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Chapter 2

Project-Based Learning and its Effects on Freshmen Social Skills in an Engineering Program

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Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.72054

Abstract

This chapter reports some effects of project-based learning (PBL) on development of social skills on Industrial Engineering freshmen (first-year) students. PBL is an active learning and student-centered methodology that promotes skills development such as the 4C—Critical thinking, Communication, Collaboration and Creativity. These skills should be an integral part of the expected engineering competences needed for professional proficiency, in order to comply with a changeable world and instable marketplaces, which require competences well beyond the technical ones. Through a survey to the first-year students and interviews to recently graduated professionals, some interesting results about the effects of PBL on social skills development were acquired. Some of these results relate to the recognition of acquiring competences during the project development and the usefulness and applicability of these in their daily professional activity. Among others, these encompass the capability to lead projects and produce effective work within multidisciplinary teams, to deal with conflicts, and to provide effective oral and written communication and capability to adapt to different work environments and assuming responsibilities, reflecting and assessing the own learning and the work of others, and to respect the attitudes and work of others.

Keywords: project-based learning, soft skills, engineering education, active learning methodologies, competencies development

1. Introduction

The Fourth Industrial Revolution, promoted by, what is known in the occidental world as Industry4.0, will put some challenges to the new engineers, as alerted by the report of the National Academy of Science and Engineering [1]. It is envisioned that the way work will be

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organized in the future will enable the release of workers doing routine tasks, appealing to their skills for more creative and value-added activities. Additionally, they will be called to develop more complex products and systems and to manage them efficiently through new methods, tools and technologies [e.g., by using, among others, augmented reality (AR), virtual reality (VR), cyber-physical systems (CPS)] and to use transdisciplinary perspectives [2].

Work organization and design changes will imply a total new role of workers, increasing their responsibility and enhancing their personal development. According to the report of the American Management Association [3], the skills to deal with the fast pace of change in businesses are beyond the traditional "Three Rs" of reading, writing and arithmetic to a new set of skills, the "Four Cs": Critical thinking, Communication, Collaboration and Creativity, to enable workers to think critically, solve problems, innovate, collaborate and communicate more effectively.

The changes described require a new thinking about the way prospective workers are trained. This implies modifications in teaching institutions and pedagogical approaches. These modifications must educate the future workers to have more initiative, to possess excellent communication skills and the ability to organize their own work, as recommended by the reports referred above [1, 3] and others [4]. These needed skills fit in the set of the called Social Skills that according to the Business dictionary is the *"Ability to communicate, persuade, and interact with other members of the society, without undue conflict or disharmony"* [5]. Other definitions found are aligned with the one presented above, such as the definition of the Collins dictionary that states: *"the skills that are necessary in order to communicate and interact with others"* [6].

Active learning methodologies are particularly advocated, such as project-based learning (PBL), as methodologies capable of providing such skills [7–9]. Project-based learning is an active learning methodology that engages the students on their own learning, and puts them at the heart of competence development, including technical and transversal ones, like social skills. Indeed, PBL requires that team members ultimately bond with their peers in a student-centered approach, aiming at the development of technical proficiency in a number of subjects, for proposing a meaningful solution for an open-ended challenge. This prolific process requires that team members abandon their passive attitude toward learning and allows them to systematically exercise a number of distinct settings, which enrich their learning experiences. These are key in engineering programs where students are ought to develop competences for future practice, such as solving real-life problems, making convincing arguments (oral and written), leading teams, managing conflicts, working effectively within teams, considering social and environmental issues, interacting with others (e.g., colleagues, partners, clients) and being proactive and innovative.

This chapter discusses the PBL implemented in the Industrial Engineering and Management (IEM) program of first year since 2004–2005 as an effective tool to promote the defined social skills in the freshman. The instruments used to evidence this were the PBL process assessment survey applied in the end of semester to the first-year students and some interviews with the graduates PBL participants.

This chapter is divided into six sections. After the introduction, a brief literature review about PBL and skills is presented in Section 2. The research methodology is introduced in Section 3. Section 4 presents the context study describing the most important aspects of PBL. Section 5 points out the results and main findings and, finally, last section outlines some conclusions.

2. Literature review

According to Schmier [10], teaching is a sacred trust, a heavy responsibility, a privilege not to be taken lightly, a noble mission, a profound opportunity and making in life. This could not be more true when it is taken seriously, and in order to happen, it is necessary to be prepared to teach. This means recognizance and having present powerful ideas in teaching, as introduced by Gibbs and Habeshaw [11]: (1) students construct knowledge; (2) students need to see the whole picture; (3) students are selectively negligent; (4) students are driven by assessment; (5) students often only memorize; (6) students' attention is limited; (7) students can easily be overburdened; (8) adults learn differently; (9) students learn well by doing; (10) students learn well when they take responsibility for their learning and, finally, (11) students have feelings.

How to put in practice such ideas and implement teaching in effective learning? Active learning seems to be the solution. Active learning is defined by Bonwell and Eison [7] as instructional activities involving students in doing things and thinking about what they are doing. These activities are capable of creating excitement in the classroom at such a point that learning would be natural. Active learning activities should be capable to provide six levels of Bloom taxonomy: (1) knowledge, (2) comprehension, (3) application, (4) analysis, (5) synthesis and (6) evaluation and this same, revised [12]. Another taxonomy to be covered by active learning methodologies is Fink's taxonomy levels [13] of significant learning. Fink's view levels are as follows: foundational knowledge, application, integration, human dimensions, caring and learning how to learn. These authors referred that Bloom six-level taxonomy is no longer enough to the transformational learning practice.

Comparing these taxonomies, all are important in education, but, particularly, the last three from Fink' taxonomy, are, maybe, the most fundamental levels in an engineer training. In addition to these, engineer training demanded an holistic development of knowledge (head), dispositions (heart) and application (hands) and competency development of sustainability, systems and ethics provided by a Lean Engineering Education, as advocated by Flumerfelt et al. [14]. Such themes are not easy to teach/learn demanding active learning but also collaborative and cooperative approaches where the students become the center of their own learning. According to Prince [15], collaborative approaches can refer to any instructional method in which students work together in small groups toward a common goal, and cooperative as a structured form of workgroup where students pursue common goals while being assessed individually.

Project-based learning is an active learning methodology that involves collaborative and cooperative approaches. This could have different roots and different moments of interest and renaissance [16]. Nevertheless, it seems that the history of project method was systematically attached to the works of Dewey [17] and Kilpatrick [18, 19]. Both authors agree on the suitability of this method to prepare autonomous, independent and responsible citizens for their active practice social and democratic modes of behavior. These values are learned by the students while constructing the path to their own knowledge, combining theory with practice in a meaningful environment and a purposeful education. Some universities and colleges, such as the Aalborg University in Denmark, are converted to the project method adopting an approach of project (project-based learning) that could go from a single project in a course, the Task project, to a problem project [9].

In an engineering environment, some authors, for example, Powel and Weenk [20], named PBL as Project-Led Engineering Education (PLEE) and defined it as *"Project-led engineering education focuses on team-based student activity relating to learning and to solving large-scale open-ended projects. Each project is usually supported by several theory-based lecture courses linked by a theme that labels the curriculum unit. A team of students tackles the project, provides a solution, and delivers by an agreed delivery time (a deadline) a 'team product', such as a prototype and a team report. Students show what they have learned by discussing with staff the 'team product' and reflecting on how they achieved it."*

By doing such projects, students develop technical competences and transversal (or transferable) competences. Among these are the social skills, referred above, that in essence are related to the ability, as individual, to engage effectively with others. It is this that defines a person in terms of how he/she establishes healthy relations with others. When this happens, there are conditions for the knowledge sharing and growth. An intelligent individual only is recognizable as such if he/she has its recognition by the peers. So, social skills are utmost the trigger for establishing a network of persons and to deal with the transdisciplinary complex systems created [21] by the Fourth Industrial Revolution. The National Academy of Science and Engineering report [1], previously referred, is clear about the training needs of workforce in managing complexity, abstraction and problem-solving. It is expected that they are able to act much more on their own initiative and to possess excellent communication skills and the ability to organize their own work, putting greater demands on employees' subjective skills and potential. Previous reports such as the ones from American Society of Mechanical Engineers (ASME) and Royal Academy of Engineering [22, 23] alerted also to these needs. At the same time, new opportunities in terms of qualitative enrichment of their work, a more interesting working environment, greater autonomy and more opportunities for self-development will be provided.

3. Research methodology

To achieve the objectives of the study described in this chapter, two research instruments were used. Instrument 1 consisted in a questionnaire on the development of social skills, targeting IEM first-year students of the last PBL edition of the Industrial Engineering and Management (PBL-IEM1) program, at University of Minho, Portugal. This was aimed at uncovering the social skills that are developed and exercised in PBL, along with a reflection on its importance for future professional proficiency. Instrument 2 consisted in interviews on the perceived importance of early experiences in PBL for the development of social Skills, targeting a group of young Industrial Engineers currently working in a number of companies. These instruments enable the gathering of different perspectives from different stages of professional development, and the use of multiple research approaches and data types, that is, a quantitative analysis grounded on the questionnaire applied to the PBL-IEM1 students, and a qualitative analysis grounded on the interviews (via email) to IEM recently graduated engineers.

The questionnaire used on instrument 1 is part of a larger annual questionnaire on evaluation of the PBL methodology. Three sections were considered to directly relate to social skills development, which encompassed a total of 25 questions, which were evaluated based on

Section	Code	Question
II. Learning and skills development	Q10	I feel that my participation in the PBL helped to develop my autonomy
	Q11	During the semester, I improved my communication skills (oral and written)
	Q12	Providing feedback to a report from another group was important and allowed to develop my critical thinking
	Q13	The construction of the prototypes stimulated my capacity for initiative and creativity
	Q14	Creating a blog/website was useful to help organize and disseminate the teams' project
	Q15	The blog/website also helped to select and organize contents
III. Teamwork	Q16	Teamwork has helped to increase my motivation for learning
	Q17	I prefer to work in groups than individually
	Q18	During the semester, I played an active role in the group
	Q19	The existence of roles in the group (president, secretary, time manager) was fundamental to understand better those roles
	Q20	During the project, my group held formal meetings and produced meeting minutes
	Q21	I consider that the interpersonal skills that I have developed are important for my future professional activity
	Q22	I shared the results of my tasks and knowledge with the rest of the group
	Q23	I was able to solve the conflicts in the group and face them positively
	Q24	I have applied teamwork supporting techniques that were useful to progress the project
	Q25	I think that I played well as a team member
	Q26	When in disagreement with the other team colleagues, we always came up to an understanding
	Q27	After each meeting and task accomplished, I always left confident and enthusiastic
	Q28	At each team meeting, I tried to understand the feelings of the others colleagues when they were angry, bored or sad
	Q29	When I was not able to fulfill a task assigned to me, I asked for help to other colleagues of the group.
	Q30	When a colleague completes the task correctly, I commend him for the achievement
IV. PBL as teaching/learning methodology	Q48	The PBL facilitated my integration and socialization at the university
	Q50	The PBL has a positive impact on the relationship established with teachers and the department
	Q55	PBL requires excessive effort when compared to any other course of the semester
	Q56	I believe, however, that this effort is rewarded with the skills acquired

Table 1. PBL questionnaire: social skills development.

Position/Company type	IEM1 edition attended (Work experience)	Job responsibility	Role within teams Daily frequency of interaction
Trainee International	2012/2013 (finishing the fifth year)	Times and methods trainee engineer	Work in a multidisciplinary team. In average, work with six workers/day.
Trainee International	2012/2013 (finishing the fifth year)	Times and methods trainee engineer	Work in a multidisciplinary team. In average, work with 20 workers/day.
Trainee National	2012/2013 (finishing the fifth year)	Production	Lead a team of 30 workers In average, work with 10 workers/day.
Trainee National	2012/2013 (finishing the fifth year)	Logistic and warehouse organization	Lead a team of nine workers In average, work with 40 workers/day.
Engineer/Trainee (abroad) International	2010/2011 (2 years)	Time Study and Methods engineer	Work in a multidisciplinary team. In average, work with 20–25 workers/day.
Engineer National (startup)	2010/2011 (2 years)	Industrial Engineering Marketing	Work in a multidisciplinary team. In average, work with five workers/day
Engineer (abroad) International	2007/2008 (5 years)	Capability Acquisition Manufacturing Engineer	Lead one worker indirectly.
Engineer International	2006/2007 (6 years)	Industrial engineer	Work in a multidisciplinary team. In average, work with 50 workers/day.
Engineer International	2006/ 2007 (6 years)	Process quality coordinator	Team moderator, three workers team multidisciplinary.
Engineer International	2004/2005 (8 years)	Logistic projects department responsible	Lead a multidisciplinary team of 8 direct and 16 indirect workers. In average, work with 50 workers/day.

Table 2. Characterization of the interview respondents (young industrial engineers).

5-point Likert-type scale. The students had to indicate the degree of agreement to each question/sentence (where "1" corresponds to "strongly disagree" and "5" to "totally agree"). The questionnaire was made available online, for 2 weeks, after the end of the semester. From the 48 enrolled students, 32 accepted the challenge and answered the questionnaire. The 25 closed questions and the corresponding sections are depicted in **Table 1**.

Regarding the young engineers' opinion on the effects of the PBL methodology on the development of social skills, three main questions were raised and answered by e-mail:

- Did you feel that having carried out a project in the PBL context was relevant to your qualification (IME)? Explain in detail how?
- Do you think it helped you to develop social skills? Which ones? Can you please give examples?

- In the exercise of your professional activity did you feel that you were able to more easily overcome difficulties (or not) due to your knowledge acquired with PBL? Identify some of the difficulties encountered?

Six young engineers and four trainees voluntarily accepted to answer the questions. The sample was defined for convenience purposes, namely easiness and speedy gathering of the information. Concerning the work experience, four of them are having their first experience in an internship program (trainee) in a company, and the remaining ones from 2 to 8 years of work experience. Most respondents were integrated in multidisciplinary teams, with small and medium dimensions, and some of them were in a leading position (three). Two of the interviewees are, currently, working abroad in international company. **Table 2** characterizes the respondents' profile, company type, IEM first year of academic years (edition) attended and number of years of work experience, type of work and if they lead a team and how many workers they lead or work with.

A quantitative analysis of the results on the questionnaire and a qualitative analysis of the answers to the interviews will be explored in more detail using context analysis in Sections 5.1 and 5.2, respectively.

4. Study context

An interdisciplinary PBL approach was implemented in the first year of the Master's Degree on Industrial Engineering and Management (IEM) program, called PBL-IEM1. This approach was firstly employed in the 2004–2005 academic year [24]. The 14th edition of the PBL-IEM1 project was held in the first semester of 2016–2017 and had 49 students enrolled. This approach challenges the teams to develop and fetch knowledge, and skills, from different disciplinary fields, in order to propose a solution for a semester-wide open-ended problem. The class was divided into six teams of eight members each, with the exception of one team, which had nine members. The teams were initially instructed on the general guidelines of PBL and in detailed aspects of its particular implementation at the IEM program at the University of Minho. The dimension of the teams is kept large purposely, as well as for practical reasons, namely due to scarcity of project rooms, a limited number of available kits for prototype development and a limited number of tutors to accompany each one of the teams.

The first semester of the IEM program includes six Project Supporting Courses (PSCs), each of one holding five ECTS. The PSCs pertain to four departments, from two distinct schools, namely Engineering and Sciences, as shown in **Figure 1**. The PSCs are as follows: (1) Introduction to Industrial Engineering and Management (Topics of IEM); (2) Calculus; (3) General Chemistry; (4) Algorithms and Programming; (5) Linear Algebra and (6) Interdisciplinary Project on Industrial Engineering and Management. It involves a team of six lecturers and four tutors (two of the lecturers perform as a tutor as well), which are, simultaneously, the coordination team of the PBL edition.

The PBL-IEM1 lasts for 20 weeks (15 weeks of contact work), 2 weeks for Christmas break, and the remaining weeks are used for assessment purposes and final examination the PSCs. Although social skills can also be learned, regular practice and experience are keys for skills development. The PBL-IEM1 requires a great deal of contact, not only among team mates who

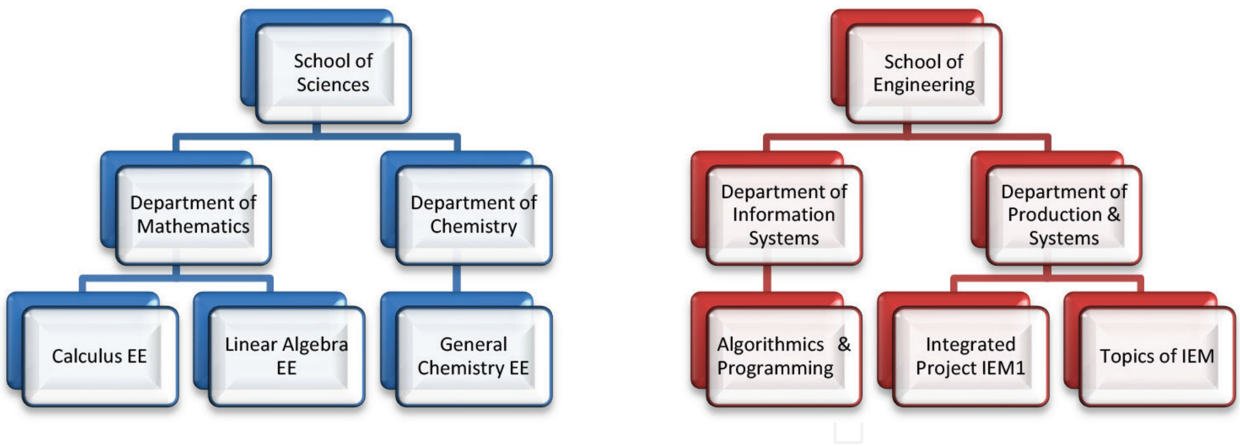

Figure 1. Distribution of IEM courses of first year, first semester by schools and departments [25].

share the same room (the teams' space) during a full semester but also a more frequent than usual interaction with lecturers and tutors. Frequent presentations to big audiences and communication with companies are also exercised during the semester. The teams are instructed as well on the theme that they have to develop [26], on the mechanism of peer assessment, on team working [27] and on conducting presentations.

The project assessment methodology (team related) is intricate, requiring the assessment of multiple items, each of them holding different weights and graded by multiple lecturers. More details on the PBL-IEM1 assessment methodology can be found in Moreira et al. [28–30], Fernandes et al. [31, 32] and Alves et al. [25, 33].

Previous research studies on PBL-IEM1 shown that the motivation to learn represents a prime driving force in Engineering Education which is influenced, not only on the interests and perceived importance of the subjects for the individual, but also on the "fun-factor" and on the inner dynamics of the individual teams, among other aspects [26]. The development of technical and transversal competences based on student-centered work is enabled through the PBL methodology and that the students themselves perceive that they have developed communication and teamwork competences [27], along with conflict management and commitment with others [34]. These findings suggest that active participation in real life should be stimulated during the learning process itself by enabling a meaningful student-centered learning environment. Moreira and Sousa [35] report an increased enthusiasm, cooperation and salutary competition between contending teams in the development of prototypes of production systems within PBL-IEM1. At the same time, teachers and researchers are also deeply involved with PBL process evaluation in a permanent cycle of continuous improvement, concerned with all aspects of PBL process [36].

5. Results and discussion

This section presents the results of application of two distinct approaches to evaluate the PBL effect on development of social skills. The results on the questionnaire, issued to first-year students on the 14th edition of the PBL-IEM1 (2016–2017 academic year), are provided in Section

5.1, while the results on the answers to the interviews, issued to recently graduated engineers, which undertook a prior edition of the PBL-IEM1, is provided in Section 5.2. The discussion on the foregoing matters follows the respective presentation of results on each one of the sections.

5.1. First-year IEM students' belief

Figures 2, **5** and **7** illustrate the distribution of the mean obtained based on first-year IEM students' perceptions regarding the social skills for Section II—Learning and skills development, Section III—Teamwork and Section IV—PBL as teaching/learning methodology, respectively. For all the statements in analysis, the mean obtained is greater than 3, showing a positive agreement. A detailed explication of the results of each figure is given next.

Although practically all the mean values obtained regarding Learning and skills development statement evaluation are around 4 (Agree) (**Figure 2**), the less positive agreement was obtained in Q15 (the blog/website also helped to select and organize contents) with 3.4.

Also, Q14 (creating a blog/website was useful to help organize and disseminate the teams' project) received a relatively low agreement (3.7). By these last two results obtained, it seems that the students do not hold a positive opinion on the use of a blog/website as a tool to improve their critique writing even in a less formal way [37]. **Figure 3** shows one of the blogs created by one team. Here it is possible to observe their concern to create an emotional appealing slogan related with their conceived company to employ an ecological material while denoting some creativity. Thus, they could not totally agree but they were enthusiastic in creating the blog and conveniently disseminate their work in progress. Nevertheless, in the fourth year, when they have PBL again, they recognize this value as they need it to demonstrate, and monitor, the results to teachers and companies [38].

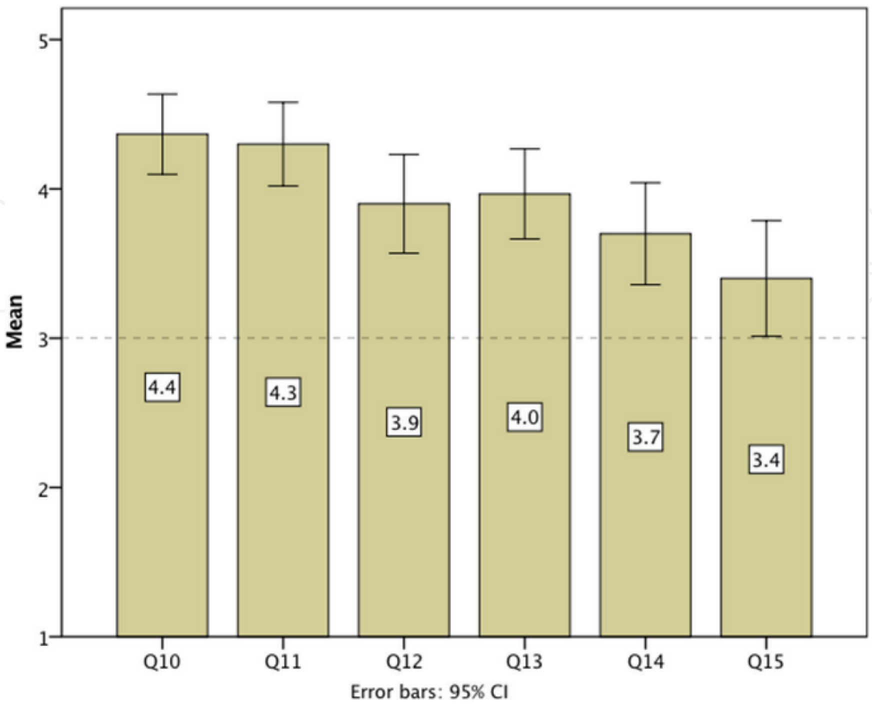

Figure 2. Questionnaire results: Section II—Learning and skills development.

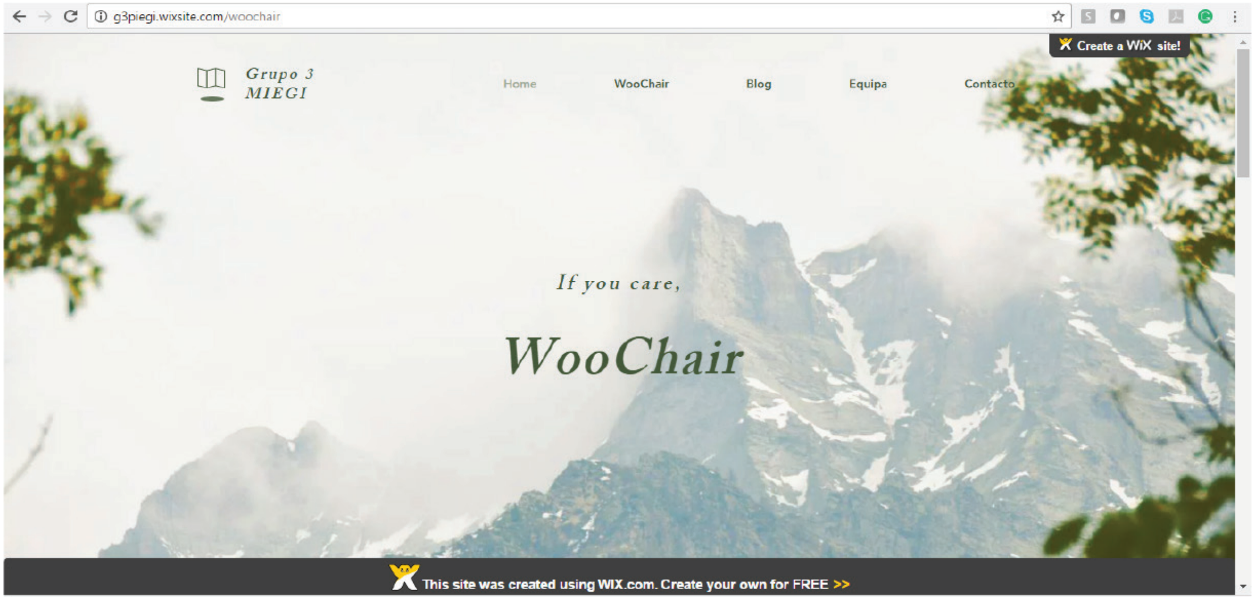

Figure 3. A blog created by one of the teams.

Concerning the Teamwork dimension (**Figure 4** shows two of the teams from 2016 to 2017 edition working in their project room), the graph of **Figure 5** shows that in average the students agree (around 4) with the statements considered, being Q27 (after each meeting and task accomplished, I always left confident and enthusiastic) the one that has received the lower value (3.4). In a way, students filling unconfident and not so keen on the work done indicate a certain inadaptability to adjust to changing situations, persons or/and environments. However, one such behavior could be expected, since it consisted a first-time experience for some of the students, if not for all. When asked about as they like to work, individually or as a group (Q17), students' responses in average show a slight agree. However, they also strongly agree (4.5) to share results of their tasks and knowledge with the rest of the group (Q22). Students in PBL context point out some weaknesses and strengths to teamwork, as discussed in Alves et al. [27].

The questionnaire of the Section IV—PBL as teaching/learning methodology also produced positive results (all of them equal or higher to four: "agree") (**Figure 6**).

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The relationship established with the teachers (and other members of the department of production and systems) of the IEM program is so effective that starting in the first year the

Figure 4. Two teams working in their project room (pictures intentionally blurred for privacy purposes; taken by one of the authors).

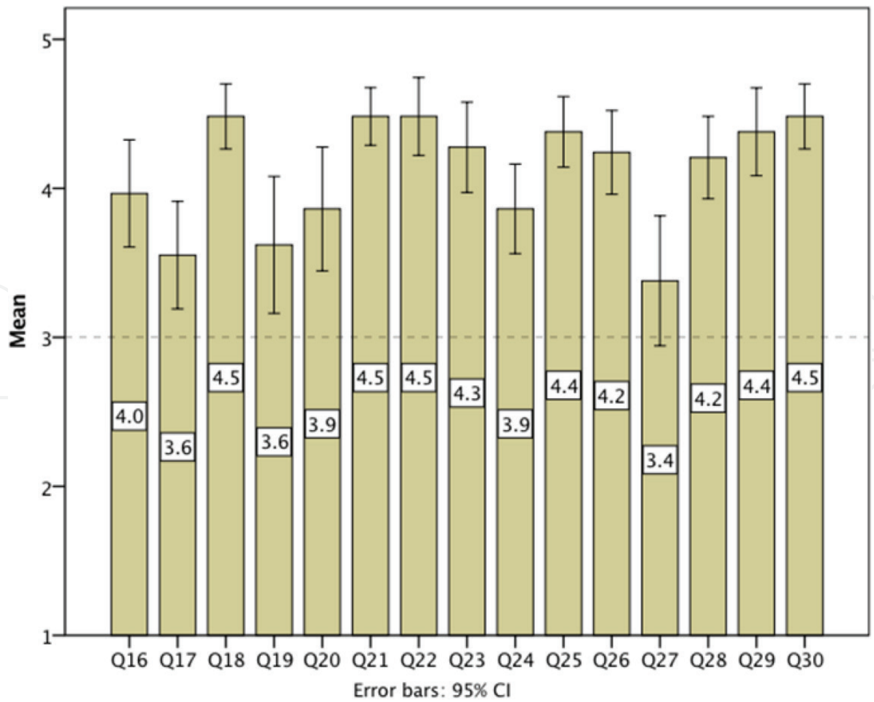

Figure 5. Questionnaire results: Section III—Teamwork.

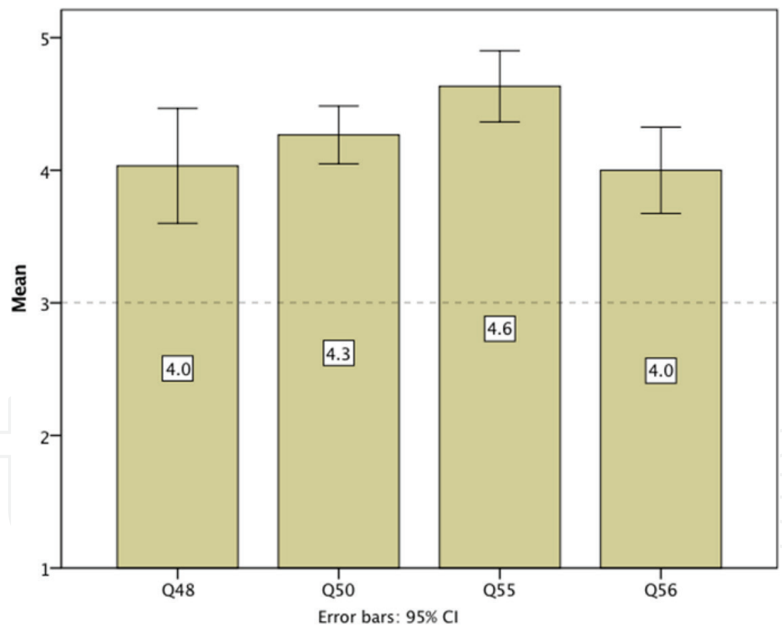

Figure 6. Questionnaire results: Section IV—PBL as teaching/learning methodology.

students are involved in the Department Day event, by presenting their projects (**Figure 7**) and by supporting and participating in the event.

Furthermore, some were even interested in starting their new experience in publishing papers [39] or in publishing their master dissertation final results in conferences and journals. A list of these publications can be seen in Alves et al. [40]. At the same time, their activity in alumni associations shows a dynamism toward to increase their collaboration on the international

Figure 7. First-year students' teamwork presentations in the Department Day (pictures intentionally blurred for privacy purposes; taken by one of the authors).

association of Industrial Engineers students (ESTIEM). Their activity is so intense that they were invited to become the magazine editors, while the number of participants in the international events was never so high.

Also, the mean value near 5 ("Strongly agree") obtained in statement Q55 (PBL requires excessive effort when compared to any other course of the semester) strengthens the difficulty that the students experience in managing time. But, at the same time, they also gave a good grade to the Q56 (I believe, however, that this effort is rewarded with the skills acquired). That is, they noticed that PBL is not equal to other curricular units.

From the 32 responses obtained in the questionnaire, it was also possible to retain some phrases reported by the students in the open question "Positive aspects of participating in the PBL":

- Development of soft skills and better understanding of the complexity of a company/industry, namely, at the level of its production system.
- Development of the spirit of initiative and "gain" more responsibility.
- Socialization with colleagues; learning of transversal competences; similarities to an employment environment (working with large groups and knowing how to manage the work and opinions of each one).
- Teamwork and resolution of various problems in a short time; acquisition of new skills/soft skills; teamwork; acquisition of knowledge that goes far beyond what is given in each course.
- The PBL allowed to develop the soft skills and the ability to work as a team; to adopt a better perspective on the course and future professional reality; to improve our ability to identify and solve problems; and to deal with different opinions.
- Skills acquired in presentations, in writing a report, in group work, in being more autonomous and able to distribute tasks and adapt to conditions.
- To learn to deal with different personalities, and sometimes they clashed with ours; in this sense, in order to keep the group going, we had to grow as people and try to understand the others as much as possible.

- There was greater proximity between teachers and students, which contributed to a better overall environment.
- Personal enrichment, coupled with the development of highly diversified skills.
- The various and different presentations throughout the semester helped us to improve our oral communication and, above all, helped us to face the fear of speaking to many people. Aspects such as creativity and initiative were greatly stimulated, as well as the development of the critical spirit.
- This project was undoubtedly enriching at all levels; however, it should be noted that the initial shock was great, everything at first seemed impossible to materialize! During the semester, the work was arduous and exhausting, but of course there is no finest rewarding sensation than what we felt; it is something that is difficult to explain in words…

5.2. Young engineers' opinions

Regarding the young engineers' written answers to the set of posed questions, the analysis will be presented below.

Attending to the first question: "Did you feel that having carried out a project in the PBL context was relevant to your qualification (IEM)? Explain in detail how?"

The qualitative analysis using the webQDA software [41] produced the result shown in **Figure 8**. It can be seen that projects are important as "*the key to the development of future industrial engineers*" as mentioned by one young engineer with 5 years of work experience in an automobile industry company that holds a recognized and strong brand.

The second question was: "Do you think it helped you to develop social skills? Which? Can you please give examples?" **Figure 9** depicts the results.

To develop and sharing ideas, to acquire different skills, to deal with others feelings, to do the presentations and to develop communication skills, among others, are competencies difficult to achieve in lecture-based classes [15].

Figure 8. Young engineers' most frequent words for the question 1.

Figure 9. Young engineers' most frequent words for the question 2.

Figure 10 presents the results of the third question: "In the performance of your professional activity did you feel that you were able to overcome more easily the difficulties (or not) due to your knowledge acquired with PBL? Identify some of the difficulties encountered?"

In this case, one of the words most identified was "problem," however, with a positive mean. As mentioned by one of the young engineers:

> *"Obtaining relevant information for analysis and problem solving: working in different teams with different personalities and solving problems."*

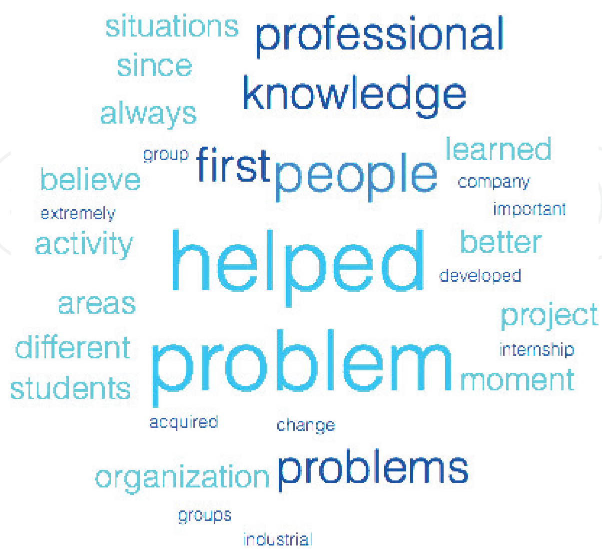

Figure 10. Young engineers' most frequent words for the question 3.

6. Conclusions

This chapter presents a study about the effect of the PBL on social skills development of first-year Industrial Engineering students. The instruments used provided evidence that PBL programs deliver a rich context where social skills can effectively be exercised and enhanced. A number of such skills were identified, and the development process thoroughly discussed, namely, effective team working, conflict management, effective oral and written communication, capacity of adaptation to different work environments, assuming responsibilities, caring about the other's learning, assessing the work of others and of their own, willingness to pertain and work in activities of student and professional associations. The acquired competences allow students to grow and become professionals capable of leading and working in projects and multidisciplinary teams.

Acknowledgements

This work has been supported by COMPETE: POCI-01-0145-FEDER-007043 and FCT – Fundação para a Ciência e Tecnologia within the Project Scope: UID/CEC/00319/2013.

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