Profile of Supervised Internship Reports of the FT/UFAM Industrial Engineering Course

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Abstract

The article analyzes the profile of the Supervised Internship reports delivered by students of the Industrial Engineering course at the Faculty of Technology of the Federal University of Amazonas (FT/UFAM), to provide useful information to the course department, as well as providing knowledge and reflection on how the discipline has been approached over time. The research is applied, documentary, using descriptive statistics along with data obtained from the collection of internship reports approved between 2008/1 to 2018/1. After analyzing the results, the main conclusions were that the average score of the 469 reports is 8.56, the industry is the segment in which the majority of the internships (76%) were carried out, while the Operations Engineering, and Production Process, Organizational Engineering, Quality Engineering, Logistics, and Work Engineering were the main areas of Industrial Engineering in which the students interned.

Keywords*:* Internship report; Supervised Internship; Industrial Engineering.

1. Introduction

The Federal University of Amazonas (UFAM) was founded in 1909 with one of the objectives of stimulating the development of the professional career of its members.

Over time, courses were created in the various teaching areas: biological sciences, agrarian sciences, social sciences, and exact sciences. Among the 18 academic units in Manaus, there is the Faculty of Technology (FT) composed of the following departments: Department of Civil Engineering, Electronic Engineering and Telecommunications, Architecture and Urbanism, Materials Engineering, Mechanical Engineering, Design, and Graphic Expression, Chemical Engineering, Electrical Engineering, Oil and Gas Engineering, and Industrial Engineering.

According to data from the Dean of Education and Graduation (PROEG), in the second semester of 2018, about 2327 students were enrolled in 12 undergraduate courses at the Faculty of Technology. Among the 12 undergraduate courses, there is the Industrial Engineering course, whose teaching activities started in the first semester of 2004 and by the end of the first semester of 2018, around 785 students were enrolled, of which 221 completed the course (UFAM, 2018).

The graduation in Industrial Engineering consists of 10 semesters, with subjects contained in the pedagogical project of the course. To conclude the course, due to the current pedagogical project, in the last two periods, the student must take the disciplines of supervised internship I and supervised internship II, to apply the knowledge, as well as report the experiences with the due monitoring and evaluation of a professor-advisor of these disciplines (UFAM, 2004).

In 2017, a group of students in this course began the work of physically organizing each internship report delivered since 2009, as well as the digital registration of most of the reports approved by the supervisors until the first semester of 2017. The organization was necessary for that the Industrial Engineering Department had a database for historical records and consultation with interested parties.

The research problem lies in the fact that in 2018/2 the teachers of the course were completing their new pedagogical project, seeking to improve the services provided to the students, and at that time there was no scientific research on the profile of the internships carried out by the students over the years.

Thus, the general objective of this article is to investigate the profile of the supervised internship of the Industrial Engineering course at FT/UFAM. To this end, the following specific objectives were outlined: (a) to update the supervised internship reporting database; (b) studying how the internship reporting discipline is covered in the top ten Industrial Engineering courses in Brazil; (c) analyze the profile of the internships carried out by the students of the course.

The research is important for the managers of the course due to the necessary document organization for the presentation to the auditors of the evaluating bodies of the Ministry of Education. The students and teachers of the course will know the main areas of Industrial Engineering in which students are applying their knowledge. It is also relevant to provide the academic community with a reflection on the supervised internship and can serve as a basis for further research.

2. Theoretical Reference

2.1 Supervised Internship in Engineering (MEC Guidelines)

According to Resolution 11 of the National Education Council/Higher Education Chamber of March 11, 2002, which establishes the national curriculum guidelines for the Engineering course in its Article 4, it states that the training of the engineer aims to provide the professional with the knowledge required for the exercise of general competences and skills listed below (CNE/CES, 2002).

- Apply mathematical, scientific, technological and instrumental knowledge to engineering;
- Design and conduct experiments and interpret results;
- Conceive, design and analyze systems, products, and processes;
- Plan, supervise, develop and coordinate engineering projects and services;
- Identify, formulate and solve engineering problems;
- Develop and/or use new tools and techniques;
- Supervise the operation and maintenance of systems;
- Critically evaluate the operation and maintenance of systems;
- Communicate effectively in written, oral and graphic forms;
- Work in multidisciplinary teams;

- Understand and apply professional ethics and responsibility;
- Assess the impact of engineering activities in the social and environmental context;
- Assess the economic viability of engineering projects;
- Assume the position of a permanent search for professional updating.

Therefore, the skills/competencies listed must be developed or part of them started, not only with the theoretical knowledge transmitted in the classroom but also with the student's performance in the practical field through a supervised internship.

The article 7 deals with the conclusion of the student's graduation in the Engineering course, including the performance of mandatory curricular internships under the direct supervision of the teaching institute, through technical reports and individualized monitoring during the period of activity realization.

2.2 The Law that conceptualizes and regulates the internship in Brazil

Law 11,788 / 2008 of September 25, 2008, conceptualizes the internship as a supervised educational act, aiming at preparing the student as a citizen and worker, through the effective application of the knowledge acquired at school, and the development of their skills.

Internship is a supervised school educational act, developed in the work environment, which aims to prepare students for productive work who are attending regular education in institutions of higher education, professional education, high school, special education and the final years of elementary education, in the professional modality of youth and adult education (BRASIL, 2018).

This law has six chapters that address: a) Chapter I: deals with the definition, classification, and relationship of the internship; b) Chapter II: deals with the educational institution; c) Chapter III: addresses the granting part; d) Chapter IV: addresses the intern; e) Chapter V: deals with inspection; f) Chapter VI: deals with final considerations.

2.3 The Importance of Supervised Internship

For Tonini and Lima (2008) the “knowledge society” requires jobs that are increasingly aware of the need for technical, human and theoretical knowledge, but for this productive configuration, it demands teaching that allows the development of skills for the training of a worker “ thinking-performer ”, able to perform both the technical and the intellectual field. Thus, a solid foundation of the student's training in the field of performance of the internship is necessary to have a better use, but this moment, in principle, occurs when the student is taking the professional and specific subjects. This way, will more security to carry out the activities.

According to Morin (2001), to develop and organize knowledge and thus know about environmental issues, reform of thought is necessary, this being the fundamental question of education and refers to the ability of each subject to organize articulated and organized knowledge in engineering practice. This practice sought in the curricular internship must not be contextualized only in pure technicality, in the use of technology, in know-how. Other values must be added to this activity: human, social, political and environmental values.

The supervised Curricular Internship is one of the answers to the challenges faced by students, among which are inexperience and insecurity and which, also, allows to reconcile the theory seen in the academic world with practice. It also makes it possible to complement professional training based on two pillars:

learning and entrepreneurship. On the other hand, the internship has fundamental importance for companies, as it is there that they find the link that connects them to the academic environment and serves as a means to pass on their needs and market trends (PADOIN, 2001).

For Rios (2003), the internship is relevant to awaken the professional vocation, obtain knowledge of different types of companies, offers experiences in the field of human relationships, apply the knowledge acquired at the university and can bring doubts to the classroom, as well how to enable the student to obtain employment in his future professional career.

3. Methodology

The research is applied, descriptive and involved in a bibliographic and documentary study. The research methodology had the following steps:

3.1 To update and organize the supervised internship reports

In January 2017, a group of volunteer students from the Industrial Engineering course started collecting data using spreadsheets and folders in electronic format. The organization of the physical collection was made alphabetically in boxes referring to the supervised internship reports held by the course department. This work was completed in December 2017, and it is necessary to continue updating the collection for the periods of 2017/2 and 2018/1. Thus, in August 2018, the physical and digital collection was organized and updated in the remaining periods, involving 34 reports in possession of the course coordinator. In all, 276 reports of internships I and 227 reports of internships II of the course were registered.

3.2 To collect information from the ten best Industrial Engineering courses in Brazil

During the second half of October 2018, the ten best courses in Industrial Engineering in Brazil were chosen using the Folha University Ranking (RUF), which is held annually by the newspaper Folha de São Paulo, to evaluate the courses higher education institutions that are offered by public and private institutions. At the time the research was carried out, the RUF of 2017 was used, whose ten best courses in Industrial Engineering in the country are shown in Chart 1.

Ranking	Institutions	State
1º	Federal University of Rio de Janeiro (UFRJ)	RJ
2º	University of São Paulo (USP)	SP
3º	Federal University of Santa Catarina (UFSC)	SC
4º	Federal University of Minas Gerais (UFMG)	MG
5º	State University of Campinas (UNICAMP)	SP
6º	Federal University of São Carlos (UFSCAR)	SP
7º	Federal University of Paraná (UFPR)	PR
8º	Federal University of Rio Grande do Sul (UFRGS)	RS
9º	Paulista State University of Júlio de Mesquita Filho	SP
10º	Federal University Fluminense (UFF)	RJ

Chart 1: The ten best courses in Industrial Engineering in Brazil in 2017.

Source: Jornal Folha de São Paulo (2017)

From there, a study was carried out on the pedagogical projects of these courses to identify the profile of the supervised internship discipline, observing the nomenclature of the subject, the semester workload, the period/semester in which the discipline is offered to students and which the method of evaluation by the teacher-supervisors.

3.3 To define the variables and prepare tables and figures

During the first half of November 2018, the variables were defined so that the data collected from the supervised internship report bank of the Industrial Engineering course at FT/UFAM could be analyzed, observing the average of the grades of the reports delivered, the student's areas of practice in the internship field and the number of reports evaluated per year.

Finally, the analysis was performed with an electronic spreadsheet and descriptive statistics, to generate the tables and figures for the discussion of the results.

4. Discussion

4.1 The profile of supervised internship of the ten best Industrial Engineering courses in Brazil

Table 1 presents the main characteristics of the supervised internship discipline in the ten best Industrial Engineering courses in Brazil in 2017.

Table 1: Supervised Internship Characteristics in the 10 best EP courses in Brazil

Universities	Course Name	CHS	Semester	Type
UFRJ	Mandatory internship	160	9º	Report
USP	Supervised Internship	195	9º	Report
UFSC	Supervised Internship in Industrial Engineering	450	9º	Report
UFMG	Curricular internship I and II	60	7º/8º	Report
UNICAMP	Curricular internship I and II	60	9º/10º	Report
UFSCAR	Supervised Internship for Industrial Engineering	180	10º	Report
UFPR	Internship I and II	120	9º/10º	Report
UFRGS	Supervised Internship	240	8º	Report
UNESP	Internship I and II	90	9º/10º	Report
UFF	Supervised Internship	160	10º	Report

Source: Author (2018)

The results show that:

1st) there is no uniformity as to the name of the supervised internship subjects, but half of the courses designate the subject as Supervised Internship, twenty percent as a curricular internship, another twenty percent as an Internship and ten percent as a mandatory internship;

2nd) 40% of the courses separate the discipline in two semesters, 50% offer the discipline in just one semester and only 10% there is not even information about the semester in which the discipline is offered;

3rd) the average course load per semester is 173 hours, highlighting the courses at UFSC and UFRGS with the highest semester load of 450 hours and 244 hours, respectively. Moreover, the courses of UNICAMP

and UFMG with the lowest semester load of 60 hours each.

4th) the majority (60%) of the courses offer the supervised internship discipline in the last two periods of the year, except the courses from UFMG and UFRGS that offer the discipline in the 7th/8th period;

5th) in all cases, the students of the discipline are evaluated using a report.

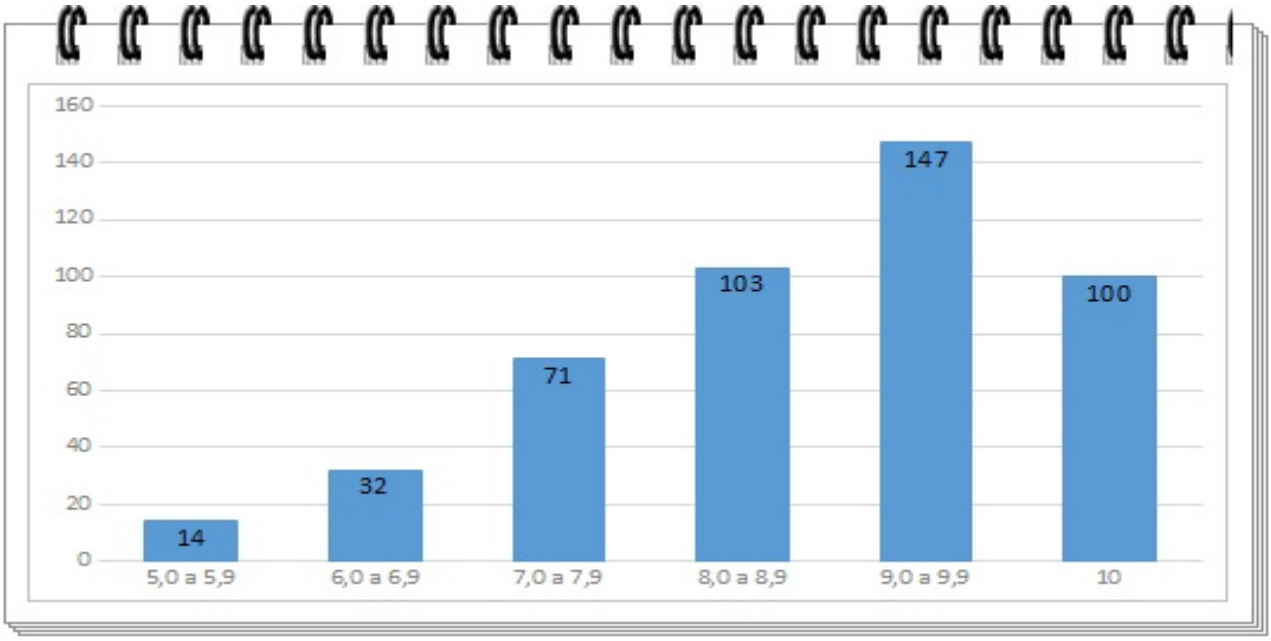

Figure 1: Number of supervised internship reports approved by grade interval.
Source: Author (2018)

4.2 The profile FT//UFAM Industrial Engineering course supervised internship

According to the Pedagogical Project of the Industrial Engineering course that was in effect in the second half of 2018, the Supervised Internship discipline is offered in the 9th and 10th periods, each with a total workload of 210 hours, totaling 420 hours. To be approved in the disciplines, the student must obtain a grade equal to or higher than 5 points, attend the guidelines and have a minimum frequency of 75%.

When analyzing the profile of the interns, it was observed that the majority (63%) are male, while 37% are female.

Regarding the type of organization in which the internship acted, it was observed that most internships are in the industry (76%), while the rest (24%) are in commerce and services.

When analyzing the average score value of all reports (275 Internship I reports and 226 Internship II reports), the arithmetic mean of 8.56 points and a median of 9.0 points were obtained. Figure 1 shows the number of reports approved per grade range, and it is possible to see that most are between 8 and 10 points. Looking at each interval in more detail, first, it goes from 5 to 5.9 points, with 14 (3%) reports. The second interval is equivalent to scores of 6.0 to 6.9 points, where 32 (6.85%) reports were found. The third interval is equivalent to 71 (15.20%) approved reports with scores between 7.0 to 7.9 points. The fourth interval is equivalent to reports approved with a score of 8.0 to 8.9, which were 103 (22.06%). The fifth interval is equivalent to the marks of 9.0 to 9.9 in which it deserves a highlight because it contains the majority (147; 31.48%) of the reports delivered. The sixth interval is equivalent to the reports delivered that obtained a

score of 10 in the evaluation of their advisor, there are about 100 (21.41%) reports.

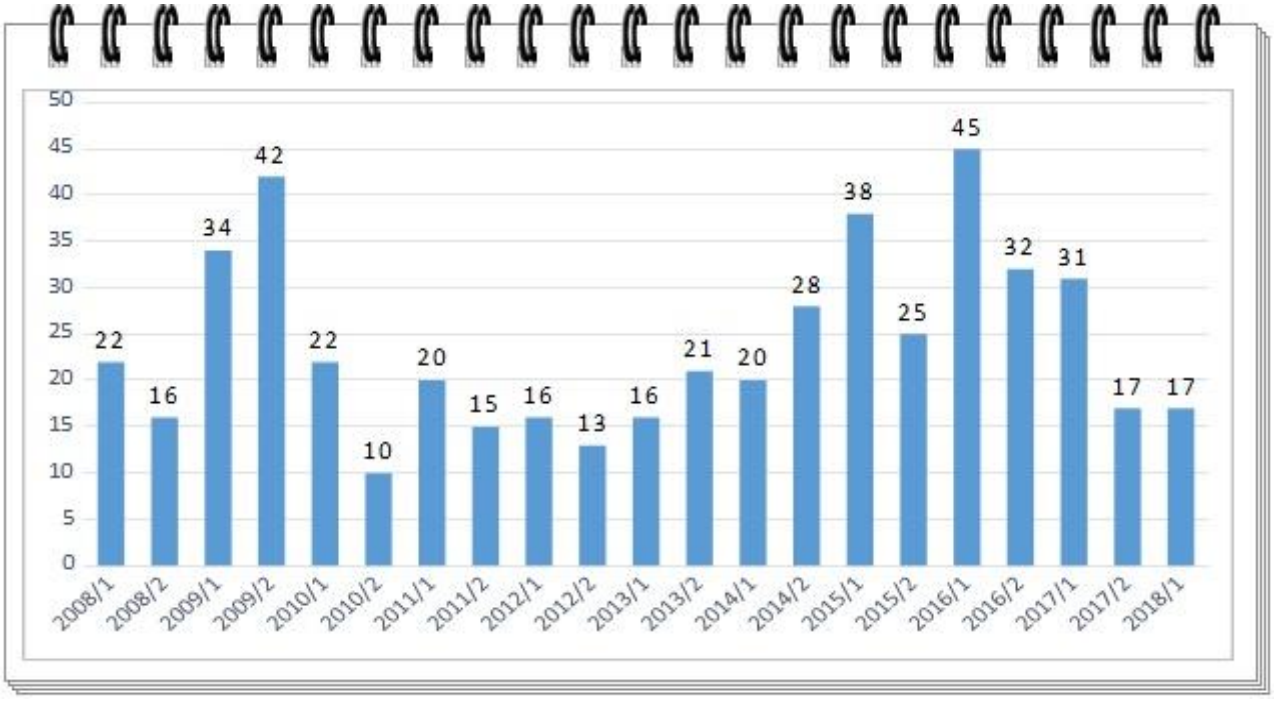

Figure 2: Number of internship reports approved per semester between 2008/1 and 2018/1
Source: Author (2018)

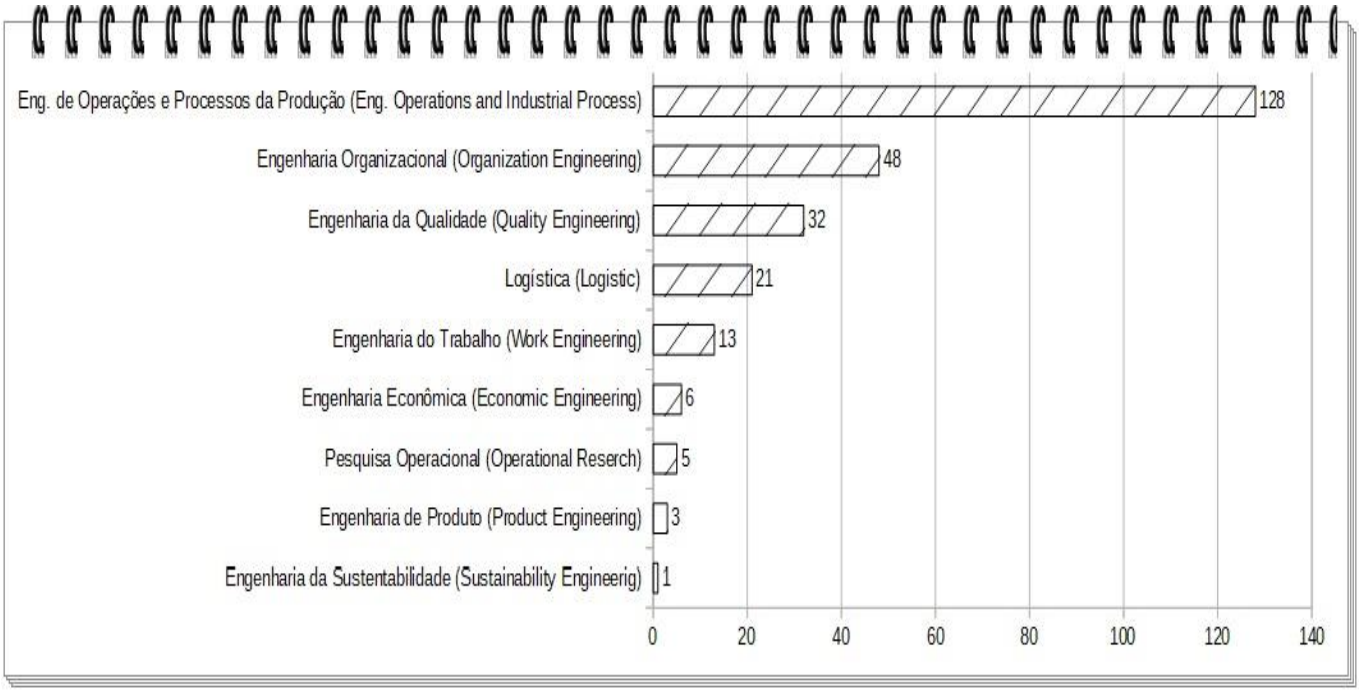

Figure 3: Industrial Engineering areas in which trainees worked between 2008/1 and 2018/1
Source: Author (2018)

Regarding the evolution of the number of supervised reports delivered over time, Figure 2 points out that the first 22 reports were delivered in the first half of 2008, with a slight drop (16) in the following semester. In general, the years 2009 and 2016 were the ones that presented the greatest amount of internship report delivery, while 2012 was the year that presented the lowest volume of reports, perhaps due to the low

number of teachers to guide students, as well as the strike that happened that year and that lasted for about 119 days.

In relation to the ten areas of Industrial Engineering in which the intern worked, Figure 3 points out that Engineering of Operations and Production Processes (128 = 49.23%), Organizational Engineering (48 = 18.46%), Quality Engineering (32 = 12.31%), Logistics (21 = 8.08%) and Labor Engineering (13 = 5.0%) were the areas that most concentrated the internships, while Sustainability Engineering (1 = 0.38%); Product Engineering (3 = 1.15%), Operational Research (5 = 1.92%) and Economic Engineering (6 = 2.31%) were the least represented.

5. Final considerations

The article analyzed the profile of the supervised internship of the graduates of the Industrial Engineering course at FT/UFAM between 2008/1 and 2018/1. After analyzing the data, it was concluded that:

a) about the Supervised Internship discipline in the 10 best Industrial Engineering courses in Brazil, it was observed that there is no standard nomenclature and workload. Also, the discipline is offered in most cases (60%) in two periods. New research can be carried out to identify how the managers of these ten courses are approaching the industry, commerce, and the public service to form partnerships and increase access for university students in these segments;

b) concerning the profile of the discipline in the FT/UFAM`s Industrial Engineering course, it was identified that a good number of reports delivered obtained scores between 8 and 10 points, with an average value of 8.56 points and a median of 9.0 points. Besides, 76% of the reports were written by interns who worked in the industrial sector, reason by which it is recommended that the managers of the course, form partnerships with organizations that work in commerce and other sectors of the service, to stimulate the performance of the internship in these segments;

c) the study also made it possible to identify that in the Industrial Engineering course at UFAM, the five areas of the greatest performance of the interns were: Operations Engineering and Production Processes, Organizational Engineering, Quality Engineering, Logistics, and Work Engineering. On the other hand, it is recommended that the department invest efforts to encourage teachers and students to research on subjects related to areas with low demand for internships, especially Sustainability Engineering, Product Engineering, and Operational Research.

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