Visualizing Extracurricular Student Teams Learning at Tu/e Innovation Space with CDIO Syllabus

VISUALIZING EXTRACURRICULAR STUDENT TEAMS LEARNING AT TU/e INNOVATION SPACE WITH CDIO SYLLABUS

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ABSTRACT

This paper's purpose is to present the findings of exploratory research performed at TU/e innovation Space to gain a better understanding of what students learn in extracurricular student teams. Having a better understanding of student learning can help us make such learning more visible, which has a positive impact on students' development of professional identity and employability. The scope of this study includes interviews with five *alumni* from student teams and an analysis of its outcomes. The results of the interviews' analysis showed that students recognized that they experienced learning gains because of their participation in student teams. However, the process of describing the learning gains in a detailed way is not easy for them, showing that their extracurricular efforts did not make these learning gains explicit. Students reported learning gains associated with personal and professional skills (CDIO syllabus section 2) and interpersonal skills, collaboration, teamwork, and communication (CDIO syllabus section 3). Peer interactions and learning by doing were the most relevant media that promoted those learning gains. Finally, we conclude that additional methods such as observations during teamwork can help understand the mechanisms that facilitate learning.

KEYWORDS

Extracurricular, Student Teams, Challenge-Based Learning, Learning gains. CDIO Standards: 1,2,3,4,5,7,8,11,12.

INTRODUCTION

TU/e innovation Space is the expertise center for Challenge-Based Learning and student entrepreneurship at Eindhoven University of Technology. The center is the umbrella for a student team program and facilitates around 700 students engaged in extracurricular student technology development teams. These students challenge themselves to tackle some of the world's complex challenges, together with over 500 external companies and organizations. Examples of these challenges are sustainable mobility (Team Polar, 2023), or accelerating the development of biosensors for health care (SensUs, 2023). The composition of the teams is diverse, their members are students from different programs and levels of education, their participation can be part-time (e.g., 10 hrs./week) or full time (e.g., ~40 hrs./week) depending on their time availability and willingness, teams shape their organization according to their needs, and the technological component of their projects ranges from technological divulgation to integration of existent technology in a novel way and development of new technology. Students in extracurricular student teams are characterized for their intrinsic motivation, students are not rewarded in any form, and their participation is voluntary. Finally, TU/e innovation Space provides coaching, technical support, physical space, and points them to financial and legal advice.

The Development Model (Seow & Pan, 2004) suggests that extra-curricular activities have a positive impact through an indirect effect on academic performance because of their non-academic and social benefits (Buckley & Lee, 2018). Empirical evidence indicates that extracurricular student team members experience learning gains in competences promoted in CDIO-based education including domain-specific knowledge and skills but also problem solving (Larson et al., 2006), interpersonal skills, communication, and working in teams (Clark et al., 2015). In addition, literature informs us that increased resilience (Thomson et al., 2013), social capital and social networks, discipline, and conformance to institutional norms and expectations (Stuart et al., 2011) are benefits of students' participation in extracurricular activities in higher education. Therefore, understanding and bringing visibility to extracurricular learning can have a positive impact on students' development of professional identity and employability. However, making student learning gains explicit requires implementing strategies to help students bring to the surface learning gains they might be unaware of (van Uum & Pepin, 2022). Moreover, there is a challenge for higher education institutions to effectively support learning in highly open, self-directed environments, such as that of extracurricular student teams, and for students to self-direct their learning.

Considering this context, TU/e innovation Space has initiated a three-year, design-based project, which aims at improving students' understanding of their extracurricular learning and competence development. Specifically, the project aims at making extracurricular learning more visible and explicit for students, guiding their learning and development while participating in extracurricular student teams. Importantly, the project aims at making a clearer link between the extracurricular activities and students' development of their professional identity, which include domain-specific (i.e., disciplinary) competences, broad professional competencies, but also their personal values and aspirations.

In this paper, the results of a first, exploratory phase in the design-based project (i.e., problem exploration) are reported. Based on in-depth interviews with alumni from extracurricular student teams we aim to answer the following research question: What do students learn in extracurricular student teams?

The remaining part of this paper is structured as follows: First, we provide the theoretical framework guiding our research. Subsequently, we elaborate on our methods, and we present the results. Finally, we conclude with a discussion on the findings.

THEORETICAL FRAMEWORK

The aim of this study is to find an answer to the research question, "What do students learn in extracurricular student teams?" To achieve this, first we need to define the concept of learning gain and, second, the concept of competence.

In this work, we define *a learning gain* as "a student's change in knowledge, skills, attitudes, and values that may occur during higher education across disciplines" (Vermunt et al., 2018). 'Learning gain' relates to the concept of *competence,* which is defined by Edwards-Schachter et al. (2015) as follows: "competence identifies both the combination of related traits, knowledge, values, attitudes, and abilities embedded in determined context and the process of development of them as an integrative personal construct". In connection with this definition, we also consider that the development of competences occurs in a learning process launching from potential capacities, involving traits, knowledge, abilities, and attitudes, and advances progressively integrating capacities (be able to) in specific contexts (Edwards-Schacter et al., 2015). Therefore, learning gains on skills, knowledge, attitudes work as building blocks for the development of competences.

Several existing frameworks provide insights into the various competences students can develop in the context of higher education (e.g., EntreComp, Bacigalupo et al., 2016; EUR-ACE, EUR-ACE, 2021; Academic Criteria for Bachelor's and Master's Curricula, Meijers et al., 2005; Bartram's Framework, Bartram; 2005). In this study, the CDIO Syllabus revision 3.0 (Malmqvist et al., 2022) guides our understanding of students' learning gains and competences reported by students. The reason for the decision is twofold. First, the CDIO syllabus presents in its four sections (fundamental knowledge; personal and professional skills; interpersonal skills; conceiving, designing, implementing, and operating abilities; and the expansion) detailed descriptions of learning outcomes that can be used to code what students self-report. Secondly, in the expansion section, detailed descriptions of learning outcomes associated with leading engineering endeavors, entrepreneurship and research, are presented (Malmqvist et al., 2022). These are relevant for this research given the characteristics of the extracurricular projects executed by student teams at the TU/e and the focus of TU/e innovation Space on promoting the development of these areas of expertise.

METHODOLOGY

In this exploratory investigation, semi-structured in-depth interviews were selected as the method to gather students' perspectives on their learning gains, as they can provide richer details (Immekus et al., 2005; Eichman et al., 2015). Five students were purposefully selected from different student teams to be interviewed for 45–60 minutes. The selection criteria required that the alumni participate for more than one year on a student team; they didn't participate in the same team; and they participated in teams solving different challenges. Participants joined voluntarily. The interviews were conducted live and voice-recorded after students signed a consent form for participation.

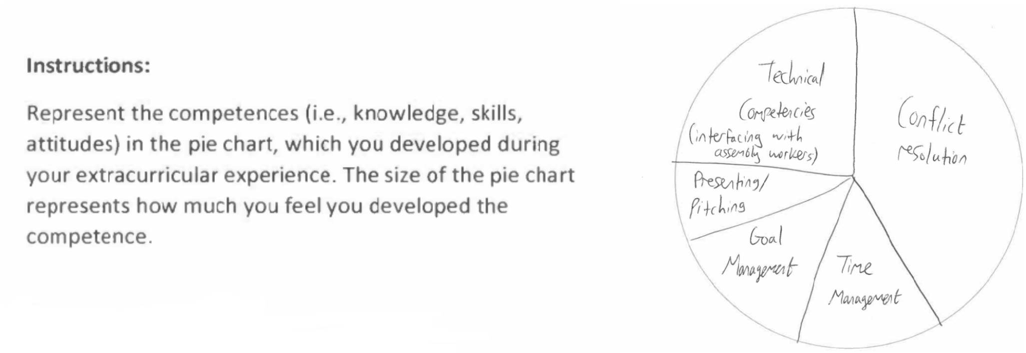
An interview guide was developed to guide the inquiry with participants, and designed to gain a better understanding of students' motivation to join a team, their learning, how they developed it, and their perception of the relevance of their learning. The competence concept is used in the interviews because it refers to the result of a learning process, which includes learning gains (Edwards-Schacter et al., 2015). In addition, terms such as attitudes and skills are not clear for students (Jorre de St Jorre & Oliver, 2018). Examples of the questions are:

a) *Tell us about what you feel you have learned during your time on the student team. Think out loud and walk us through the process.*
b) *Walk us through the learning you just identified. Where do you see this competence evident? Where did you need it? Where were you able to use it?*
c) *Provide examples of how you reached this learning/developed this competence: How did you develop it? Who or what was important in this learning? Which tasks were you able to do at the end of your participation in the student team but couldn't do at the start?*

Moreover, following the method proposed by van Uum and Pepin (2022), a pie chart was included in the guide, where every student was asked to represent their perceived learning gains or developed competences. In the pie chart exercise, the students received the following instruction: *Represent the competences in the pie chart, which you developed during your extracurricular experience. The size of the pie chart represents how much you feel you developed the competence.* An example of the pie chart is presented in Figure 1. Finally, students were asked to indicate the factors that influenced the growth of the indicated competences by clicking on boxes. The alternatives included: a) workshop, b) prior course of your program, c) students(s) in your team, d) academic consultant, e) industry or business consultant, f) internet source, g) by doing, h) by reflecting in team sessions, i) last's year team, j) outside support (friends, family, etc.), and k) others.

We only considered learning gains or the development of a competence when the student explicitly indicates that he or she has gained more insight into or understanding of his or her own performance on or mastery of competences, as Bakkenes et al. (2010) did in previous works. Other expressions were excluded in this exploratory phase.

Figure 1. Pie chart example



DATA ANAYSIS

The data analysis consisted of three steps. First, interview transcriptions were read, and the sentences where students explicitly indicated that they gained more insight were marked. Also, examples of tasks that students indicated they were able to do at the end of the project but couldn't do at the start were considered. Second, interview transcript quotes were coded in relation to CDIO syllabus 3.0, associating the contents of transcribed sentences with competence. The information included in the pie chart was also included as interview information. Third, codes were counted and grouped under the main CDIO syllabus 3.0 categories: fundamental knowledge; personal and professional skills; interpersonal skills; conceiving, designing, implementing, and operating abilities; and the expansion, which includes leading engineering endeavors, engineering entrepreneurship, and research. Thus, we will see what competences were mostly reported.

RESULTS

In this section, the results are presented in the form of portraits; the names of the students were changed to pseudonyms to ensure anonymity. The findings from the interviews are supported by representative quotes that are intended to be illustrative.

Portrait of Gert

Gert is a student of biomedical engineering at TU/e. When consulted about his motivations to join a team, he expressed:

One of my friends was already in the organization. So, I joined a couple of meetings. I found it very interesting. That's why I joined. And also, because I had some spare time in a week. So, it was great!

The team's objective is to organize a student competition where teams from all over the globe develop innovative biosensing systems. Gert was responsible for organizing the whole competition week and ensuring that all the activities ran smoothly.

Gert's learning expectations were: increasing meeting skills, developing professional skills, learning how to write emails, connecting with companies, and learning how to talk to professionals. After his participation, his learning expectations were surpassed.

In the pie chart exercise, Gert indicated and ranked the competences according to how much he felt he developed them as follows: a) risk management, b) meeting efficiency, c) professional contact, d) reduction of calling fear, e) biosensors. Gert indicated that these learnings were promoted by self-reflection, peer feedback, and observing and selecting other people's good practices to integrate into his work process.

Finally, Gert indicated that he knows he learned many things, but he has difficulties expressing them in a detailed way.

Portrait of Lena

Lena is a management student at a university of applied sciences. She joined a student team because she was looking for a place to do her internship. In that process, one of the TU/e student teams offered a position to manufacture a machine for a specific market need.

Lena joined a team whose objective is to improve the most challenging branches of the recycling industry, working on e-waste recycling and breaking it down to raw materials. She described her expectations as follows:

A lot of learning, a steep learning curve, a lot of mistakes, and eventually delivering a product that could change the world or the industry.

When asked if her expectations had been met after two years on the team, she replied:

The steep learning curve and the possibility to learn most certainly, the project still hasn't changed the world.

The role she performed was first technical while she was building the machine, and then, when she earned a minor in management, she took on a role associated with management. In her technical role, she had to design, build, and test a machine to recycle mobile batteries. In her managerial role, she had to research different management structures and analyze how they could be applied to the team.

In the pie chart exercise, she indicated and ranked the competences according to how much she felt she developed them as follows: a) research, b) critical thinking, c) working in teams, d) managing a team, e) business structure, f) doing experiments, and safety. Lena reported that most of these learnings were promoted by team members' interactions, by doing, and by workshops organized by her team.

Lena explained that she is very fluent when it comes to expressing her learnings because she has always been an easy talker who says exactly what she is thinking.

Portrait of Max

Max is an industrial design master's student. Max indicates that when he joined the team, he had no expectations regarding learning. His motivations were mainly related to social aspects:

I liked the challenge of having this huge group of students, all multidisciplinary, all types of students, working together towards one goal. I really enjoy working on projects with a big group.

Max joined a team whose objective is to design and build sustainable cars. His role in the team was social media manager. He participated in this role for one year.

In the pie chart exercise, he indicated and ranked the competences according to how much he felt he developed them as follows: a) social aspects, b) professional behavior, c) myself, d) social media, e) cars, technical knowledge, f) Adobe. Max reported that most of these learnings were achieved via peers, by doing, through external support, and as a result of workshops.

Finally, Max indicated that he recognized that he learned a lot, but explaining clearly what he learned is difficult.

Portrait of Anna

Anna did her bachelor's in industrial design and then followed innovation management. She has always wanted to run her own business and was never swayed by the traditional course structure. She did the challenge-based, on-campus, master team-based project. Once there, she identified the opportunity to transform the project outcome into a start-up. This company develops cognitive training for different areas, such as sports and the health sector.

Anna's role involved making strategic decisions for the company, creating business models, managing finances, and being responsible for work processes.

Anna, when asked about her opinion about her experience on the team, said that she enjoys being part of the team and that she feels it is like a hobby.

In the pie chart exercise, she indicated and ranked the competences as follows: a) internal management, b) being flexible, c) communication (presenting, pitches, networking), d) building confidence, e) regulation and finances, and d) managing people. Anna reported that most of these learnings were promoted by peers, by doing, by business consultants, and by workshops.

When consulted about how difficult the process of recognizing learning gains or the development of competences is, she answered:

After I learned something or didn't, in my bachelor or master, and I look back on what I learned, I don't really feel like that I learned anything because you don't really know what you knew before that experience.

Portrait of Helena

Helena follows the sustainable innovation master program. Her motivation to be part of a student team was to apply her bachelor's knowledge to an impactful project that lasted more than just a quarter. Her objective was to shape the team and the project.

Helena participated in a team whose objective was to design and build a sustainable, autonomous, and affordable rover to support research activities in Antarctica. She worked for the team for three years. The first year, she executed technical and engineering tasks; the second and third years, she executed managerial tasks.

In the pie chart exercise, she ranked the competences as follows: a) team building, b) learning how to learn, c) external relationships, f) identifying and assessing problems and priorities, g) presenting, and h) computer aided design, CAD. She indicated that these learnings were promoted by doing, by peers, by outside support (family), by an academic consultant, by workshops, and by internet tutorials and resources (TED talks).

Lastly, Helena indicated that she learned many things, but she thinks that describing her learnings with clarity is difficult.

Table 1 shows an example of the competences identified, and Table 2 shows a summary of the number of competences counted. The complete data are indicated in Appendix A.

Table 1. Competence identified after coding - example

Student	CDIO sec.1: Fundamental engineering knowledge	CDIO sec.2: Personal and professional skills and attributes	CDIO sec. 3: Interpersonal skills	CDIO sec. 4: Conceiving, designing, implementing, and operating	CDIO sec. 5: Leadership, entrepreneurship, and research	Competences not included in CDIO syllabus 3.0
Lena	Advanced engineering fundamental knowledge methods and tools	Critical thinking; Motivation for continuing self-education; Experiments planning; Experimental and knowledge discovery; Self-awareness; Information search; Personal vision on one's future; Time and resource management; Self-direct learning	Establishing diverse connections and networking; Forming teams, assigning roles and responsibilities; Handling diverse perspectives and conflicts; Coordination of team meetings; Oral presentation; Pitching; Planning and scheduling the work; Setting goals and objectives; Working in teams	Designing, recycling; Disciplinary design; Enterprise and business context; Safety and security; The research and technology development process; Utilization of knowledge in design	Business plan development; Creating new solution concepts; Defining the solution; Identifying the issue, problem; Thinking creatively and communicating possibilities	How to work in teams that provided services/products in Business to Business setting; Knowledge on how business to business works

Table 2. Number of competences counted after coding

Student	CDIO sec.1: Fundamental engineering knowledge	CDIO sec.2: Personal and professional skills and attributes	CDIO sec. 3: Interpersonal skills	CDIO sec. 4: Conceiving, designing, implementing, and operating	CDIO sec. 5: Leadership, entrepreneurship, and research	Competences not included in CDIO syllabus 3.0
Gert	1	3	5	0	0	0
Lena	1	9	9	6	5	2
Max	1	5	5	2	1	2
Anna	0	6	7	6	9	0
Helena	0	9	11	2	1	0
Total	3	32	37	16	16	4

DISCUSSION AND CONCLUSIONS

In this research project, we set out to explore what students learn in the extracurricular projects at TU/e. The research project is a first step in a three-years design-based project, aimed at making extracurricular learning more explicit. Our results identified that most of the learning gains reported by the five students, in both the pie chart and in the analysis, were associated with personal and professional skills (CDIO syllabus section 2) and interpersonal skills, collaboration, teamwork, and communication (CDIO syllabus section 3). Leadership, entrepreneurship, and research (CDIO syllabus section 5), and conceiving, designing, implementing, and operating (CDIO syllabus section 4) were reported with higher frequency in the case of two students who performed specific roles that exposed them to situations that promoted the development of those. Learning associated with content knowledge (CDIO Section 1) was reported only by one student in the pie chart and appeared three times after analyzing the coding results. From this finding, we infer that a possible relationship exists between the roles in the team and the learning gains reported by students.

While not our primary goal, our research also led to insights into how students learn in the context studied. When students were asked to indicate the factors that influenced the development of their self-reported learning gains, they reported them in order of relevance: by doing, team peers, and workshops. Other methods were reported less often. From this result, we conclude that most of the learning occurs while working in the team on their projects, and in day-to-day interactions with peers. However, team activities are disconnected to premeditated learning objectives, which could possibly explain why learning is not explicit for students. When asked how easily they identify learning gains or the development of competences, students indicated that they can identify the development of competences during their participation in student teams. However, they find it difficult to identify those learnings precisely. This is in line with what was reported by van Uum and Pepin (2022), who indicate that students might develop certain competences that they are not aware of.

In addition, the number of learning gains reported in the pie chart is lower than the number detected after analyzing the coding. For example, Lena reported working in teams as a learning gain in the pie chart. However, after analyzing her interview coding, we detected learnings associated with two CDIO syllabus learning outcomes: (a) forming teams, assigning roles, and responsibilities; and (b) coordination of team meetings. Both are subcategories of working in teams. From this result, we hypothesize that a) student descriptions of learning gains could be limited by their vocabulary, b) students are not aware of some learning gains that they might experience, and c) some learning gains are not immediately relevant for them, therefore, although they experience them, they do not report them.

Overall, we can conclude that students in extracurricular student teams experience learning gains which are associated with CDIO learning outcomes. However, making students' learning visible is still a challenge in this context where intended learning outcomes are not defined a-priori, and the learning path of a student in a certain team is not well understood yet.

Limitations and future work

Several limitations can be reported in connection with this exploratory research. First, the use of self-reporting as a unique source of information to gather student-perceived learning gains could have an impact on the validity of our findings. Including other instruments, such as observations, surveys, and reflections could help increase the soundness of information and the validation of students' self-reported learning gains. Second, we decided to consider as learning gains only those quotes where the students explicitly indicated that they had gained more insight into, or understanding of, their own performance or mastery of competences. However, literature includes other learning categories where the students report they have gained, through the learning experience, more understanding on how a skill works, or express a positive change in their perception of the value, importance, or significance of a generic skill (van Ravenswaaij et al.,2022). Third, the participation of only student teams' alumni, which could lead to a specific set of learning gains, and a weaker link to contextual information relevant to understand *how* extracurricular students develop their learning.

The work presented in this paper also informs future research and actions in our three-year design-based project. Of particular interest is the acquisition of content knowledge through the extracurricular learning experience, which was not prominently listed as a learning gain by students. Future work could therefore explore students' views on extracurricular learning in relation to the learning in their own programs. In the next steps, we will focus on further exploring learning and competence development in extracurricular teams and how to make it visible or explicit through a mixed-methods approach, such as surveys, observations, and co-creation sessions. Future work should also expand on the number and diversity of students to be interviewed. In this regard, we recommend including active members of different student teams who play different roles on them. In addition, we recommend adding additional categories to detect a learning gain or the development of competences based on the work of van Ravenswaaij et al. (2022) and Bakkens et al. (2010). Finally, we propose performing a more detailed study to understand how peers' interactions and work in the team, without a premeditated learning objective, promote learning gains and the development of competences.

Our ongoing research already takes the above insights into account and dives deeper into the topic of extracurricular learning through case studies of sampled student teams. We expect this approach will allow us to map in more detail the roles within student teams, the learning ecosystem in general, the team processes and outcomes, and their connection to learning. Performing these and future research activities will help to improve the characterization of the learnings experienced by student teams' members. This will provide better tools to suggest specific learning paths and resources to students when they want to develop or acquire specific competences. Finally, these best practices could impact positively and make more effective the design of Challenge-Based Learning experiences in the curriculum.

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BIOGRAPHICAL INFORMATION

Eugenio Bravo is an educational researcher in the project "Extracurricular Learning & Competence Development" at Eindhoven University of Technology. He has been involved in the implementation of Challenge-Based Learning courses in engineering higher education. His research interests are engineering education innovation and competence development.

Ana Valencia is an educational design researcher and project leader of the project "Extracurricular Learning & Competence Development" at Eindhoven University of Technology. She combines her passion for innovation, design thinking, and education in her present project. Next to this, she supports the innovation of education at TU/e, and particularly on the topic of assessment as learning in Challenge-Based Learning.

Isabelle Reymen is the scientific director of TU/e innovation Space and professor design of innovation ecosystems. She started TU/e innovation Space with the ambition to structurally change education and after 7 years she is the director of an award-winning team with never-ending ambitions.

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Appendix A – Interviews analysis outcome

Student name	CDIO sec.1: Fundamental engineering knowledge	CDIO sec.2: Personal and professional skills, & attributes	CDIO sec. 3: Interpersonal skills	CDIO sec. 4: Conceiving, designing, implementing, operating	CDIO sec. 5: Leadership, entrepreneurship, & research	Competences not included in CDIO syllabus 3.0
Gert	Advanced engineering fundamental knowledge methods and tools	Adaptation to change; Professional behavior; Self-confidence, courage and enthusiasm, determination to accomplish objectives	Communication: communication context; Communication: the needs and character of the audience; Coordination and management of the team process, meetings; Forming teams, assigning roles and responsibilities; Working in teams	Not reported	Not reported	Not reported
	Total: 1	Total: 3	Total: 5	Total: 0	Total: 0	Total: 0
Lena	Advanced engineering fundamental knowledge methods and tools	Critical thinking; Motivation for continuing self-education; Experiments planning; Experimental and knowledge discovery; Self-awareness; Information search; Personal vision on one's future; Time and resource management; Self-direct learning	Establishing diverse connections and networking; Forming teams, assigning roles and responsibilities; Handling diverse perspectives and conflicts; Coordination of team meetings; Oral presentation; Pitching; Planning and scheduling the work; Setting goals and objectives; Working in teams	Designing, recycling; Disciplinary design; Enterprise and business context; Safety and security; The research and technology development process; Utilization of knowledge in design	Business plan development; Creating new solution concepts; Defining the solution; Identifying the issue, problem; Thinking creatively and communicating possibilities	How to work in teams that provided services/products in Business to Business setting; Knowledge on how business to business works
	Total: 1	Total: 9	Total: 9	Total: 6	Total: 5	Total: 2
Max	Advanced engineering fundamental knowledge methods and tools	Professional behavior; Professional conduct in social media; Search and identification using library, on-line, data bases; Self-awareness and self-reflection; Self-confidence, courage, and enthusiasm to accomplish objectives	Communication, needs and character of the audience; Communication strategy; Meeting coordination; Use of digital tools for graphical communication; Working in teams	Enterprise stakeholders, strategy and goals; Experimental prototypes and test articles in design development	Planning an managing a project to completion	Communicating the concept and meaning of a brand; Creating a brand
	Total: 1	Total: 5	Total: 5	Total: 2	Total: 1	Total: 2
Anna	Not reported	Adaptability resourcefulness and flexibility; Balance between personal and professional life; Initiative and willingness to make decisions in the face of uncertainty; Professional behavior; Prioritization and focus; Self-confidence	Communication strategy; Coordination and management of team processes; Establishing diverse connections and networking; Negotiation, compromise and conflict resolution; Oral presentations; Setting norms about confidentiality; Working in teams	Enterprise strategy and resource allocation; Engineering project finances and economics; Entrepreneurial finance and organization; Enterprise stakeholders, strategy and goals; Partnership and alliances; Working effectively within hierarchy and organization	Business plan development; Establishing enterprise processes; Company capitalization and finances; Consideration of regulatory forces; Creating the corporate entity and financial structure; Conceiving products and services around new technologies; Leading and building an organization; Managing intellectual property; Relationship with customers	Not reported
	Total: 0	Total: 6	Total: 7	Total: 6	Total: 9	Total: 0
Helena	Not reported	Ability to examine critical questions; Critical thinking; Finding a solution that solves the problem; Information search and identification using library, on-line, and data based tools; Issue prioritization in context of overall goals; Personal vision for one's future; Problem identification and formulation; Self-awareness; Self-directed learning	Coordination and management of the team process; Creativity, empowerment and motivation; Coordination and management of team processes, communication-information; Forming teams, assigning roles and responsibilities; Handling diverse perspectives and conflicts; Working in teams; Oral presentations; Setting goals and objectives, planning, scheduling the work; Stakeholder engagement; Team membership and leadership; Use of digital tools for graphical communication	Utilization of Technical and scientific knowledge; Validation of performance to customer needs	Validation of performance to customer needs	Not reported
	Total: 0	Total: 9	Total: 11	Total: 2	Total: 1	Total: 0