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ANALYSIS OF THE TRAINING OF ERGONOMICS TEACHERS IN PRODUCTION ENGINEERING COURSES

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Abstract

Teacher training for higher education is a challenging task, requiring not only subject knowledge, but also teaching skills and effective relationships with students. However, preparation for this profession is often deficient, since most university courses do not offer specific undergraduate and teaching courses. This gap is reflected in postgraduate courses, where in-depth study of teaching practices is scarce. This is particularly problematic in interdisciplinary areas, such as ergonomics, where teachers may not be familiar with the essential knowledge of the field. The lack of clear guidelines for training ergonomics teachers leads to limited reproduction of prior academic knowledge.

The Brazilian Ergonomics Association and the International Ergonomics Association seek to standardize the knowledge and skills required for ergonomists. However, certification in the field is not yet a requirement for teaching. Furthermore, teacher training in ergonomics is often not specific or comprehensive enough, since undergraduate courses in related disciplines may not provide a solid foundation. The lack of teacher training can result in a negligent approach to ergonomics, especially in areas such as production engineering, where the focus on productivity often overshadows the importance of worker well-being.

To investigate this issue, a qualitative-quantitative study was conducted to analyze the training of ergonomics teachers in Brazil. The study considered the teachers' academic backgrounds and areas of expertise, as well as the geographic distribution of production engineering courses that offer ergonomics courses. The results highlighted the need for improvements in training and recognition of the importance of ergonomics in higher education.

Keywords: Teacher training; Engineering Education; Human Factors; Curriculum.

1. INTRODUCTION

The training of a higher education teacher is complex. In addition to the knowledge taught to students, the teacher needs to have a mastery of didactics and pedagogical practices

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and a good relationship with the class (MARTIN; ROMANOWSKI, 2010; LIBÂNEO, 2015; GATTI, 2017). It is challenging to qualify for this profession, as most university courses do not have teaching and teaching disciplines, leaving the teacher's responsibility for deepening during graduate studies.

Improvement in teaching degree concepts and practices does not always occur in master's and doctoral courses. There are few disciplines linked to teaching-learning that show practices and reflections on the preparation of a class, the student-teacher interaction and the way in which teaching and evaluation are taught (CORRÊA; RIBEIRO, 2013; SAINTS; GIASSON, 2019; MONTEIRO *et al*., 2020). At various times, this is only the responsibility of teaching internship disciplines, which do not have a standard to follow or an essential syllabus (ROCHA-DE-OLIVEIRA; DELUCA, 2017; RODRIGUES *et al*., 2022).

This becomes a bigger problem in areas that do not have a specific degree, such as ergonomics. This is an interdisciplinary area by concept, using different sciences to build its main knowledge. Ergonomics as a science derives from the areas of health, engineering, applied social, human and linguistic areas (DUL *et al.*, 2012). This fact makes different concepts essential to be taught during the training of a professional in this area due to the diversity of knowledge and the interdisciplinarity proposed by this theme (SILVA; BIFANO, 2020).

The Brazilian Association of Ergonomics (ABERGO) strives to direct and standardize knowledge, skills, and assessment for this profession in Brazil, in the same way that the *International Ergonomics Association* (IEA) accomplishes this goal worldwide. The essential knowledge for an ergonomics professional is described by different documents, such as the *Core Competences in Human Factors and Ergonomics* (IEA, 2021) and Brazilian Ergonomics Standards, such as ERG BR 1001 – Essential Competencies for Certified Ergonomists (ABERGO, 2002). Even so, it is not possible to find in the literature what are the essential contents that an ergonomics teacher should teach in his classes. This generates a practical gap, where teachers do not recognize what is necessary to teach and end up reproducing what they have learned during their academic training, making it necessary to monitor and assist them continuously (COURA; PASSOS, 2017; ALVES, 2018).

The Brazilian Ergonomics Certification System (SisCEB), organized by ABERGO, certifies professionals in the field of ergonomics who wish to work in the job market. Teachers can also carry out this certification, in two different ways: by the National Ergonomics Exam (ENERGO) or by proving their work in the area by the ERG BR Standard (ABERGO, 2017).

However, this certification is not yet used for the choice of the teacher, or as an additional evaluation requirement.

Another gap is in the training of this teacher. Ergonomics has interdisciplinary bases and is present in different undergraduate courses, such as architecture, physiotherapy, psychology, *design,* and different engineering. After completing a postgraduate degree in areas such as these, it is possible for the professional to become a university professor and teach different students. However, it is not always that graduate programs address these topics with the necessary depth and specificity. Likewise, in order to teach ergonomics, it is not necessary for the teacher to have completed specializations in this area or in related areas that work on the evaluation of work and workers' health.

By analyzing the gap in teacher training, it is also possible to investigate whether there is a deficiency of knowledge in the training of this teacher. During the academic training of a professional, different activities can ensure the development of knowledge: undergraduate, curricular internship, specialization, master's and doctorate. When these are not linked to ergonomics, it is suggested that this teacher's contacts with ergonomics may have been flawed and ineffective. Therefore, the reflection that remains is whether these teachers are really prepared to teach the subjects.

In the area of production engineering and ergonomics, for example, jobs like these are scarce, but they are necessary. The reason for this need is that ergonomics, within production engineering, is a neglected area, with a lack of humanization of this professional in relation to workers (MAZZURCO; DANIEL, 2019) and a lack of understanding of his social responsibility as an engineer (OVIEDO-TRESPALACIOS *et al*., 2021). In an undergraduate course where there is exhaustive thought about increasing productivity, optimizing processes and reducing costs, the worker can often be left aside, while he is one of the main elements to achieve these objectives (SMITH, 2007; SAURIN; PATRIARCCA, 2016).

Thus, studying how teacher training occurs in this environment is essential, so that there are answers in previous reflections and defenses based on improvements based on the adaptation of work to the worker. Therefore, the research question of this article is: *How was the training of ergonomics teachers and where was this learning developed?*

In order to answer this question, the present study aimed to analyze the training of ergonomics teachers who teach in universities in Brazil. For this, an investigation in the literature, digital platforms and virtual curricula was carried out. In order to delimit and perform

a better analysis, ergonomics disciplines belonging to the production engineering courses were considered.

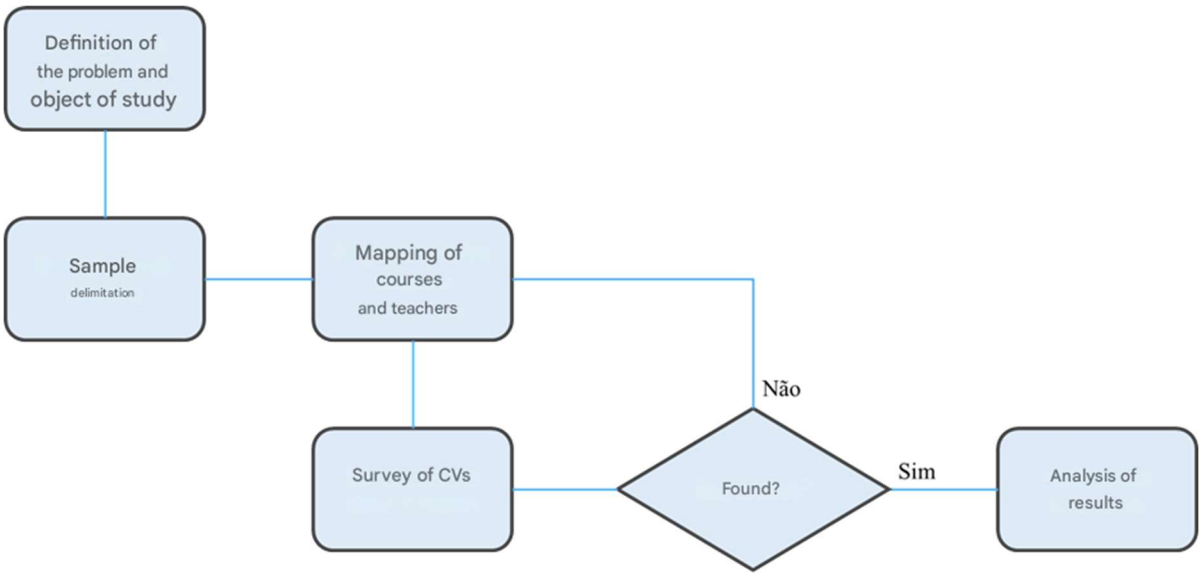
2. METHODOLOGICAL PROCEDURES

This research can be considered qualitative-quantitative. This research approach is used to explore poorly structured questions, in order to characterize a certain number of factors for which the use has not yet consolidated a scale to measure their performance and, also, by a simple ordinal scale it is possible to carry out the approach (ENSSLIN; VIANNA, 2008).

This type of study can also be characterized as quantitative-descriptive, by the study of the description of a population (LAKATOS; MARCONI, 2003). Thus, the quantitative approach is based on the count and percentage of the data collected and the qualitative approach is based on the analysis of the relationships between the training of each teacher for each stage of the academic process – undergraduate, specialization, master's and doctorate.

In this sense, an investigation in the literature and on digital platforms was carried out. This allowed us to survey the state of the art and the reality of the situation, demonstrating the way it is currently and analyzing the situations to improve the panorama. The investigation allows a gathering of a number of information, in order to work with data on a certain institution or group of investigated subjects (ANDRADE *et al*., 2010). Figure 1 shows the main stages of the methodological procedures of this research.

Figure 01 – Methodological procedures of the study



After defining the objective and the research problem, the first stage was initiated: definition of the object of study and the location of the sample. In this stage, we sought to

investigate what would be the main data to achieve the objective and where this collection would be. The ergonomics disciplines of the production engineering courses of different universities served for the research as an object of study. Thus, at the national level, the Ministry of Education (MEC) portal has a database that shows the universities that have production engineering courses in the country.

In order for the sample to be classified and defined, the second stage was used: the delimitation of the sample. The work focused on institutions classified as public and private non-profit that have their classes at the face-to-face level. The selected production engineering courses were the bachelor's degrees evaluated in the last current National Student Performance Exam (ENADE) with a score of four or five.

The third stage: research on university and course platforms was the moment when the data began to be collected. For each of the production engineering courses, the institution's website was searched and a tab or profile was located that described the professors. In case this item was not located, the class schedules or disciplines related to ergonomics were searched, in order to observe some indication of who is responsible for teaching the discipline. It is worth noting that educational institutions that did not have the necessary information available were excluded from the study sample.

After finding the name of the teachers in charge, the fourth stage: search for the curriculum to identify the training was initiated. To this end, the teachers' data were placed on the Lattes Platform, a virtual curriculum system created by the National Council for Scientific and Technological Development (CNPq). In the Lattes of each professor, the training of each professor was identified in the "Academic Training/Title" tab, collecting the four possible levels of training: undergraduate, specialization, master's and doctorate. The place where the training was held was also collected.

When the names of the professors were not found on the digital platforms, or the ergonomics disciplines were not located along with their syllabus, the strategy adopted was to send an e-mail to the coordination of the course. Thus, the project was detailed and the reason for the contact was described, and each coordination was asked to send the name of the teacher, his training and the characteristics of the course's ergonomics discipline (location in the curriculum, workload and syllabus).

By joining the answers from the fourth, the last and fifth stages: descriptive statistical analysis and discussion of the results were carried out. For this, the location of the production engineering courses by Brazilian state was mapped, and the information of the professors was

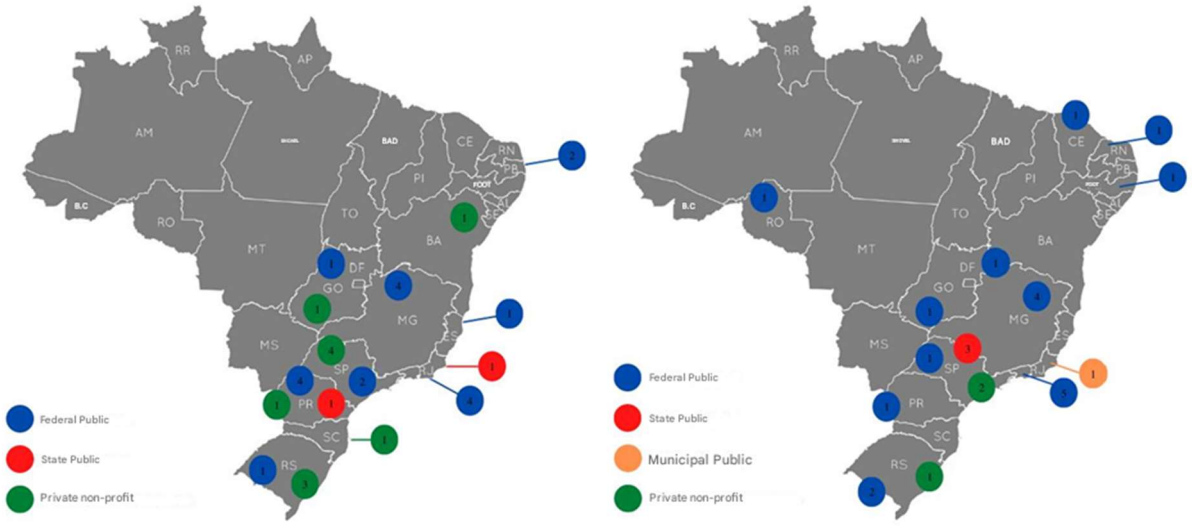
described in relation to the region of the country, gender, area of knowledge of the four levels of training, place of training and area of the dissertation or thesis. Afterwards, a temporal analysis of the teachers' training was carried out, that is, how the training was according to the areas of knowledge and the levels of training.

3. FINDINGS

The results collected were analyzed by descriptive statistics, counting and their respective percentages according to the classification. The names of the professors found and their respective universities where they teach were preserved, in order to avoid their identification.

According to the MEC and ENADE databases, the number of courses in production engineering is 61 with ENADE 4 and 29 with ENADE 5. With the information on the discipline of ergonomics available, the sample for the study was 32 courses with concept 4, of which approximately 60% are from federal public institutions, 34% from state public institutions and 6% from private non-profit institutions. With a score of 5, 26 courses were part of the sample. According to the classification of the institutions, 73% are federal public, 11.5% state public and 11.5% private non-profit. In addition, it was observed the existence of a public institution at the municipal level.

Figure 02 – Mapping of the production engineering courses in the sample: ENADE 4 (A) and ENADE 5 (B)



Regarding the courses awarded ENADE 4 by the institutions, the North region is the only one without a representative. The Southeast (16) and South (11) regions have the largest number of courses, with the states with the highest concentration of courses: São Paulo (6) and Paraná (5). The states of Minas Gerais, Paraná and Rio de Janeiro have the largest number (4) of federal public institutions, which corresponds to 63%. On the other hand, the states of São Paulo (36%) and Rio Grande do Sul (27%) have the largest number of private non-profit companies, respectively. The state of Paraná is the only one to have the three classifications of institutions.

All regions have courses with ENADE 5 concept, with 61% of the courses concentrated in the Southeast region. It is possible to verify that federal public institutions are present in all states that contain this course concept. The states of São Paulo and Rio de Janeiro have the largest number (6) of institutions with the course. Specifically regarding federal public institutions, Rio de Janeiro is the state with the highest number (5), and still has the only municipal institution. The state of São Paulo is the only one that has state public institutions (3).

Table 01 – data collected on the training of ergonomics teachers

		CAPES 5		CAPES 4		Total	
		N	%	N	%	N	%
Teacher Number	s	28	45,90%	33	54,1%	61	100,00%
Region	Southeast	16	57,14%	17	51,52%	33	54,10%
	South	4	14,29%	11	33,33%	15	24,59%
	Midwest	2	7,14%	2	6,06%	4	6,56%
	Northeast	5	17,86%	3	9,09%	8	13,11%
	North	1	3,57%	0	0,00%	1	1,64%
Gender	Male	16	57,14%	19	57,58%	35	57,38%
	Female	12	42,86%	14	42,42%	26	42,62%
Graduation*	Production Engineering	4	14,29%	10	30,30%	14	22,95%
	Other Engineering	11	39,29%	16	48,48%	27	44,26%
	Exact and Earth Sciences	2	7,14%	2	6,06%	4	6,56%
	Health Sciences	2	7,14%	2	6,06%	4	6,56%
	Agricultural Sciences	2	7,14%	1	3,03%	3	4,92%
	Applied Social Sciences	7	25,00%	4	12,12%	11	18,03%
	Humanities	2	7,14%	0	0,00%	2	3,28%
Specialization*	Occupational Safety Engineering	10	35,71%	10	30,30%	20	32,79%
	Ergonomics	7	25,00%	6	18,18%	13	21,31%
	Engineering	1	3,57%	2	6,06%	3	4,92%

	Other areas of knowledge	5	17,86%	7	21,21%	12	19,67%
	It does not have	8	28,57%	14	42,42%	22	36,07%
Masters	Ergonomics	1	3,57%	0	0,00%	1	1,64%
	Production Engineering	12	42,86%	17	51,52%	29	47,54%
	Other Engineering	6	21,43%	10	30,30%	16	26,23%
	Other areas of knowledge	9	32,14%	5	15,15%	14	22,95%
	It does not have	0	0,00%	1	3,03%	1	1,64%
Doctorate	Ergonomics	2	7,14%	1	3,03%	3	4,92%
	Production Engineering	10	35,71%	16	48,48%	26	42,62%
	Other Engineering	4	14,29%	3	9,09%	7	11,48%
	Other areas of knowledge	9	32,14%	3	9,09%	12	19,67%
	Doesn't have/In progress	3	10,71%	10	30,30%	13	21,31%
Place of training	Brazil	22	78,57%	32	96,97%	54	88,52%
	America	1	3,57%	0	0,00%	1	1,64%
	Europe	5	17,86%	1	3,03%	6	9,84%
Area of the professional's dissertation or thesis	Ergonomics area	13	46,43%	13	39,39%	26	42,62%
	Ergonomics related area	3	10,71%	2	6,06%	5	8,20%
	Another area	12	42,86%	18	54,55%	30	49,18%

* The total number of training is greater than the total number of teachers due to the possibility of a teacher having more than 1 course.

After carrying out the descriptive analysis of the location and categories that the universities are in the MEC, it is possible to carry out a descriptive analysis of the data found. Table 1 presents the respective numbers of the categories surveyed, such as the gender of the teachers, their training – undergraduate, specialization, master's and doctorate, the main place of training of these teachers and the area in which these professionals carried out their academic work with the most impact (dissertation or thesis).

In Table 1, some values were highlighted for better understanding. Since it is an analysis of the training of teachers of production engineering courses who teach ergonomics disciplines, it is worth highlighting these two courses at their respective levels. Thus, it is expected that these teachers have a relationship with these areas, because the concepts that are worked on in the classroom were developed in some of these spheres. It is worth mentioning again that there is no undergraduate degree in ergonomics in Brazil and, therefore, no count was obtained about it and it is not highlighted in the general table.

Graduation was the first item analyzed, since it is the basic training for a teacher to teach at a university. Because ergonomics is a multidisciplinary discipline, the classification of the training courses considered was diverse, trying to cover different points of training – exact, social, health, among others. As a main result, only 23% of the teachers surveyed have a degree

in production engineering (total of 14). According to the guidelines of the Brazilian Association of Production Engineering (ABEPRO), this course has a specific area for human factors and, thus, it is known that ergonomics disciplines are mandatory for this course. Thus, it is possible to report that, of 61 professors, only 14 had contact with ergonomics in their undergraduate courses.

Even so, the concepts observed in other engineering are also essential for a teacher in this area. Civil Engineering, Mechanical Engineering, Control and Automation Engineering, Food Engineering, Forestry Engineering, and Computer Engineering appeared to different teachers as their professions. In an analogous way, the concepts of occupational safety appear in most of them, but focused on their areas. It is possible to expect that, within these areas, ergonomics will not be evidenced as a discipline or as a large part of one, leaving contact in the undergraduate course outdated.

Analogous to other engineering, some degrees address issues related to ergonomics, even without having a main discipline on the subject. Courses in Physiotherapy, Psychology, Design and Architecture and Urbanism address topics related to their areas, such as worker rehabilitation, the cognitive process and mental workload, product development, accessibility and ergonomics of the built environment. These themes, for example, are diluted in most subjects and, although important, they are not exclusive and unique in ergonomics disciplines in production engineering.

Finally, some courses with little or no relation to ergonomics appeared in the training of teachers, such as Visual Programming, Tourism, Nursing, Forest Sciences, Business Administration, Computer Science, Mathematics Degree and Textile Technology.

Most of the teachers analyzed do not have specialization (36%). All these teachers have other types of complementary training, such as master's, doctorate or both. Even so, 13 professors completed a specialization in ergonomics during their careers (22%). However, most ergonomics professors did a specialization in occupational safety engineering (33%). In these specializations, there are ergonomics disciplines that address their main concepts, highlighting the similarity between the two areas (OSH and ergonomics).

It should be noted that only three professors (5%) have a specialization in higher education teaching, leaving the question of where the current professor learned or developed his knowledge about teaching and learning in engineering. Other specializations also appeared during the analysis, such as Construction Management, Business Management, Food Health

Surveillance, Information Technology, Productivity Engineering, Occupational Physical Therapy and Cardiopulmonary Physical Therapy.

When it comes to master's courses in ergonomics, there is only one in Brazil, and it is at the professional level – at the Federal University of Pernambuco (UFPE), with the Graduate Program in Ergonomics (PPGErgo). Even so, no ergonomics professor in production engineering courses has taken this master's degree. Another result shows that only one professor has completed a master's degree in ergonomics – which was in an international environment, in Belgium. As expected, most of the professors have a master's degree in production engineering (48%).

Likewise, other master's courses appeared as teacher training, with the number equivalent to those who completed the master's degree in production engineering (48%). Among these courses, it is possible to mention several Engineering, such as Civil, Mechanical, Agricultural, Agronomist, Urban, among others. Other courses, such as Technology, Forest Sciences, Meteorology, Design, Geography and Biomolecular Physics. Only one professor did not hold a master's degree in any area.

Analogous to undergraduate, there are no doctoral courses in ergonomics in Brazil. Thus, it was not expected that there would be professors with a PhD in ergonomics teaching in production engineering. However, three professors have this title, granted in countries such as France and Belgium. Analogous to the master's degree, the doctoral course most found among these professors was Production Engineering, with 42%.

Another piece of data that stood out in the data collection was the number of professors who are pursuing their doctorates in different areas (about 22%). Other areas of knowledge, such as Design, Health Sciences, Occupational Health and Safety, Forest Sciences, Geography, Collective Health, and Memory and Conservation were found by the survey (about 19% of the data collected). Other Engineering was also identified, such as Agronomy, Mechanics, Civil Construction, Electrical and Agricultural, with about 12%. It is worth noting that, in addition to the doctorates carried out in France and Belgium already mentioned above, Canada and Portugal also appeared as countries in which professors completed their academic processes.

Finally, the theme of these professors' thesis was investigated. This is justified because, even if you have a doctorate in an area that is not ergonomics, you can have a job that this is the focus on. Thus, during their master's/doctoral processes, the professor may have developed ergonomics knowledge from their research and writing academic papers.

The ERG BR 1003 Standard, which establishes standards for the accreditation of Lato Sensu Graduate Programs [Specializations] in Ergonomics, also categorizes the evaluation of the faculty of the courses based on their most important academic works. For these studies, we used the same concepts from three categories. For the first, which are professionals with a dissertation or thesis in the area of ergonomics, 26 professors were found (with about 42%). For related areas or related fields, with theses that work with similar areas, such as occupational safety, for example, 5 professors were found. Finally, for academic works in other areas that are not related to ergonomics, 30 professors were found (with 49%), presenting a higher number than those who carried out theses and dissertations in ergonomics.

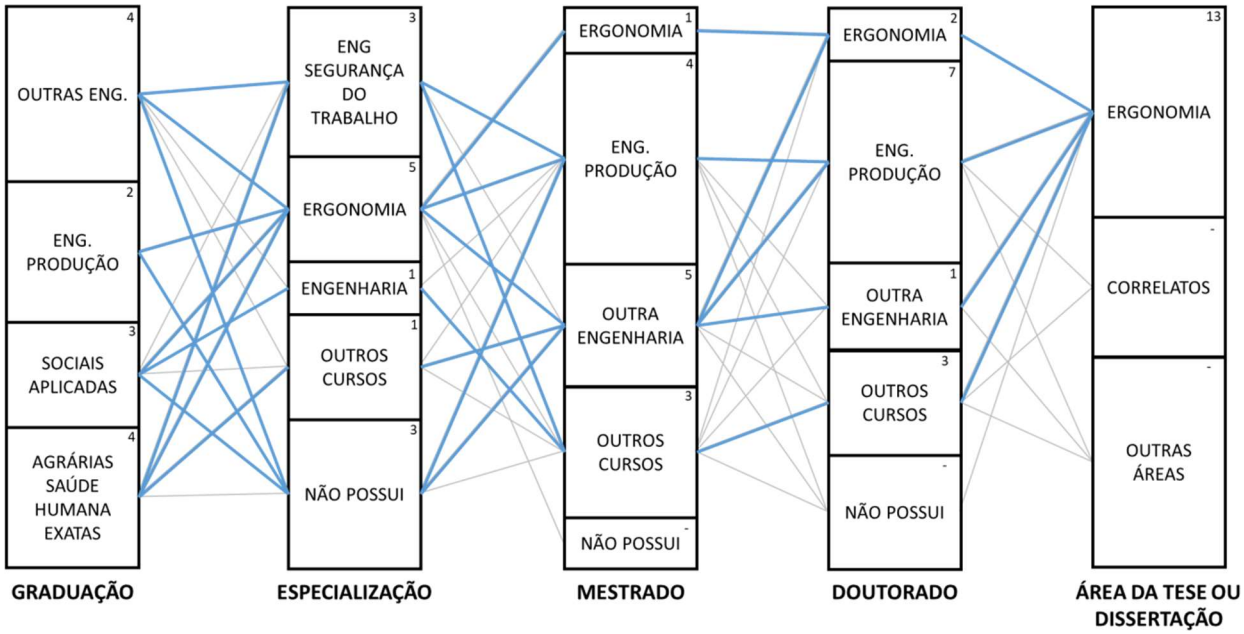
4. DISCUSSION

The descriptive analysis of the data showed the percentages and counts of teacher training at different levels of training. This is useful when we work with the centers and the main courses taken by these professionals, in addition to their places of work. Still, even if a professor has taken a certain course during his undergraduate studies, it does not mean that he kept it during his graduate studies, and can change areas depending on his will. Finally, as described in the results section, it may be that the professor has taken other courses, but an academic work in the area of ergonomics, or in related areas.

Thus, for the discussion of these results, we sought to analyze each path that this teacher has taken or continues to take during his training. For a better analysis, it is necessary to evaluate the training of each teacher, considering a relationship between the four formations and the theme of the thesis. Figure 3 is an example of an analysis that should be done in this way, analyzing the individual academic path of professors from universities with grade 5 in ENADE, who have theses on the theme of ergonomics.

In this image, each blue line represents an existing path that a teacher analyzed by the research has followed; the gray ones are the others found by the research and existing in the captured panorama. The classification was made in this way, in order to facilitate the interpretation of the results and better understand these possible paths found.

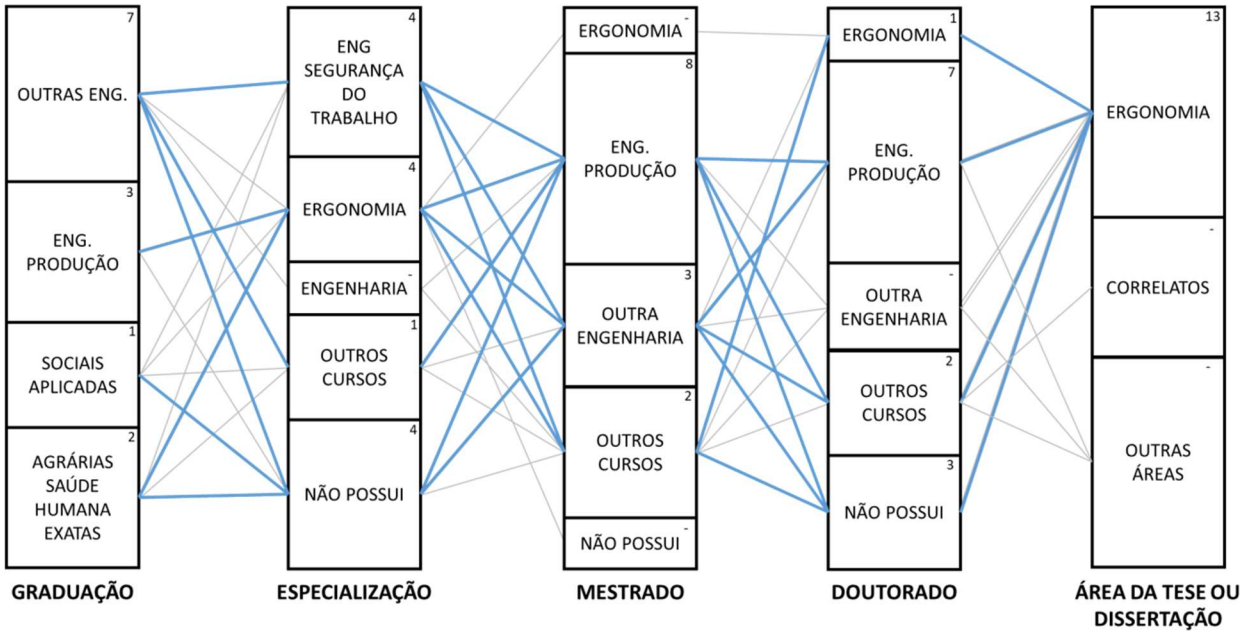
Figure 03 – Academic path taken by ergonomics professors, in production engineering courses with grade 5 in ENADE, who have academic works in ergonomics



In Figure 3, it is possible to observe that the researchers in ergonomics, professors with thesis and dissertation themes in this area, come from different undergraduate courses, with the different groups of undergraduate courses contemplated. Most of them have done specializations in the area of emphasis of the research (e.g. Ergonomics or Occupational Safety Engineering), but some have not yet taken any course at this level. It is also observed that a large part of the training of these teachers is concentrated in Production Engineering, as expected. It is also noticed that all those who researched ergonomics were based on theses. Finally, in addition to Production Engineering, other courses were raised that also carried out research in ergonomics, such as Agronomy, Agricultural Engineering and Forest Sciences.

Figure 4 shows the same characteristics as Figure 3, but with the universities with concept 4 in ENADE. However, differences were found. There are only occupational safety engineers who have done engineering other than production. Production engineers, on the other hand, are all experts in ergonomics. The vast majority held a master's and doctorate in Production Engineering, with final academic works in ergonomics. Three professors also stand out who have not completed their doctoral courses yet, but the master's works present this theme. In addition to Production Engineering, other courses were also raised with research in ergonomics in theses and dissertations, such as Social Memory and Cultural Assets, Integrated Management in Occupational Health and Environment, Collective Health and Agricultural Engineering.

Figure 04 – Academic path taken by ergonomics professors, in production engineering courses with grade 4 in ENADE, who have academic works in ergonomics



This analysis in the form of a relationship between the formations was carried out for the theses and dissertations in other themes (such as the correlated ones) and in different themes. In order not to pollute with repetitive figures, it was decided to only describe them as the analyses were performed.

In view of the other analyses, other different items were found. There is a professor who did not have a master's and doctorate, but has a specialization in ergonomics. There are also more ergonomics professors who have completed their theses and dissertations in other areas (49%) than have completed their theses and dissertations in ergonomics (42%). This is more evident in courses with concept 4 in ENADE. Of these 35 professors who have carried out theses and dissertations in other areas, only 4 have completed specializations in ergonomics. In addition, a great exchange of courses was observed during its academic path, migrating to different areas and research between undergraduate, specialization, master's and doctorate.

Therefore, the diversity found in the training of ergonomics teachers exists and has its pros and cons. Due to its interdisciplinarity, it is necessary that the teacher's training goes through different areas, in order to have basic knowledge about different topics to address in ergonomics classes (e.g. managerial aspects, concepts of biomechanics and physiology, physical and mental workload, environmental factors and work-related legislation and standards). By going through different areas of knowledge, these subjects are seen and learned, so that the examples are more realistic.

However, the different training courses can generate some problems from different perspectives, such as at the classroom level, at the university level and at the association level, such as ABERGO. It is clear, from this research, that there is no standard with basic requirements for the training of an ergonomics teacher. The different training leads to reflection on where the basic concepts to be taught were learned, or even if they were learned during their academic path. Still, there is the hypothesis about the lack of basic knowledge that students will not acquire if teachers have not acquired it during their training. On the other hand, it is known that it is possible to acquire knowledge individually and self-taught, but practical examples and situations in the labor market can become obsolete and simple in the face of the reality of the market.

For ABERGO, these deficiencies in the standardization of teacher training generate problems for certification. Different backgrounds generate a more complex certification process. These problems could be circumvented, for example, with the existence of a degree or a doctorate in ergonomics or even the incentive for the creation of other master's degrees in ergonomics. This would make the training of the teacher in ergonomics standardized and governed by a certification that is simpler to be carried out.

5. CONCLUSIONS

The main objective of this work was to identify the training of ergonomics teachers in production engineering courses, evidencing their academic trajectory such as undergraduate, specialization, master's, doctorate and the theme of their final academic works. From the investigation of the *Lattes curriculum* of these professionals, who teach in universities with courses with ENADE 4 and 5 concepts, the data were collected and analyzed under a quali-quantitative methodology, by descriptive statistics and by analysis of the individual academic path and its implications. This research is a stage of the doctoral research of the authors of this article.

From this work, it was possible to conclude that the training of ergonomics teachers in Production Engineering courses is diversified and there is no standard. Reflection on the impacts that are generated are still scarce, mainly due to the lack of studies in the area and with themes that address the training of this professional. This is because most of the professors did not carry out their final academic work in the area of ergonomics. In addition, more than half of the master's and doctoral courses were not carried out in the areas of research – production engineering and ergonomics.

Thus, it is perceived that other research is carried out in order to understand how these teachers acquired the experiences and knowledge in ergonomics to be taught in production engineering courses. It is possible to collect this data from interviews, questionnaires or an approximation of ABERGO with these professionals. In addition to demonstrating this fact, a channel can be created for the exchange of needs and doubts, serving as a basis for these professionals. As future works, it is also suggested to carry out the analysis for the other courses, with concepts 2 and 3 in ENADE, in order to make a complete overview of these professionals, mainly knowing their training. Finally, it is suggested the analysis of the places where this knowledge is developed, encouraging and fostering ergonomics, its research and teachings.

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