of paying attention to the details that our sensory perceptions provide us with a correct understanding of the environment; (3) increasing awareness of the fact that the same reality is perceived differently by different people; (4) knowing the effects that sensory perceptions have on decisions, through the reactions they generate.

In what concerns the development of emotional skills, a synthesis of the statements can even lead to a procedural type of emotion management by: (1) identifying/ recognizing/ understanding the emotional states (emotions, sensations, feelings), both of the person in question and of the others; (2) differentiating between functional and dysfunctional emotions; (3) identifying effects of emotions on the body; (4) identifying ways of approaching/ regulating/ controlling emotions.

The exercises that aimed to develop spiritual abilities led, according to students, to: (1) knowing and ranking one's own value system; (2) differentiating between personal and social ("collective") values; (3) adapting behavior according to embodied values; (4) understanding the notions of „purpose and meaning in life" in order to have a sense of fulfillment; (5) understanding the importance of these skills for becoming more autonomous and responsible.

5.3 Practical application of SES skills

Firstly, we needed to see whether and to what extent SES skills led to students' better self-

understanding. The examples provided in Table 1 reveal both how SES skills led to this desired self-introspection, self-reflection, etc. and the results obtained (what needs to be improved, better self-awareness, the ability to control negative emotions, teamwork ability, own level of active listening, good and bad habits).

Secondly, we were interested in students' views on the practical applicability of SES skills in everyday life, as being essential to the validity of ProCESS methodology [8]. The examples taken from the four students' reports (see Table 2) unequivocally emphasize the usefulness of these skills in everyday life. As expected, the emphasis placed by students on the skills grouped as awareness, connectedness and alignment differs from one student to another, and there are also combinations of them ("a combination of SES skills", "a mix of all three skills").

Thirdly, another focus was directed toward the contribution of SES skills for a better dealing with case studies (see Table 3). In this respect, several students' statements emphasize usefulness of the combination of the gained SES skills and the logical analysis tools in generating creative ideas for analyzing the case studies. Students considered that SES skills enabled them to approach the problem from a different perspective, they realized that logical analysis instruments cannot solve problems if they are not accompanied by use of SES skills and some of them were surprised to discover that they could find very good solutions for their case studies in this way.

Fourthly, students were asked to elaborate ideas supporting if and to what extent are SES skills related to business. Students' statements in this respect vary from very concise formulations, as "SES skills are required in every business", or "SES skills can be used in absolutely everything we want to decide about a business", to more elaborate ones, delineating more or less extensive explanations (eg. the importance of SES skills in setting up an action plan of a company). For the latter, the authors were interested to notice the logic of argumentation, or the line of thinking starting from a certain statement, followed by intermediary support ideas (like the means), and ending with the attainment of certain results by

doing so. To this end, the authors had to be attentive to keywords like „because", „due to", „for" etc. Here are a few examples: [by taking into account employees' emotions] ... „that make us human" ... because people love when their hearts and needs are touched … [this can led to] „a lot of benefits, when it comes to business"; [organizations] „can use them for personal and emotional development because nowadays most of the unpleasant situations that arise are due to lack of communication and lack of emotional intelligence."

Fifthly, regarding students' opinion on how SES skills can support effective leadership, the authors discovered varying statements in students' reports by making use of SES skills in general, or of a certain SES skill in particular (see Table 5). These statements are covering a wide range from what can leaders learn („how to understand, how to communicate and how to use such skills for the benefit of the company they work for"; „how to perceive, process and respond to the world around them through their senses, emotions, and spiritual beliefs") , to how they should be in order to be successful („open-minded, self-aware, honest, empathetic, a good listener, selfless, adaptable and open to change, patient, respectful, cooperative and trustful"). Making use again of the line of inquiry presented above, the authors encountered several examples related to this last question students had to address in their reports. In their opinion, these skills are crucial for leaders as they need to understand human behaviors and they can benefit from them by using them "in power-dynamic situations that can make or break a deal".

6. CONCLUSION

This paper presented the results of testing ProCESS methodology by identifying, analyzing and discussing the implications of a group of six workshops on developing sensorial, emotional and spiritual skills of 16 TUCN students, in implementing ProCESS project.

The in-depth analysis of the four reports of the 16 students of TUCN who participated at a number of six SES skills workshops, using a qualitative research methodology based on Strauss and Corbin reference book, led to the following main conclusions.

1. The participation of students on the set of the workshops was to a large extent beneficial for all the students, their reports stating it explicitly, as presented above.

2. Both qualitative and quantitative research results, based on the analyzed reports and students' overall feedback, prove the relevance and certain benefits of developing SES skills for both personal development and for organizational life, including more effective leadership.

3. Comparing the soft skills identified in the students' reports as being gained during the six workshops, we conclude that many of these skills are in line with those emphasized in the literature review, in both bibliographical and empirical studies, as better communication, opening toward teamwork, problem solving ability, enhanced emotional intelligence, to name just the most frequent ones. All these skills are related by many studies to aquiring not only higher degrees of employability, career development and succes, but also to increasing organizational performance.

As soft skills become more and more required on the labor market, including in engineering field, engineering educations programs should encourage students to develop and use their sensory, emotional and spiritual intelligences, as a sub-category of soft skills, in addition to their rational capacities, in order for students to become more employable and better prepared for solving the increasingly complex engineering problems and challenges.

The results presented in this paper have limited scope, as they are based only on the second year of ProCESS project's implementation in TUCN. However, these results are encouraging and confirm the ones obtained after the first round of the project, one year before [17]. As the third and final round of the project will take place between October 2023 and January 2024 and will involve other 16 engineering students from TUCN, the near future will enable the authors to get a more in-depth perspective on the usefulness of SES skills for engineering students, based on the entire three years duration of the project and on the experience of a total of 48 engineering students from TUCN.

7. ACKNOWLEDGEMENT

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Percepțiile studenților din inginerie privind dezvoltarea abilităților de rezolvare a problemelor complexe

Rezumat: Lucrarea prezintă rezultatele testării metodologiei ProCESS prin identificarea, analiza și discutarea implicațiilor unui grup de 6 workshop-uri asupra dezvoltării abilităților senzoriale, emoționale și spirituale ale 16 studenți din UTCN, care au fost organizate pe parcursul celui de-al doilea an de implementare a proiectului ProCESS. Pe baza unei cercetări calitative, rezultatele evidențiază valoarea dezvoltării unor abilități transversale care să fie utilizate împreună cu gândirea rațională, atât pentru dezvoltarea personală a studenților, cât și pentru creșterea eficienței și eficacității organizațiilor în general și a leadership-ului în particular.

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