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FACELERA: DEVELOPING CORPORATE, SOCIAL AND TECHNOLOGICAL SKILLS IN ENGINEERING COURSE STUDENTS

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ABSTRACT

The training of engineers, with skills and competences required by the National Curriculum Guidelines (DCNs) in force, is inserted in a challenging scenario, and courses must be increasingly aware of constant technological and organizational changes. The objective of this study was to evaluate, through the application of questionnaires, the perception of students and facilitators who participated in a university extension project called Facelera, which has an innovative vision of academic training based on the integration of the university with companies and entrepreneurs in the area. of engineering. The Facelera project allowed students to immerse themselves in the professional environment, addressing issues that improve their people and process management skills, through mentoring entrepreneurs with consolidated experience in the professional environment. The results obtained in the research show that the project was successful in developing and/or improving the students' leadership, management, teamwork and communication skills, both in the view of the facilitators and the academics. It was also possible to observe that the project, added to the adaptations of the curricular matrices and the way in which the classes are carried out, can be an option for educational institutions to improve training and remedy some of the main shortcomings of newly graduated professionals, related to the lack skills related to soft skills, highlighting behavioral and emotional management skills to deal with situations involving interpersonal relationships.

Keywords: education, skills, engineering.

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1 INTRODUCTION

The current bases that guide the teaching in engineering courses, in general, aim at the formation of a graduate with a strictly technical and theoretical profile, as can be seen in the curricular matrices, in the Pedagogical Projects of Courses and in the National Curricular Guidelines (DCNs) of the Undergraduate Engineering Course (CNE/CES No. 2/2019). However, the professional environment has undergone several changes, requiring a professional who can adapt to such transformations, not being a mere technician, but an engineer with skills and attitudes necessary for what the market needs. In this way, it is pertinent that education in engineering sciences addresses, in their curricular structures, topics such as management, leadership, entrepreneurship, teamwork, strategic planning, emotional balance, decision-making capacity, and prioritization (Pinto, Scheidegger, Gaudêncio & Turrioni, 2015; Silva et al., 2018).

In this sense, according to Czekster & Costa (2015), graduates from engineering fields seek complementary training after their insertion in the labor market, in order to fill the gaps generated during their graduation, because the humanistic training of these professionals, as a rule, does not receive the same attention as the technological training.

Another effect of this absence of differentiated training may also influence the dropout of students from engineering courses, because the absence of contact with professional reality and with situations experienced in the routine of an engineer makes the student not glimpse the applications of the content that are covered in their first semesters. The dropout rate from engineering courses, which reached approximately 55% in 2017, is a worrying factor, since Brazil has only 4.8 engineers for every 10,000 inhabitants, while developed countries, such as Austria, have 20 engineers for the same number (Brazil, 2019).

In an attempt to stimulate the interest of academics in the area of engineering, reducing dropout, as well as fill the gaps mentioned above, some Higher Education Institutions (HEIs) have applied different methodologies that aim to propose challenges to students and put them in different situations to experience new possibilities, such as the Active Methodologies (Pereira & Santos Júnior, 2018).

Santos & Simon (2018) argue that the application of new methodologies by HEIs is vital for students' skills to be enhanced and meet the needs of the labor market. However, a differentiated methodology can also be applied by the integration of universities with companies, as HEIs alone cannot train students that meet the need of the industrial environment. Therefore, it is insightful that educational institutions integrate with companies, so that together they generate more training and experience, which, consequently, improve skills and competencies, resulting in more qualified professionals to create solutions and solve industry problems (Bispo, Abreu & Santos, 2017).

> As advocated by Resolution No. 2 of April 2019, which establishes the National Curriculum Guidelines for the Undergraduate Course in Engineering, the profile of graduates in this area should include characteristics such as "work and lead multidisciplinary teams: be able to interact with different cultures, by working in face-to-face or distance teams, in a way that facilitates collective construction; act, in a collaborative, ethical and professional manner in multidisciplinary teams, both locally and in networks; manage projects and lead, in a proactive and collaborative manner,

> defining strategies and building consensus in groups; recognize and live with socio-cultural differences at the most diverse levels in all the contexts in which they operate (global/local); prepare to lead enterprises in all aspects of production, finance, personnel, and market", as well as "implement, supervise, and control Engineering solutions: be able to apply management concepts to plan, supervise, elaborate and coordinate the implementation of Engineering solutions; be able to manage both workforce and physical resources, with respect to materials and information; develop global sensitivity in organizations; design and develop new entrepreneurial structures and innovative solutions to problems; perform critical-reflective evaluation of the impacts of Engineering solutions in the social, legal, economic and environmental contexts" (Brazil, 2019).

Engineering firms in many industries have recognized that the skills and competencies of their engineers provide the greatest strength for economic competitiveness. More specifically, effective utilization of the skills and competencies of their engineers can improve organizational performance, thereby helping to remain competitive in the marketplace (Coates, Thompson, Duffy, and Hills, 2009). Employee skills and competencies are widely recognized in an organization as the most valuable asset (Matsumoto, Stapleton, Glass and Thorpe, 2005), a key driving force in economic development (Delbridge, Edwards, Forth, Miskell & Payne, 2006), and a source of competitive advantage (Coetzer, 2006).

In this sense, it is understood that universities should be prepared to train professionals who can act both in technical areas and in those that involve the management of people, knowledge and processes, as well as possess skills in leadership, communication and entrepreneurship (Sturm, Schrippe, Medeiros, Koschek & Weise, 2015). This training methodology, which seeks to develop multidisciplinary skills in students of engineering courses, known as Technology Education, provides a more robust and reliable production system, meeting the needs of the labor market. This only happens because this process involves education, technology, science, technique and ethics to form critical citizens capable of understanding the world around them, but not only focusing on technology, being the main target of this training the human being (Carvalho & Tonini, 2017).

Therefore, it is clear that the academic training of graduates of engineering courses presents some gaps in relation to the needs of the current market, which is experiencing a scenario of intense and absolutely disruptive transformations, which bring enormous personal challenges, due to the professional environment being considered volatile, uncertain, complex and ambiguous, i.e., being a VUCA environment (volatile, uncertain, complex and ambiguous) (Alves, 2017). Thus, the development of a country should be based on the training of professionals who have the aforementioned competencies, because this will supply the market with engineers who are better able to overcome challenges and optimize their teams, allowing technologically improve the production of a nation and establish a level of sustainable economic growth.

In this context, this paper aims to investigate and demonstrate the perception of students and facilitators who participated in the university extension project called Facelera, whose methodology seeks to help educational institutions to develop the competencies and skills that meet the needs of companies in terms of the need for engineering professionals, increasingly qualified and able to adapt to change. This work aims not only to demonstrate the Facelera methodology, but also to present the results obtained in the pilot test of the project, evaluating its capacity to assist in the development of corporate, social and technological skills of the professional engineering professional.

2 CORPORATE, SOCIAL AND TECHNOLOGICAL SKILLS OF THE ENGINEERING PROFESSIONAL

In this century, rapid technological changes parallel to extensive economic restructuring have generated drastic changes in industries, which need competent, competitive and multi-skilled human capital resources to keep the company developing and competitive in the industry (Azmi, Kamin & Noordin, 2018).

Market competition has been causing changes in production systems, demanding new approaches to production activity (Batalha, 2008). The fierce corporate world demands that organizations be agile and effective, and must rely on human resources that positively influence the performance of organizations. In this way, the human element is one of the key pieces to achieve competitive advantage. One way to ensure this advantage is to make the most of the knowledge and skills of individuals, because they are responsible for converting information into knowledge, using their skills and competencies.

The professional profile demanded for the 21st century covers a set of competencies, which are divided into three dimensions: knowledge, skills and attitudes, encompassing technical issues, cognition and attitudes related to work. The first dimension, knowledge, corresponds to a series of information assimilated and structured by the individual, the knowledge he has accumulated throughout his life (Santos & Simon, 2018).

Skill, in turn, is related to knowing how to do something, or the ability to make productive use of knowledge, that is, to use it in an action. It can be an innate or developed aptitude, and training and experience allow the individual to improve it (Chiavenato, 2010). According to the Ministry of Education and Culture (MEC, 2002), skill refers to know-how, but these attributes are not only related to this know-how, but also to knowledge (knowledge), to knowing-being (attitudes), to knowing-acting (work practices).

The third dimension, attitude, refers to social and affective aspects related to work; it is the predisposition toward adopting a specific action, with a certain pattern of recurrence (Durand, 2000). According to Duarte and Dellagnelo (2001), attitudes are directly related to doing, comprising values, beliefs, involvement and commitment of people, with the objectives of the organizations.

The idea of competence comes from the Latin competentia, derived from competere, 'to get to the same point', and from petere, 'to go towards'. It refers to 'what is suitable'; in Old French, it meant 'appropriate'. It is currently used with authoritative judgments, depending on the area of activity in which the term is nailed (Dadoy, 2004).

The concept of competencies was first discussed in 1973 by American David Mc Clelland, with the publication of "Testing for competence rather than intelligence", whose competency was posited as an underlying characteristic of an individual that is casually related to superior performance in performing an activity. This concept of competencies has undergone constant changes (Fleury & Fleury, 2007).

Competencies are a collection of knowledge that add essential values for both the organization and the individual. Competence is the combination of characteristics that can be acquired during an individual's education. Competence is knowing how to act responsibly and that is recognized by others. It implies knowing how to move, integrate and transfer knowledge, resources and skills in a given professional context (Fleury & Fleury, 2004).

A study conducted by Ragusa (2014) in six universities in the United States with 493 engineering students, concluded that students are not adequately prepared for the labor market that demands innovation, leadership spirit, and agility in problem solving. Also, studies conducted by Paton, Wagner & Macintosh (2012) in a German machinery and equipment industry identified that only 16.5% of knowledge related to the application of management tools is acquired during engineering courses.

In Brazil, research conducted by Borchardt, Vaccaro, Azevedo & Ponte (2009), identified gaps in the professional profile of the production engineer. Another study conducted by Santos & Simon (2018), with the objective of investigating how companies evaluate the competencies and skills of the production engineer in the performance of their activities in the industrial environment, showed that students of present deficiencies in these professionals. The skills related to i) sizing and integrating physical, human, and financial resources in order to produce efficiently and at the lowest cost; and ii) using performance indicators, costing systems, as well as assessing the economic and financial feasibility of projects are considered very important, however, they are also considered the most deficient. The same occurs with the skills related to "oral and written communication" and "foreign language skills".

Therefore, it is concluded that efforts should be made for a better professional engineering education. Part of this responsibility falls on higher education institutions, as mediators of knowledge and trainers of skills. However, the university alone cannot train students that meet the needs of the industrial environment. It is understood, therefore, that in competitive scenarios there is a need for educational institutions to integrate with companies/entrepreneurs/specialists so that together they can generate more training and experience, which, consequently, improve skills that, in turn, improve competencies and result in more qualified professionals to create solutions and solve industry problems.

3 MATERIALS AND METHODS

3.1 Pilot Project Description

Facelera, whose name comes from the fusion of accelerated facilitation, is a project that has been in development for more than a decade. Called in its first versions Educcare, the project was created by a chemist (at the time, executive manager of the Capuava Petrochemical Complex in Mauá) and an economist also majored in Business Administration (he worked at Companhia Siderúrgica Paulista - Cosipa, currently Usiminas, from 1970 to 2000).

The creators of the project, also called mentors, met when they were children and had mutual support to get out of their difficult financial situation and build their professional lives. Mentor M1 tells a little of the history of the partnership that has lasted many years, and shows how the project began:

> Early on, in our adolescence, it was clear to us that only through studies could we break the cycle of poverty and improve our living condition. And so it was done, we did everything possible to advance in our studies and improve our standard of living [...] my beliefs about the value of education were strengthened and solidified during my studies in Economics. I came to believe in the value of education not only as a means to raise personal living

> standards, but also, and above all, as an essential condition to raise the country's standard of development. So it was that in one of my visits to M2*, in São Bernardo, he presented me, in 2008, the first ideas of Educcare, today Facelera, and asked for my opinion and my willingness to engage in the project.

A brief summary of the history of the project was contacted by one of the mentors, and is presented in the text below:

> The inspiration for what would become educcare.com came in 2003, when I was returning from the STC - Executive course at the Kellogg School of Management, in Chicago, at North Western University, when, on the plane, I fell into the reality that I felt prepared and equipped for the challenges of the unit I was managing, which was in danger of closing, but I did not know how to pass everything I had learned to the employees, about 100, who would in fact have to "suffer" the change, which at that moment, would be imperative. The group in this factory was made up mostly of local residents, neighbors of the factory, who had a love for everything, and depended on the success of this enterprise [...]. The management model of this factory, like many in Brazil, was centered on a lot of effort and dedication, but the method used represented much more of a fraternity, than in fact a management model that used high level tools, allied with strategic planning that provoked a change in mentality. At this point, a company came up with an unusual proposal. A leadership training program lasting nine months, focused on employees who were in a position to grow professionally, where each of them would defend a business theme, with a facilitator who would support the theme throughout the course [...]. I confess that this program in this format only worked because I bought the idea, because the forces for not doing it were many, since it would radically change the mindset of local leaders. We soon realized the uneasiness caused by the program, when some participants asked to leave, because they were very shy, and every month they would have to present in public the result of their learning. The stress of the class was high, but we soon realized the result a few months later when a director attended one of the meetings and was astonished. In short, at the end of nine months the 20 participants showed surprising growth and resourcefulness in presenting their topics, and we ended up running the program for the whole factory.

A new edition of this project took place in another factory for employees who were taking technical courses at schools such as Fatec, Etec, and Senai, whose main result was the observation that the schools provided good technical training, but did not provide the behavioral training and learning requirements for a new way of thinking. Thus, the first version of the project for higher education students appeared, called "Educcare.com", which was the first step in the project that is now Facelera.

The Educare project then came about, by means of a student from the chemical engineering course at Unochapecó, who was doing an internship at the petrochemical pole, and the Educcare project was presented to the course coordinator, and it took place for 3 editions at Unochapecó.

The project graduated three classes from 2010 to 2013 and took place face-to-face in a format very similar to what is now called Facelera. The results obtained with the project were fantastic, since the students had internships and were hired in large companies in Brazil. However, the travel and accommodation costs of the mentors and facilitators, who came from São Paulo to Chapecó every month, made it impossible to continue the project.

In 2018, a new attempt was made in order to reactivate the project, but again the costs for the project to take place in a face-to-face or semi-presence way prevented a resumption. However, with the context of the pandemic and the need to implement remote systems to ensure the development of various activities, whether economic or educational, there was a significant improvement in digital platforms, allowing the project format to be restructured in the remote format. It was then, embraced by a professor and the coordinators of the food engineering and chemical engineering courses, that the project happened.

The Facelera Project was implemented at Unochapecó to be a bridge between the technical knowledge received in the chemical engineering and food engineering courses and the knowledge of large corporations through their executives, delivering to the participants information that has become knowledge and that is a great differential in the labor market. This corporate education program is aligned to the main trends in the business world and is result-oriented, aimed at sustaining competitive advantage by inspiring permanent learning and exceptional performance of people and, consequently, of the organizations.

The Facelera Project was carried out with 20 students from the food engineering and chemical engineering courses, who worked in pairs to develop the work. Each pair was guided by a facilitator, who is currently working in the engineering and people management area, who led the teams to study and develop the theme, with the facilitator being the key person for the guidance in conducting the work and support for the group's doubts.

The students had their themes, pairs, and facilitators changed once during the edition of the project, allowing for a deeper knowledge of two themes, as well as the opportunity to get to know and manage the challenges of a new pair and a new facilitator, as well as improve teamwork and conflict management through different thoughts. The themes addressed by the students were: Corporate Governance and Compliance; Digital Transformation; Innovation and Creativity; Citizenship and Social Rights; Accounting, Cost Management, and Finance; Strategic Management and Strategic Planning; Motivation and Teamwork; Safety and Quality of Life at Work. The meetings were held live remotely, once a month, over a period of 5 months, using the Google Meet® platform. Each group had an average of 30 days to develop the assigned theme.

The students prepared the themes for presentation to an examining board of professionals working in the approached themes, who made their considerations and contributions to the group. Each participating student was recorded (with due authorization) at each presentation in order to register their evolution during the project. The evaluation items were: compliance to the times set for the presentation, resourcefulness and preparation of the theme, use of tools during the presentation, the group's ability to adapt to the adversities imposed on them, content mastery, and argumentation capacity to the questions posed by the panel and/or the audience.

The recordings of the presentations were stored in the Facelera Platform (www.facelera.com.br), to which all participants had access. With this, all the project participants had the opportunity to watch the presentations again and perform a vote assigning the concepts A, B or C. The students received an individual concept for each presentation, and the grade obtained at the end of the project represented an arithmetic mean of the grades of all the presentations. The students who got the 3 best grades at the end of the project were awarded prizes.

3.2 Collecting Data

In order to identify the perception of the project by the students and facilitators who participated in the project held at Unochapecó, a questionnaire was applied that included questions that evaluated the existing gaps in the current curricular matrices, the benefits that the project provided, what skills were developed, and what suggestions for improvement were indicated for the project. Thirteen students and 11 facilitators participated in the survey.

For data collection the Survey methodology was applied, characterized by being a quantitative approach, aiming to present opinions through questionnaires or interviews, in order to provide information and/or knowledge about a particular area of interest (Marconi & Lakatos, 2006).

Initially, in the first stage of the methodology, two questionnaires were prepared, one to be applied to the students participating in the project, and the other to the facilitators. First, a pilot test was conducted, allowing us to assess the need for improvement. In the second stage, the validated questionnaire was prepared and sent electronically via the Google Forms® platform to all students and facilitators involved in the project.

The data collection performed with the students was developed from a questionnaire with 15 questions, 11 closed questions (dichotomous or multiple choice) and 4 open questions (Chart 1 - Appendices). The questions with the asterisk symbol "*" next to them are considered mandatory.

For the research carried out with the facilitators, a questionnaire was prepared with 11 questions, being 8 closed questions (multiple choice) and 3 with open answers (Chart 2 - Appendices). The questions with the asterisk symbol "*" next to them are considered mandatory.

The questionnaire was sent to the students and facilitators through the link on the electronic platform, forwarded via e-mail and made available in the WhatsApp group with all the project participants.

The data analysis was performed in graphical form by evaluating the answers given for each of the questions.

4 RESULTS AND DISCUSSION

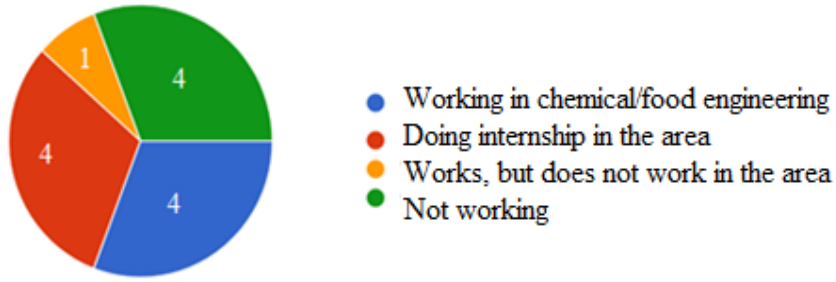
4.2 Students' perceptions

The survey conducted with the students, obtained a total of 13 responses, representing 92.8% of the students participating in the project. Of the students participating in the project who answered the survey, it was possible to observe that they are already in a more advanced stage of the undergraduate course, eight students are in the second third, between the fourth and seventh period of the course, and five students are in the final third of the undergraduate course.

The goal of the Facelera project is to always work with students in the final stages of their education, since these students will soon be professionals in the job market. However, this was not possible in this pilot test, because a peculiar characteristic of the profile of chemical engineering and food engineering students is that many are already working in the job market, even during graduation, and because they work on Saturdays, many were prevented from participating in this edition.

Figure 01 shows the profile of the students who participated in the Facelera project. It can be seen that eight students are already working in their area of education, either as employees (4) or as interns (4). In addition, one student works in areas other than chemistry or food science, and only four students are not currently working. The fact that 2/3 of the participants are already in the labor market made them realize the importance of the project for their professional lives, because many of them have already been able to apply it in practice. With this, it was possible to see that the students who sought out the project were those who were already in the labor market and felt the lack of these topics in their course matrix and, therefore, saw in the project an opportunity to improve their soft skills.

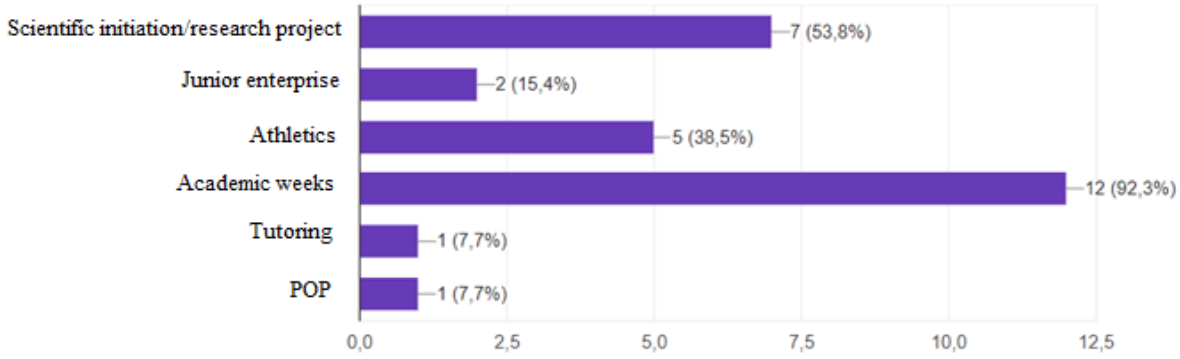
Figure 01 - Chart representing the students' professional performance during the project's execution period.



Source: Prepared by the authors (2021).

The students were asked about which academic activities they have participated in during their undergraduate course, the results of which are presented in Figure 02.

Figure 02 - Participation in academic activities during the undergraduate course.



Source: Prepared by the authors (2021).

It can be observed that almost all students have participated in academic weeks, which offer lectures, workshops and mini-courses on various topics. It is also possible to observe that more than half of the students (7) have performed or are performing scientific initiation activities, via research projects. This result reflects the great differential in research and development in both undergraduate courses. Other activities offered by the courses, such as athletics (5) and junior enterprises (2), also stood out, with a high percentage of students participating.

Observing the results, it was possible to verify that the students who sought the project are those who have the tendency to seek curriculum improvement, because they have already developed several other activities. They are students concerned with improving their curriculum and who already have a glimpse of what the market is looking for, and the project provided them with something they would not have had contact with in the current mold of the matrix or of the academic activities already available.

In recent years, higher education in Brazil has been undergoing continuous changes influenced by several factors, whether by the Ministry of Education's guidelines, by the Professional Councils' resolutions, by the peculiarities of the Higher Education Institutions (public, private, community), or by the current professional market, which is becoming more and more globalized and competitive. These factors, directly or indirectly, influence and direct the reorganization of education in the country, aiming at the continuous structuring of curricular matrices, syllabuses, and new teaching and learning methodologies (Ferreira & Florio, 2018).

Understanding the purpose of the Facelera project in being an extensionist project, which aims to put students in adverse situations to those they experience in undergraduate studies, the participants of the Facelera project were asked about the level of agreement or disagreement with respect to the content taught in universities, being asked whether this is sufficient to form a good professional. Moreover, it was also asked if the content taught at Unochapecó is sufficient to form a good professional, and the students should answer 1 for total disagreement and 5 for total agreement. The results obtained show that eleven interviewees understand that the content taught in universities, in general, is not enough to form a good professional. For six students, the content taught at Unochapecó is not enough to form a good professional in terms of what the job market expects.

A study conducted by Flores Rodriguez & Alcala Cortes (2019) with 1460 students in the Engineering department of the University of Guanajuato in Mexico showed that when asked if the education they were receiving at university was adequate, 68.10% of the students surveyed feel they are receiving a "partial" university education and only 31.90% said they received a "complete" education.

Higher Education becomes a strategic objective, according to recommendations of the World Conference on Higher Education (WCHE), to the extent that the responsible institutions impose themselves as protagonists of this process for the generation of wealth, strengthening of cultural identities, social cohesion and development of a new society, in which governments can command their destinies and place themselves at the service of the welfare of all (Andriola & Barrozo Filho, 2020). However, a study conducted by Lima, Maia, Ciasca & Antunes de Souza (2020), evaluated the results obtained in the average concepts of the undergraduate courses of the federal universities of Brazil, members of the IGC/SINAES, in the trienniums from 2009 to 2017. The results indicated that the average concepts of the undergraduate courses, grew only 0.67% in 8 years, leaving 2.99 in 2009, to 3.01 in 2017. Regarding the IGC, its growth was only 2.31%, evolving from 3.93 in 2009, to 3.98 in 2017.

The results of the previous studies show that there are many gaps and opportunities for improvement in higher education. In this sense, the Facelera project is one of these opportunities to cover gaps, which often cannot be contemplated in the curricular matrix, which needs to

comply with specific workloads and content required by the regulations of each undergraduate course. Therefore, extension courses present themselves as alternatives and opportunities to improve the training performance of the students.

The research evaluated the Facelera extension project, seeking to identify positive posts and points for improvement, in order to make it a permanent project in the courses and scale it up to other undergraduate courses, not only at Unochapecó, but also in other universities. To this end, several questions were asked to the participating students, seeking to understand their perception of the project.

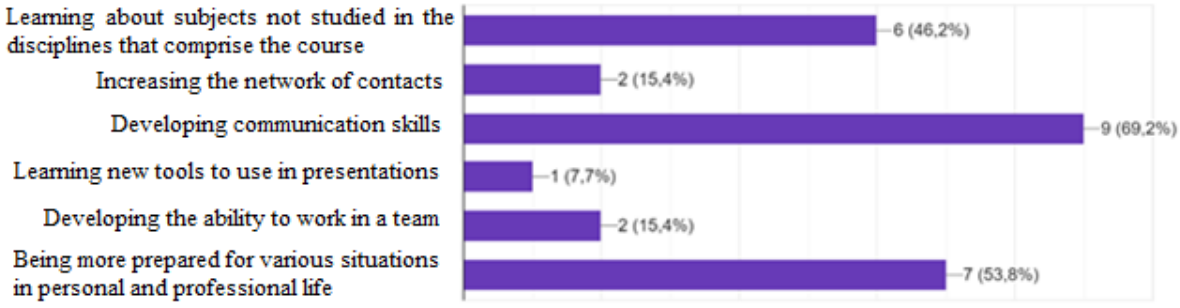
As for the general evaluation of the Facelera project, seven interviewees thought it was very good, and six students rated it good. When asked about how they evaluate their engagement in the Facelera project, nine respondents said they had a good engagement, and four found their engagement to be regular. The results can be linked to the fact that most students work and study, leaving little time for dedication to other activities, which corroborates Figure 1, possibly impacting on responses such as "Excellent" in this question.

In terms of student interaction with the facilitators of the Facelera project, it was possible to observe that for six students the interaction was excellent and another six had a good interaction, but for one student the interaction with the facilitator was bad. As already mentioned, the project facilitator is a professional with knowledge in the topic to be presented and the student needed to turn to him for support and validation of the presentation of the assigned topic. These answers attributed as "Poor" will be the focus of further studies to improve the interaction between student and facilitator, seeking to narrow the dialogue and eliminate such notes, in order for the project to be meaningful to all involved

When asked about the fulfillment of their expectations in relation to the Facelera project, one respondent said the project exceeded their expectations, nine said the project fully met their expectations, and four said it partially met their expectations.

The participants were exposed to four different benefits that the program could provide, and could choose up to two of the most significant options. Figure 3 shows the participants' choices.

Figure 03 - Of the benefits the program has provided you, choose 2 options that are meaningful to you:



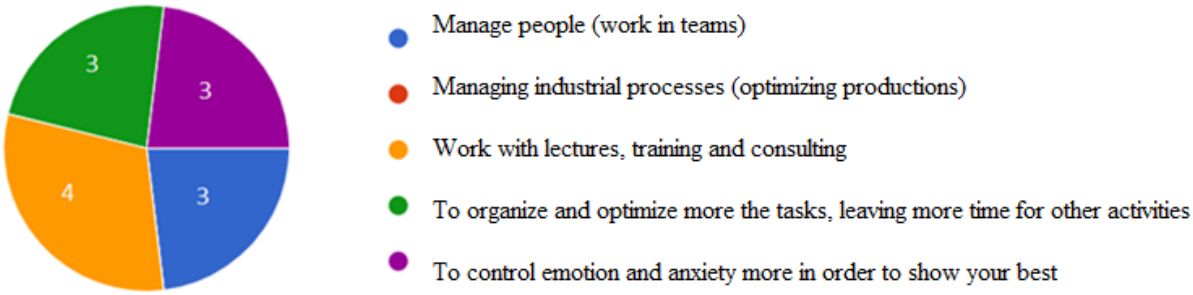
Source: Prepared by the authors (2021).

Three benefits appeared with higher percentages: developing communication skills (9 students), being better prepared for various situations in personal and professional life (7 students) and learning about topics not studied in the subjects that make up the course (6 students). The benefits chosen by the participants corroborate with the specific objectives of

the Facelera project, especially bringing academics closer to the professional environment, improving leadership skills, management, teamwork, and communication.

The participants were also questioned about being more prepared for some of the requirements needed by engineering professionals. Figure 04, shows the participants' choices.

Figure 04 - At the end of the Facelera project you feel more prepared to:



Source: Prepared by the authors (2021).

The findings indicate that four requirements appeared with close percentages, with a subtle preference for working with lectures, training and consulting, no student indicated that they feel more prepared to manage industrial processes (optimize production). Based on the expertise of the project's creators and mentors, one of the main objectives of Facelera is precisely to improve the future engineer's oratory and presentation skills in the processes, and this benefit was well observed by the participants.

Market competition has notoriously been provoking changes in production systems, demanding new approaches to productive activity. In this sense, organizations need to be agile and effective, and they must especially have skills, competencies, and people who are able to develop quickly. According to Jabbour, Freitas, Teixeira & Jabbour, (2012), human resources positively influence the performance of organizations. For Boahin & Hofman (2014) companies are increasingly in need of engineers who are able to combine skills and competencies in an innovative and productive way, to deal with the rapidly changing globalized environment. According to Streiner, Sacre, Shuman & Bursic (2014), in order to compete successfully in the professional environment of the 21st century, engineers must be capable of innovation, entrepreneurial initiative, agility and flexibility in problem solving.

Some open-ended questions, were applied in order to better capture the individual perceptions of the participating students. As for the possibility of the Facelera project involving other activities, the vast majority of participants agreed, suggesting: dynamics for interaction among all Facelera participants and not only in pairs; simulation of the world of work with real industrial situations to be solved by the participants; challenges such as reducing the time allotted for the presentation or not making use of auxiliary material like slides and in loco visits to companies in the industry.

When asked about points for improvement, four of the thirteen interviewees answered that the project execution period should be longer, indicating that the development time for this edition was too tight. They also suggested holding the presentations in periods alternating with

the undergraduate course evaluations. Two suggestions were proposed that the theme should not be presented twice by the same pair of students, allowing more in-depth contact with more themes by the participants and closer contact with a greater number of facilitators. Another suggestion mentioned by two participants was related to the form of evaluation of the presentations, suggesting that it should be standardized, scoring a positive characteristic and an opportunity for improvement for each student, and that all facilitators could, after the presentation, generate written feedback on the platform, so that the evaluation process would be broader. This demonstrates the maturity of many of the participating students, who became involved in improving their knowledge and suggesting improvements.

The participants were asked what the Facelera project added to their personal and professional lives. More than half of the interviewees pointed out as the main point the improvement in communication skills, cited by them as "public speaking". Also highlighted was the increase in knowledge of new resources that can be used during presentations.

According to Franzen, Schlichting & Heinig (2011), having professionals who know how to interact, who know how to use language, who can adequately write a text, select readings and materials that are useful for their daily work is a differential for organizations in the globalized market. Therefore, it is expected that the engineer knows how to use and produce texts in his professional field, in a clear, coherent, cohesive, and objective way.

Among the students who participated in the survey, four of them cited as a highlight the development of teamwork and conflict management skills, as well as "knowing how to deal with emotions". According to the report of the students, these skills could be improved, especially when changing the members of the pairs, as well as changing the facilitator and the theme once during the project. This perception is clear in the report made in the questionnaire by student E1: "It added contacts for future opportunities, improved my communication skills, and opened the door to new possibilities for the direction of the qualifications I intend to take in the future".

Student E2 described:

> For my professional life, I believe that I am more prepared for the job market, due to the various subjects that were addressed in Facelera and that are closely related to the job market. Besides being subjects that are not covered during college and that are essential in professional life.

A final point raised by two participants was cited as "increased networking and exchange of incredible experiences," provided by the fact that they got to know the professional history of entrepreneurs from large companies in the industry, who spared no effort to pass on tacit knowledge to the "mentees," in a clear and simple way. This point corroborates the words of one of the mentors of the project, defined here as M1, who said: "I have always preached to those who listened to me that the greatest asset a professional can have is called 'access'. Having access to knowledge, especially tacit knowledge, is the purpose of Facelera, building that bridge between organizations and schools."

4.3 Facilitators' Perception

To meet the objective of improving the students' corporate, social, and technological skills, foreseen in the project, the learning acceleration occurred through the mentoring of

entrepreneurs with consolidated experience in the professional environment. For this edition, a team of 11 facilitators participated in accompanying the teams, guiding the students in the development of their theme.

Facilitator" is defined as "a characteristic of someone who makes things easy; who facilitates; who elucidates certain things" (Risco, 2020). According to the definition of Adriano Tavares, a professional with extensive experience in the corporate IT market, Agile Coach and Solutions Architect at Fiat Chrysler Automobiles, the facilitator is responsible for leading the process of a session where participants work together to achieve a certain goal. He must encourage the participants to use the process defined for the session in the most effective way possible to accomplish the tasks, while respecting the pre-defined time constraints.

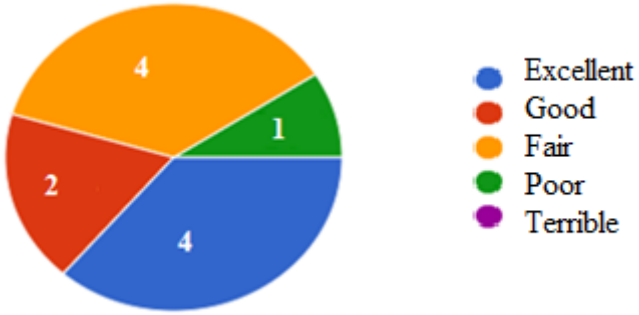
Having a facilitator with vast experience in the subject helping and guiding the student makes the learning exponential, since a lot of tacit knowledge is passed on to the student clearly and quickly. The team of facilitators was composed mostly of chemical engineers and food engineers, but facilitators with degrees in social communication, law, administration, economics, mechanical engineering, and environmental engineering were also part of the team. As for professional experience, seven facilitators had more than 20 years of experience, one with 10 to 20 years, two between 5 and 10 years, and only one facilitator had less than 5 years of professional experience, showing that during the elaboration of the project there was always a concern in structuring a multidisciplinary team with experience in the topics they would advise the students on.

The professionals, participating in the project as facilitators, found Facelera to be very good (10) or good (1), with five saying they had excellent engagement with the project and six saying they had good engagement. Also, ten facilitators said they achieved good engagement from their mentored students and one facilitator felt they achieved an excellent result with the students. For six of the facilitators the results achieved with the class were excellent, four found the results to be good, and only one found the class result to be regular. This fact is important, as it demonstrates that the project promoted an evolution in the students, so that they met what, in the facilitators' view, are the minimum requirements demanded by the current job market. This also explains that the methodology employed in the project promoted a constant and gradual development of the students.

The team of facilitators was formed by professionals from the most diverse areas, as already mentioned, and who work in the main industries of the sector in the country. One of the ways to make the project viable was to hold meetings between students and facilitators and to socialize the themes remotely. For validation purposes, the facilitators were questioned about the remote live model. For six facilitators the model was excellent, four thought it was good, and only one thought it was regular. Future adjustments should be made to improve the interaction, even if remotely, such as the presentation of the themes by the students in auditoriums and classrooms, which will allow the use of more resources and greater interaction between the pairs. In the edition under analysis, the pairs presented their work without being in the same environment, each in their own home.

In order to develop and improve teamwork and conflict management skills, and to give the students the opportunity to have closer contact with more than one facilitator, a change of pairs, themes and facilitators took place during the project. The evaluation of this process is shown in Figure 5, with most facilitators rating this change positively (excellent or good), with only one facilitator rating the change as bad, and no facilitator rating it as terrible.

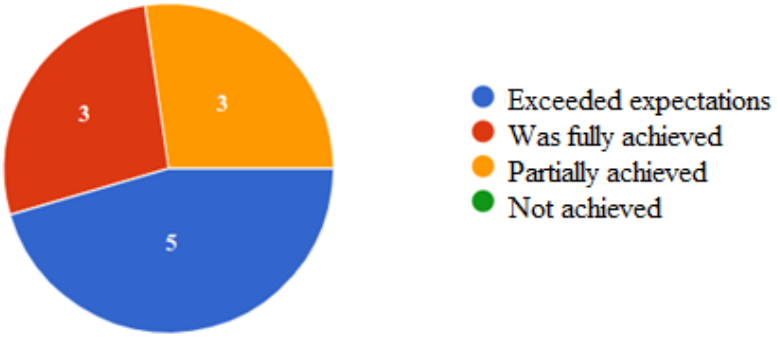
Figure 05 - Evaluation of the change of themes and pairs during the project



Source: Prepared by the authors (2021).

The facilitators were also asked if the purpose of developing students in management areas was met. The students who felt that the project exceeded expectations in this regard were five, while three facilitators felt that this aspect was fully achieved and three said it was partially achieved (Figure 6).

Figure 06 - Meeting the purpose of student development in the management areas.



Source: Prepared by the authors (2021).

Taking advantage of the facilitators' vast professional experience in their fields of work, they were asked about the main gaps that newly graduated professionals have when entering the job market. The main gap pointed out by 5 interviewed facilitators was the lack

of soft skills, highlighting behavioral and emotional management skills to deal with situations involving interpersonal relationships. The lack of knowledge of many of the management tools was pointed out. Other facilitators also pointed out competencies related to soft skills, such as lack of confidence, proactivity, and fear of entrepreneurship. Some facilitators reported that they observe a lack of connection between the university curriculum and the dynamic demands of the market. They mentioned that there is a university bureaucracy that prevents a quick follow-up to market changes. They also pointed out the lack of practical classes that simulate real industry situations, contemplating situations of professional demand. These evaluations were of great value, because they can improve the subsequent modules of the Facelera project, making it increasingly robust in providing the students with the development of characteristics that the labor market usually requires. Based on the facilitators' comments, it is possible to see that the project can help to fill these gaps in the curricular matrices, but changes in the curricular matrices themselves are necessary, and the way classes are executed also needs to evolve in order to develop the competencies desired for the training course.

Evaluation processes are always necessary at the end of pilot projects. In this way, the facilitators were questioned about the positive points and the points for improvement in the project. There were several positive points, the main ones being the themes approached, the methodology used, and the interaction that was provided to the students. Some comments made by the facilitators should be highlighted to elucidate the results achieved. The facilitator named F1 answered:

> There are numerous positive points worth mentioning: students can exercise and practice their speaking skills without being in a pressured environment such as at work or also in an academic environment, the possibility to interact with different people and therefore reinforce the idea of adaptation and integration. Not to mention that students broaden their knowledge by studying their own topic and watching other students' topics. The fact that they have to prepare and study in advance will help them to perform similar tasks at work, in college or in their personal field.

Another comment answered in the questionnaire by the facilitator named F2 is also noteworthy:

> The biggest positive point I see is that the student has to study and get to know areas that are completely different from what he is studying at university and that will certainly be required in his professional life, because in a globalized world, it is not worth having only technical knowledge of what he will work on, but to have a general knowledge of several areas of the corporate world. And the fact that he attends several subjects, that is great! He dedicates himself a little more to his theme, but he gains knowledge of all the themes by attending all the presentations.

Other positive points were about the remote model, which easily allowed the connection between facilitators and students. In addition, the use of a platform to post the videos and have the presentations evaluated by all the facilitators and colleagues participating in the project ensured the necessary interaction to achieve the results. It was

also highlighted that besides the knowledge of new themes, the students were able to discover various tools to give more interaction in the presentations.

As points for improvement, the evaluation system was indicated, with emphasis on the exchange of themes and pairs, which, despite providing the students with the opportunity to relate to other students and deepen their knowledge on more themes, decreased the students' enthusiasm, and it was clear that there was a loss of rapport in all the new pairs. The facilitators noticed a lack of motivation from the students after the second stage of the project, which corroborates the data presented in Figure 5.

Another point highlighted was the methodology for evaluating the presentations of each student. According to some facilitators, the ways in which some feedbacks were given generated demotivation in some students, as shown in the answer of facilitator F3:

> I understand that we are all there to learn, teach, correct, praise, etc., but I realize that the way some feedbacks are transmitted to students can leave them unmotivated. We know that the feedbacks always have a constructive objective, and here I am not saying that only praise fits, far from it, of course all the negative points should be pointed out for future correction, after all this is the goal of the project, but the format of how it is passed, sometimes, can have a demotivating effect.

Other negative points pointed out by the facilitators were the difficulty that the students had in reconciling work, tests, and Facelera, in addition to the time used in the meeting of 4 (four hours). As suggestions were cited the reduction of time with more meetings in smaller groups, focusing on what will really bring results for the students. The lack of alternation between virtual and face-to-face meetings was also mentioned as a point for improvement.

Other negative points were also mentioned as suggestions for improvement, such as a closer approach of the concepts to business demands (case simulations), democratize the content produced in Facelera through other channels (internal debates, intranet, etc.), Workshops during the project (Successful entrepreneurship / Tools that help manage successful teams / Self-knowledge).

Thinking about the future of the project, the facilitators were challenged to indicate new themes to be worked on by the students in new editions. The following themes were suggested: high performance, self-knowledge, personal financial education, companies' contribution to environmental preservation, Harvard's soft skills, human resources, finances, supply chain, socio-environmental projects, and accountability. There were also indications that the students should suggest new themes for future work.

The Facelera project presented very positive results for the first remote class. The methodology used in the project proved to be effective in meeting the objectives, which were clearly presented in the evaluations carried out by the students and the facilitators. The project presents itself as a viable alternative for complementing the training of professionals, being scalable to many other courses and institutions.

5 FINAL CONSIDERATIONS

At the end of the project, it was possible to conclude that the students who participated in the Facelera project had the opportunity to have a closer contact with entrepreneurs and

professionals in their fields of expertise and were also exposed to a challenging and stimulating environment, given the topics addressed. The Facelera Project proved to be a promising university extension project, which involves the company and the university to build a more solid career for the engineers who graduate from Unochapecó, having as its horizon the formation of a citizen who knows how to live with change, assuming an analytical, reflective, critical character and able to live and coexist in today's world, as well as forming leaders capable of innovating and managing their teams to seek continuous improvement and meet the expected results, in times of continuous change and innovation. The students pointed out the need for curricular improvement actions to be continuous, and that other new projects, as well as adaptations to existing ones, need to be constantly implemented. The analysis of the results showed that the objectives of the work were achieved, with the perception of most students and facilitators being that they had made progress in some of the main competences and abilities for the formation of good engineers.

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APPENDICES

Table 1. Questionnaire sent electronically to the students participating in the project

Which semester stage of the undergraduate course are you in? *
( ) First third ( ) Second third ( ) Final third
At this moment you are? *
( ) You are hired and already working in the chemical/food engineering area
( ) Doing internship in the area
( ) Works, but does not work in the area
( ) Not working
Indicate on a scale of 1 to 5, the level of agreement or disagreement, being 1 the total disagreement and 5 the total agreement. *
The content taught in universities, in general, is sufficient to form a good professional. [ ]1 [ ]2 [ ]3 [ ]4 [ ]5
The content taught at Unochapecó is sufficient to form a good professional. [ ]1 [ ]2 [ ]3 [ ]4 [ ]5
As an academic, what academic activities have you participated in? *
[ ] Scientific initiation/research project
[ ] Junior enterprise
[ ] Athletics
[ ] Academic weeks
[ ] Tutoring
[ ] Other extension activities, which:
Please indicate your overall evaluation regarding the Facelera project. *
( ) Very good ( ) Good ( ) Average ( ) Poor ( ) Very bad
Indicate how you evaluate your engagement in the Facelera project. *
( ) Excellent ( ) Good ( ) Fair ( ) Poor ( ) Very poor
Indicate how you evaluate your interaction with the Facelera project facilitators. *
( ) Excellent ( ) Good ( ) Fair ( ) Poor ( ) Bad
Indicate how you evaluate the fulfillment of your expectations in relation to the Facelera project. *
( ) Did not meet expectations
( ) Met expectations partially
( ) Fully met expectations
( ) exceeded expectations
Of the benefits that the program provided you, choose 2 options that most represent to you: *
[ ] Learning about subjects not studied in the disciplines that comprise the course
[ ] Increasing the network of contacts
[ ] Developing communication skills
[ ] Learning new tools to use in presentations
[ ] Developing the ability to work in a team

[ ] Being more prepared for various situations in personal and professional life
At the end of the Facelera project, do you feel more prepared to? *
( ) Manage people (work as a team)
( ) Manage industrial processes (optimize production)
( ) Work with lectures, training and consulting
( ) Organize and optimize more the tasks, leaving time for new activities
Regarding your expectations, the project: *
( ) did not meet ( ) partially met
( ) Met in full ( ) Exceeded expectations
Do you believe Facelera could involve other activities? Which ones?
What would you improve or change in Facelera?
About the graduation course, what do you think should be changed, aiming to deliver (form?) the best possible professional in the job market?
About Facelera, what did it add to your personal and professional life?

Source: Prepared by the authors (2021).

Table 2. Questionnaire sent electronically to the Project Facilitators

Please indicate your general evaluation regarding the Facelera project. *
( ) Very good ( ) Good ( ) Fair ( ) Poor ( ) Very bad
Indicate how you evaluate your engagement in the Facelera project. *
( ) Excellent ( ) Good ( ) Fair ( ) Poor ( ) Very poor
Please indicate how you rate the results achieved by the students under your mentorship in the Facelera project. *
( ) Excellent ( ) Good ( ) Regular ( ) Poor ( ) Bad
Indicate how you evaluate the progress of the students under your mentoring in the development of the Facelera project activities. *
( ) Excellent ( ) Good ( ) Fair ( ) Poor ( ) Bad
Indicate your evaluation of the students under your mentoring in the development of the Facelera project activities. *
( ) Excellent ( ) Good ( ) Fair ( ) Poor ( ) Bad
Indicate your evaluation of the Facelera project in a remote way (on line). *
( ) Excellent ( ) Good ( ) Fair ( ) Poor ( ) Very poor
Indicate your evaluation regarding the change of themes and pairs during the Facelera project. *
( ) Excellent ( ) Good ( ) Fair ( ) Poor ( ) Bad
Do you believe that the purpose of developing students in management areas: *
( ) has not been achieved ( ) has been partially achieved
( ) has been achieved in full ( ) has exceeded expectations
What are the main gaps that you perceive that recently graduated professionals have when entering the job market?
Would you indicate a different theme from those proposed so far?
About the Facelera project, please indicate: Positive points; points to be improved.

Source: Prepared by the authors (2021).