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Organizational and pedagogical notes of the Federal Institutes and the Physical Education scenario

Ademir Faria Pires[1*], Juliana Pizani[2], Claudio Kravchychyn[3] and Ieda Parra Barbosa-Rinaldi[3]

[1]Universidade Estadual de Londrina, Rodovia Celso Garcia Cid, PR 445 Km 380, Campus Universitário, 86.044-766, Londrina, Paraná, Brasil. [2]Universidade Federal de Santa Catarina, Florianópolis, Santa Catarina, Brasil. [3]Universidade Estadual de Maringá, Maringá, Paraná, Brasil. *Author for correspondence. E-mail: afariapires@gmail.com

ABSTRACT. This descriptive study aims to diagnose, based on the perception of pedagogical coordination and Physical Education teachers, the organizational and pedagogical specificities of Federal Institutes in the state of Paraná, with emphasis on Physical Education. Data collection was based on semi-structured interviews with six physical education teachers and six course coordinators from six campuses of the Federal Institutes of Paraná. The research findings demonstrate that the Federal Institutes are made up of organizational and pedagogical specificities that can be subdivided into potentialities and weaknesses. Among the potentialities, we find the central categories: pedagogical issues and organizational issues of teaching work. The 'tripod' relationship between teaching, research and extension stood out in the interviewees' speech, becoming one of the differentials that interfere in the institution's daily life and in its results in the development of the teaching and learning process. Regarding weaknesses, we identified important characteristics that impact on the organizational issues of teaching work. Issues related to physical spaces, material resources, organization and absorption of teaching and administrative functions also came to the fore. In general, there were some pointed out peculiarities making these institutions to be considered unique in the Brazilian educational scenario. Although the findings of this study are related to the specific reality of the investigated campuses, they demonstrate that they can be referenced and contributed to the development of other units, since they show characteristics that concern the identity of the Federal Institutes.

Keywords: vocational education; technical education; pedagogical issues; administrative structure; educational research.

Organizational and Pedagogical Notes of the Federal Institutes and the Physical Education Scenario

RESUMO. Este estudo, do tipo descritivo, tem como objetivo diagnosticar, a partir da percepção da coordenação pedagógica e dos docentes de Educação Física, as especificidades organizacionais e pedagógicas dos Institutos Federais no estado do Paraná, com destaque para a Educação Física. A coleta de dados se deu a partir de entrevistas semiestruturadas com seis professores de EF e seis coordenadores de curso de seis campi do Instituto Federal do Paraná. Os achados da pesquisa demonstram que os Institutos Federais são constituídos por especificidades organizacionais e pedagógicas que podem ser subdivididas em potencialidades e fragilidades. Dentre as potencialidades, encontramos as categorias centrais: questões pedagógicas e questões organizacionais do trabalho docente. A relação do 'tripé' ensino, pesquisa e extensão se destacou na fala dos entrevistados, configurando-se como um dos diferenciais que interferem no cotidiano da instituição e em seus resultados no desenvolvimento do processo de ensino e aprendizagem. No tocante às fragilidades, identificamos importantes características que impactam as questões organizacionais do trabalho docente. Questões relacionadas a espaços físicos, recursos materiais, organização e absorção das funções docentes e administrativas também vieram à tona. Em geral, foram apontadas peculiaridades que fazem com estas instituições sejam consideradas ímpares no cenário educacional brasileiro. Embora os achados deste estudo sejam referentes à realidade específica dos campi investigados, demonstram ser passíveis de referenciamento e contribuição para o desenvolvimento de outras unidades, visto que evidenciam características que dizem respeito à identidade dos Institutos Federais.

Palavras-chave: educação profissional; ensino técnico; questões pedagógicas; estrutura organizacional; pesquisa educacional.

Notas organizacionales y pedagógicas de los Institutos Federales y el escenario de la Educación Física

RESUMEN. Este estudio descriptivo tiene como objetivo diagnosticar, a partir de la percepción de la coordinación pedagógica y de los profesores de Educación Física, las especificidades organizativas y pedagógicas de los Institutos Federales (IF) del estado de Paraná, con énfasis en Educación Física. La recopilación de datos se basó en entrevistas semiestructuradas con seis profesores de educación física y seis coordinadores de cursos de seis campus de la IFPR. Los resultados de la investigación demuestran que los Institutos Federales se componen de especificidades organizativas y pedagógicas que se pueden subdividir en fortalezas y debilidades. Entre las potencialidades, encontramos las categorías centrales: cuestiones pedagógicas y cuestiones organizativas del trabajo docente. La relación 'trípode' entre docencia, investigación y extensión se destacó en el discurso de los entrevistados, convirtiéndose en uno de los diferenciales que interfieren en el cotidiano de la institución y en sus resultados en el desarrollo del proceso de enseñanza y aprendizaje. En cuanto a las debilidades, identificamos características importantes que inciden en las cuestiones organizativas del trabajo docente. También se destacaron cuestiones relacionadas con los espacios físicos, los recursos materiales, la organización y absorción de las funciones docentes y administrativas. En general, se señalaron peculiaridades que hacen que estas instituciones sean consideradas únicas en el escenario educativo brasileño. Aunque los hallazgos de este estudio se relacionen con la realidad específica de los campus investigados, demuestran que pueden ser referenciados y contribuir para el desarrollo de otras unidades, ya que muestran características que atañen a la identidad de las IF.

Palabras-clave: enseñanza professional; enseñanza técnica; problemas pedagógicos; estructura administrativa; investigacion educativa.

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Introduction[1]

The Federal Institutes of Education, Science, and Technology (FI) are institutions with a distinctive organizational structure, as they were established through the transformation and integration of former vocational institutions, such as technical schools, agricultural schools, and Federal Centers for Technological Education, traditionally focused on technical high school education (Paiva et al., 2016). In this sense, the FI emerged with a unique identity within the Brazilian educational system, operating as multi-campus, multi-curricular institutions of higher, basic, and vocational education, specializing in the provision of Professional and Technological Education (PTE) across different educational modalities (Law n. 11,892, 2008).

Although organized within a multi-curricular framework, it is well documented that Physical Education (PE) has historically been absent from the curricula of vocational education institutions, only being reinstated in 2004 with the implementation of integrated upper secondary education programs. In this context, scholars such as Gasparotto and Navarro (2017) suggest that this constitutes a new field of professional practice and academic research, providing theoretical and methodological support for the pedagogical practice of teachers working in these educational settings.

Considering that this is a relatively recent phenomenon, the present study seeks to investigate the characteristics of PE within the context of the Federal Institutes, contributing to a broader understanding of this educational system and providing records that may serve as a reference for the implementation and development of other units, given the current scarcity of research on this subject.

More broadly, school-based Physical Education remains comparatively underexplored in academic literature when contrasted with other subfields of Physical Education (Anversa et al., 2018). Research specifically addressing the upper secondary level (Dias & Correia, 2013) and, more particularly, technical upper secondary education (Gasparotto & Navarro, 2017) is especially scarce, showing the importance of studies targeting this educational context.

With a more specific focus on PE, Metzner et al. (2017) point out that Physical Education in the FI transcends the minimum curriculum requirements and the traditional role of a curricular component.

[1] Pesquisa aprovada no Comitê de Ética em Pesquisas a partir do parecer n. 3.032.034.

According to these authors, PE teaching is integrated with outreach projects, extracurricular activities, and research initiatives, mediated by pedagogical actions that complement the contents covered in regular classes. Another notable feature of the FI is the centrality of activities and projects articulating teaching, research, and extension—an environment more commonly associated with universities. In a comparative study, Oliveira and Nunes (2017) found that the teaching careers at the FI differ significantly from those in other upper secondary schools in Brazil, particularly in aspects such as: career plans, exclusive dedication contracts, reduced teaching workloads, and adequate physical and material infrastructure for pedagogical practice.

Based on the existing literature and the results obtained by the FI in assessments such as the National High School Examination (ENEM) and the Programme for International Student Assessment (PISA), it becomes evident that these institutions possess distinctive features when compared to other educational institutions in the country. This justifies our interest in examining their organizational and pedagogical characteristics, with a particular emphasis on the Physical Education curriculum component, in alignment with Oliveira and Nunes' (2017) suggestion that the model adopted by the FI may serve as a reference for improvements and headways in Brazil's public education system.

Considering these considerations, we recognize a gap in research addressing the specific context of the PE curriculum component within the FI, particularly in the state of Paraná. Therefore, we deemed it relevant to conduct a study aimed at investigating the organizational and pedagogical specificities of the FI, from the perspectives of those directly involved: PE teachers and course coordinators. To this end, the objective of this study was to identify, based on the perceptions of pedagogical coordination and PE teachers, the organizational and pedagogical specificities of the Federal Institutes in the state of Paraná, with a particular emphasis on Physical Education.

Methods

This is a descriptive study, since it seeks to describe the characteristics of a given population or phenomenon and to determine the relationships among its variables (Gil, 2017). It also qualifies as a field study, as it aims to obtain information about a particular problem for which answers are being sought, or to test a given hypothesis, with the potential to discover new phenomena or relationships between them (Lakatos & Marconi, 2003). To analyze the results, we adopted a qualitative approach.

The Permanent Ethics Committee for Research Involving Human Beings of the State University of Maringá approved the research (approval no. 3.032.034). To carry out data collection, we first made contact with the coordinators of integrated upper secondary education programs in the northern and northwestern regions of Paraná, whose contact information were available on each campus' official website. We selected these regions because of their proximity to the researchers, following a convenience sampling strategy. In these regions, seven campuses of the Federal Institute of Paraná (IFPR) were identified, with six of them accepting the invitation to participate in the study. We made contact via email and telephone. We did not receive a response from a coordinator, resulting in a final sample of six campuses.

After obtaining approval from the course coordinators, contact was made with the PE teachers. All PE teachers and course coordinators from the selected campuses were invited to participate. The final sample consisted of six course coordinators (32% of the total in the regions surveyed), three holding doctoral degrees, two holding master's degrees, and one specialist—as well as six PE teachers (approximately 70% of those working in these regions), including one PhD, two with master's degrees, and three specialists.

Data collection was conducted through semi-structured interviews with both teachers and coordinators, guided by 15 questions related to the study's objectives. These questions were developed based on an analytical matrix constructed by the authors and validated by three PhD professors in the field of Physical Education. The interview script was organized to cover four analytical dimensions: (1) professional profile; (2) professional practice; (3) organizational and pedagogical characteristics of the FI; and (4) organizational and pedagogical characteristics of PE in the FI. Interviews were audio recorded using a smartphone and subsequently transcribed into Microsoft Word. For information validation purposes, the transcriptions were sent to the participants, who verified the accuracy of the content. To ensure participant anonymity, the respondents' testimonies were coded as P1 to P6 for PE teachers and C1 to C6 for course coordinators.

Data analysis was performed following the content analysis method proposed by Bardin (2011), which is understood as a set of techniques for the systematic and objective analysis of message content. The analysis process was divided into three stages: (1) pre-analysis: organization and systematization of the collected

data; (2) material examination: data structuring; and (3) inference and interpretation: coding of the data into meaning units, followed by the construction of categories and subcategories, organized a posteriori.

The created categories reflect the organizational and pedagogical specificities of the FI and aspects related to PE in this context, organized into two major axes of analysis: potentialities and weaknesses. The potentialities axis encompassed aspects considered favorable for the teaching-learning process and aligned with academic discussions concerning the desired institutional educational environment. The weaknesses axis addressed factors that negatively affect pedagogical practice and, consequently, pose challenges for teaching in the investigated context.

Results and discussion

To analyze the data, we sought to triangulate the collected information with existing perspectives within the investigated field, structuring the analysis around two main axes: (1) potentialities and (2) weaknesses, as shown in Tables 1 and 2.

- Axis 1 – Potentialities

Within Axis 1 — Potentialities, two categories and their respective subcategories were identified: (1) Pedagogical Aspects, in which the subcategory Integration of Teaching, Research, and Outreach (*f*=12) was unanimously recognized by the participants as a strength. This was followed by Vertical Integration of Education (*f*=7) and Interdisciplinarity (*f*=6). (2) Organizational Aspects of Teaching Work, where the most frequent subcategory was Exclusive Dedication (ED) (*f*=11), followed by Career Development Plan and Physical and Material Infrastructure (both *f*=9), Team Collaboration (*f*=7), and Professional Autonomy (*f*=6).

Table 1. Categories and Subcategories for Axis "Potentialities"

Axis — Potentialities		
Categories	Subcategories	*f*
Pedagogical Aspects	Integration of Teaching, Research, Outreach	12
	Academic Vertical Integration	7
	Interdisciplinarity	6
Organizational Aspects of Teaching Work	Exclusive Dedication	11
	Career Development Plan	9
	Physical and Material Infrastructure	9
	Team Collaboration	7
	Professional Autonomy	6

Source: Elaborated by the authors.

Regarding the subcategory 'Relationship between teaching, research, and extension,' we observed a broad appreciation for the integration of these three dimensions, which is pointed out as an enriching factor for student education and as an element that contributes to fulfilling the social role of the Federal Institutes (FI), by fostering dialogue with society. This necessary inseparability is reinforced by Law no. 11,892 of 2008, which in its Article 6, states that this is one of the purposes and characteristics of the FI. Also in Pacheco (2011), who emphasizes that Professional and Technological Education (PTE) must guide actions in teaching, research, and extension, culminating in the development of scientific inquiry skills, which are essential for the construction of intellectual autonomy.

When addressing the school environment, the inclusion of research and extension as formative tools constitutes one of the major distinguishing features of the FI. For professors and coordinators, students feel more integrated into the institution and, consequently, there are greater involvement, commitment, and dedication, as well as formative improvements, as can be seen in the statement by C4:

> [...] most of the students who come into the institution arrive with significant deficiencies, many even struggling with basic mathematics, writing skills, and so on. When we see all the training and formation that takes place over those four years, and then, by the end, we see students publishing in A1-ranked journals — it's an enormous transformation" (C4).

C4's statement highlights the relevance attributed to the quality of the research produced, a point also indicated by C6: "[...] with high school students we conduct research at a master's degree level, and it was through these research projects, in fact, that we managed to implement our master's program" (C6).

In addition to carrying out and participating in these projects, it was emphasized that, at times, the knowledge produced and the accumulated experiences are disseminated in scientific events, which actively involve student participation. One important moment is the Seminar on Extension, Teaching, Research, and Innovation (SE²PIN, 2018a; 2018b), an event organized and carried out annually by the Office of the Pro-Rectory of Extension, Research, and Innovation and supported by the Pro-Rectory of Teaching. With the aim of promoting the gathering of the institution's entire academic community, enabling and encouraging the dissemination of research and the exchange of experiences. The holding of this type of event, bringing together teaching, research, and extension, demonstrates how the tripod has been established within the Federal Institutes of the state of Paraná, further supplemented by technological innovation projects.

We also highlight the relationship established with other educational institutions through research projects, a moment in which students approach universities, higher education professors, and undergraduate and graduate students, which is beneficial for the training of EMI students, enabling experiences that surpass the expectations typically attributed to this level of education. In this sense, the creation of communication networks between the Federal Institutes and Universities tend to provide greater interaction in research, strengthening a shared educational space in which practices are extended through formative partnerships, known, discussed, and shared, increasing students' knowledge and the institutional relationship itself (Santos, 2018).

In a more direct relationship with Physical Education, we emphasize that it receives greater prominence in sports projects, encompassing not only the institution's students but also the external community, thus fulfilling the purpose of extension. It is worth pointing out that in the Federal Institutes Physical Education is present in both the organization and participation of events such as interclass games, municipal and regional games and participating in the Federal Institutes Games. P6 highlights that the institute has a strong extension agent: "[...] the institute is made for extension, it is made for the community, and several projects are directed towards the community here" (P6).

Considering these findings, we observe Physical Education in the Federal Institutes with efforts directed mainly towards extension, to the detriment of research. The attention given to training sports modalities through extension activities can be seen as a first step toward the potential of Physical Education in these projects, considering that there is still a long path and development possibilities for the area.

A possible way to improve the relationship between Physical Education and the tripod of teaching, research, and extension may be through investment in scholarships and subsidy. C1 indicates the work of the Federal Institutes in this direction, stating that "[...] through a CNPq funding call, we managed, for sure, more than 500 thousand reais in resources for consumables, for student scholarships [...]" (C1). This finding aligns with those of Paiva et al. (2016), who verified that the equalization of these institutions with federal universities concerning the tripod represents relative progress, indicating the possibility of seeking support from funding agencies for the development of research.

Another potentiality perceived from the conducted interviews concerns the subcategory 'Academic vertical integration.' We found that this process has taken place in most of the campuses investigated, even if at times it still occurs timidly, as many programs — especially undergraduate and graduate — are still in the process of implementation.

The emphasis given by the professors and coordinators interviewed to this item encompasses two points: 1) the possibility for professors in these institutions to work at different levels of education. From basic education (BE) to high school (HS), going through Professional and Technological Education (PTE) with subsequent technical programs, and up to higher education (HE) programs, encompassing undergraduate and both stricto and lato sensu graduate education. And 2) the opportunity for students to continue their studies within the same educational institution, being able to attend high school and later enter higher education in the same area of training.

The academic vertical integration of education emerges as one of the premises of the Federal Institutes, having as one of its foundational characteristics the offering of higher, basic, and technological education. The guidelines of the Federal Institutes recommend that these professionals, within the same institution, act in different teaching modalities and levels of professional training, seeking methodologies that best apply to each action, so that the relationship between teaching, research, and extension remains inseparable. For this, it is necessary that the education professional is capable of developing reflective and creative work, promoting contextualized didactic transpositions that allow for the construction of students' autonomy (Constitutional Amendment n. 95, 2016).

This academic vertical integration is closely related to the issue discussed in the previous subcategory, through the connection established by the tripod, this interconnection between different levels and teaching modalities occurs organically, given that through research and extension projects, students can communicate their knowledge with other programs, professors, and students, thus promoting a dialogue between working teams.

Regarding Physical Education, we noticed that the academic vertical integration is not fully consolidated yet, mainly because there are occasional difficulties in inserting Physical Education content into the existing higher education programs within the Federal Institutes. However, we verified that some of these professors already see this possibility for action and that, at present, discussions regarding this dialogue between areas are being held for future experiences.

> [...] we have the technical informatics program aimed at high school, and we have systems analysis, which is the higher education program. So, we have students who migrate, doing the technical program already transitioning to higher education [...] we have a biology class, and at the beginning of the program, they invited me to be part of the teaching staff because of my master's degree in teaching, to work in the area of teacher training within the biology program (P6).

The study by Paiva et al. (2016) points out that the academic vertical integration as an advancement of the Federal Institutes, opening the possibility of constituting itself as a more integrative institution, working across various levels and teaching modalities. At the same time, this proposal represents a challenge for teaching practice, considering the different audiences, levels, and needs present in the vertical teaching proposal. Thus, based on the findings of the authors and our research, we understand that, as it is a recent proposal, refinements are still required for this educational paradigm to be concretely established.

The subcategory related to 'Interdisciplinarity' is connected to the other subcategories mentioned, since the pedagogical work in the Federal Institutes is marked by efforts to overcome the separation between science and technology and between theory and practice. With research as an educational and scientific principle and extension activities as a form of permanent dialogue with society, revealing, therefore, its prerogative of breaking with a format consecrated for centuries, of treating knowledge in a segmented way (Pacheco, 2011).

During the interviews, we perceived a constant effort to bring curricular components closer not only within the technical area but also between it and the common area. Reports gathered in the research indicate that there is an interest in combining different areas of knowledge, with the aim of contributing to the students' educational process, as exemplified in P5's statement:

> [...] we have a lot of partnerships, we work a lot with interdisciplinarity, there are some actions we carry out within the discipline that allow us to work with the mathematics area, for example. We managed to add a lot to the learning process, not only in our area but in others as well (P5).

When discussing the attenuation of disciplinary divisions and the development of competencies, Perrenoud (1999) states that the approximation between disciplines can assist in the development of competencies that lie between two areas, which alone would not reach a given field. This task presents itself as a challenge for teachers, requiring them to venture beyond their own areas and be willing to work with problems that transcend them.

It is noteworthy that in one of the campuses investigated, the pedagogical projects of the programs are not integrated by fragmented disciplines but rather by curricular units. According to the Physical Education professor and the program coordinator of this campus, these units bring together knowledge from various areas and can be shared among up to three professors. The content offered in this format follows a logical structure in the National Curriculum Parameters for High School (Brazil, 2000) and professors have the freedom to create their curricular units.

The professor and coordinator mentioned that most of the campus's professors are against the division of disciplines and the order of content offerings typically found in the country's Basic Education. In light of this, we can verify the perception of interdisciplinarity from this newly adopted paradigm:

> [...] I understand that what further enhances is the fact that the curricular units can be worked on in an interdisciplinary manner, we can share content with colleagues from other areas or even from another unit and build something from that relationship (P4).

For Santomé (1998), the levels of knowledge and experience of the specialists who make up the team condition the value of interdisciplinary work. The author asserts that education based on interdisciplinarity

possesses great structuring power, as the concepts, theoretical contexts, and procedures faced by students are structured around broader units, with conceptual and methodological structures shared by various disciplines.

Still discussing the category 'Potentiality', but now regarding the subcategory 'Organizational aspects of teaching work', the subcategory 'Exclusive dedication' was the most prominent in the interviewees' statements, being considered a specificity that has a significant impact on the work carried out by teachers at the Federal Institutes. One of the points raised is associated with the fact that, with exclusive dedication (ED), teachers at these institutions have more time to dedicate themselves fully, allowing them to develop their research and extension projects, while also providing higher quality teaching for students.

It was observed that there is a disparity between the work carried out by teachers who have ED and those who are not present at the Federal Institute all week and, at times, accumulate other employment contracts:

> [...] we have a good advantage of working calmly, with planning, in research and extension, and this is only possible with exclusive dedication, this conditions the institutes to be somewhat different in the field of research and extension (C3).

According to the interviewees, the greatest differential provided by ED is the possibility of having a limited workload in the classroom. Studies such as those by Oliveira and Nunes (2017) and Metzner et al. (2017), also point to the division of teaching work in the Federal Institutes based on ED as one of the distinguishing features of these institutions, enabling teachers, in addition to performing teaching duties, work on the preparation of pedagogical activities, elaborate and participate in extension and research projects and, above all, develop professionally.

C1 reiterates the benefits when addressing ED:

> [...] today we have a maximum teaching load of 16 hours, this in teaching hours must be about twenty 45-minute classes, so the rest of the workload is student assistance, teaching maintenance, and we have 16 hours for research and extension (C1).

It is worth noting that, at IFPR, teachers' workload is regulated by Resolution 002 of the Higher Council (2009), which establishes that teachers with a 20-hour workload may allocate a maximum of 12 hours to teaching, while full-time teachers (40h) will allocate a maximum of 16 hours per week to classes.

When portraying the scenarios of Secondary Education in Brazil, Mesquita and Lelis (2015) state that one of the greatest current challenges is related to teachers' workload, noting that teachers daily face difficulties in their work. While the level of demand increases with accountability policies and society's pressure for better youth education, working conditions are deteriorating. One of the obstacles pointed out by these authors is the long working hours, averaging 30 hours a week in the classroom. In this sense, the model adopted by the Federal Institutes, allowing for a division of teaching tasks with limited classroom hours, stands out as a reference for overcoming the problem. Furthermore, when teachers have time available for research and extension work, the quality of teaching tends to improve, through updates and further developments in the field of teaching practice — a fact that feeds back into the subcategory dealing with the relationship between teaching, research, and extension so that they can indeed be inseparable.

We also point out that teachers have the possibility of dedicating part of their workload to individual student support, emphasizing that this opportunity strengthens the teacher-student relationship and broadens the teaching and learning process. According to Tardif and Lessard (2009), these interactions are indispensable, and without them, the school would be nothing more than an immense empty shell. This contact takes root and structures itself within the school process, essentially in the work of teachers 'over' and 'with' students, constituting the foundation of social relations within the school.

Regarding the subcategory 'Career plan', according to the teachers interviewed, the career plan in these institutions can be considered one of the best available, compared to career plans in state or municipal education networks, as stated by one of the participating teachers: "[...] of the career plans, I know the state and the private network, and this is the best, without a doubt" (P6). Furthermore, in general, teachers believe that the institution encourages its staff to seek professional growth, which, combined with ED, contributes to a higher level of education. In addition, according to the research subjects, these teachers are used to a high level of demand, which raises students' expectations. The testimony of C3 illustrates this position:

> [...] teachers who pursue postgraduate studies, master's, and doctoral degrees have a reduced teaching workload, so they can spend 16 out of those 40 hours working on their projects off-campus, and that's a great advantage, it encourages them to keep working and doing their postgraduate studies (C3).

Pimentel et al. (2009) found that characteristics such as salary satisfaction and continued education, together with mastery of the subject content, have positive impacts on student performance. Moreover, considering the importance of the teaching profession, improving the working conditions, qualifications, and appreciation of education professionals are actions that need to be materialized daily.

We understand that, based on the subjects' statements, when compared to other public educational institutions in the country, the Federal Network of Professional, Scientific and Technological Education (RF) also stands out because of its career plan, and it could serve as an example for municipal and state education networks. The career plan of the Federal Institutes was restructured in 2012, through Law No. 12.772 of 2012, which aligned the Career of Basic, Technical, and Technological Education (BTTE) teachers with that of higher education teachers. In 2016, Law No. 13.325 adjusted the remuneration and rules for incorporating performance bonuses into retirement pensions for public servants. This restructuring brought improvements such as maintaining and reducing the division of the career into classes and levels, the possibility of progressing to the position of Full Professor through performance evaluation and the defense of a memorial or thesis, salary alignment with the Higher Education Teaching Career also the creation and implementation of the Recognition of Knowledge and Skills for the BTTE career (Mendes, 2017).

Regarding the subcategory 'Physical and material resources', this was the only point reported by the interviewees that showed ambivalence, at times appearing as a potentiality (f=9), at others as a weakness (f=6). We understand this disparity because each of them experienced their implementation phase at a given moment, during the RF expansion stages (Souza & Silva, 2016). It is justified by the fact that, in certain campuses, the infrastructure is advanced, with educational and administrative buildings, facilities specifically for laboratories and technical labs, equipped with state-of-the-art equipment, as well as gymnasiums with multipurpose sports courts, which were praised and highlighted as positive aspects of the Federal Institutes. In others, however, there is only a single educational-administrative building to accommodate teaching, research, and extension activities.

The favorable infrastructure present on some of the campuses investigated can be seen in the statement by C4:

> Here on campus, we have fantastic infrastructure compared to the other public institutions we have. The classrooms are very well equipped, all the equipment is new, well maintained, all the rooms now have air conditioning, so today we have very good infrastructure on campus to carry out our activities. We have some rooms with interactive whiteboards, all rooms with data show always available (C4).

We also found that the subjects mentioned the strengthening of the campus after the construction of the multipurpose sports gymnasium, understanding that this new space is configured not only for PE classes but also for holding cultural, scientific, and sports events, including various competitions such as interclass, municipal, regional, and the FI' own games.

Based on the reports of the teachers and coordinators interviewed, our findings corroborate the hypothesis stated by Andrade (2014), confirming that the infrastructure of the Federal Institutes is a characteristic that positively affects student education and positively influences the employability of graduates. We believe that this item, especially when added to the other potentialities found in this study, such as the teaching, research, and extension relationship, can constitute a strengthening aspect of the institution.

In this regard, Pacheco (2011) states that the constituted spaces, related to the physical facilities of the learning environments of the Federal Institutes, such as classrooms, laboratories, libraries, and specialized rooms with adequate technological equipment, together with information and communication technologies, are facilitating factors for quality pedagogical practice. Silva and Fraga (2014) when discussing the substantial financial investment that these federal institutions of Professional and Technological Education (PTE) received during the process of expanding and improving their expansion project highlight this differentiated infrastructure. It provided new physical structures, better equipment, qualified personnel, etc.

Another component present among the potentialities was the subcategory 'Autonomy', mentioned mainly by PE teachers. This characteristic, present in the Federal Institutes, is similar to the autonomy found in universities, since teachers have the freedom to exercise their functions and build their planning, establishing their priorities for teaching, research, and extension activities.

Authors such as Tardif and Lessard (2009) and Contreras (2002) have raised discussions about teacher professionalization, highlighting the devaluation of teaching work —, which, consequently, leads to the

reduction of autonomy — as a phenomenon that negatively impacts pedagogical practice. The counterpoint observed in this research offers an example of valuing teaching work, as advocated by the authors:

> We have the freedom to work on our annual planning, we have the freedom to develop activities in a specific, broader way, we have the freedom to develop new activities, we do not need to be tied to ready-made lessons and schedules, and we have autonomy and flexibility (P4).

When addressing the autonomy present in the Federal Institutes, Pacheco (2011) recalls the legal framework for the creation of these institutions, which were designed by equating them to universities, and regarding their legal nature as autonomous public entities, emphasizing the self-structuring characteristic of the Federal Institutes. However, the author emphasizes that legal provision alone does not guarantee autonomy in daily school life, which must be earned through changes in the relationships and bonds between teachers, students, the school, and the community.

Metzner et al. (2017) identified elements that contribute to the consolidation of PE in the IF's Secondary Education, and the teachers' autonomy to develop and propose the curricular organization of content and syllabi stood out as an important aspect, building a pedagogical commitment and better adaptation to local reality. To that end, teacher autonomy is a characteristic that helps professionals construct, from dialogue among peers, with students and society, a meaningful pedagogical practice.

Table 2. Categories and subcategories related to the 'weaknesses' axis.

Axis – Weaknesses		
Categorias	Subcategorias	F
Organizational issues in teaching work	Physical and material resources	6
	Physical education workload	3

Source: Elaborated by the authors.

We observed that, regarding the subcategory 'Physical and material resources', teachers raised concerns about the lack of adequate spaces for teaching, research, and extension activities, which negatively influences pedagogical practice. This aspect is corroborated by Ferreira et al. (2018), who indicate that deficient or inadequate infrastructure harms teachers' work and compromises the quality of education offered. Additionally, there were reports of a lack of materials and the need for equipment maintenance, as frequently some equipment is unusable, as stated by one of the coordinators: "[...] we have a huge backlog in maintenance, many equipment and devices become inoperative, they break down, it's hard to maintain, difficult to repair" (C3). According to results presented by Ferreira et al. (2018), we found that negative indicators regarding physical and material resources are recurrent in other institutes. According to the authors, campuses of the Federal Institute of São Paulo frequently face physical structure problems, mainly related to poorly planned maintenance in older campuses and the lack of necessary infrastructure in newer campuses.

Wanderley Junior and Cezar (2013) as a common feature in the Brazilian educational landscape identify these difficulties faced by PE teachers. According to the authors, PE is still in the process of legitimization, and as long as it is not valued, it will not receive the necessary support in terms of workload, materials, well-equipped physical spaces, and the physical infrastructure required to be recognized as an indispensable discipline in the comprehensive education of students.

The participants of the research mentioned the new fiscal adjustment of 2016 – Constitutional Amendment (CA) No. 95, which froze public spending for 20 years – arguing that this government measure could lead to the degradation of public institutions that have received numerous investments, especially in the last ten years. As C1 pointed out:

> [...] after that CA was created, which freezes investments for 20 years, we're bound to see the deterioration of public institutions, so if things don't change soon, we are under a huge risk of all the resources that were invested, all that work, fall apart, so this budget cut really hampers a lot (C1).

The precariousness of physical and material resources could be a demand for many other educational areas. In the case of PE, there is an additional challenge related to the space required by the physical structure. Thus, it's not only about acquiring materials, but also constructing spaces dedicated almost exclusively to PE, such as multi-sport courts, swimming pools, soccer fields, etc. In this sense, teachers usually adapt with what is available, which results in a significant gap in the proper education applied to the area's reality.

In light of this reality, it is hard not to link this line of thought to the lack of appreciation for the field within Basic Education (BE). The lack of investments in physical and material resources also affects human resources, as their area of work is constantly questioned and devalued in the school environment.

Related to the statement above, we highlight the indicator 'PE workload', mentioned by the subjects as one of the institution's weaknesses.

> Two PE classes per week for two years of the integrated courses is minimal. The campus intended to increase it to three years, but we miss having at least three years. All the demand falls on just one teacher, which restricts us from trying to improve and make modifications to our pedagogical proposal (P5).

In the study by Silva and Fraga (2014), we found that PE in the Integrated Education courses studied also has fewer hours than what is commonly found in regular schools. Due to the high workload in the technical core, common core subjects tend to take a back seat. According to PE teachers, there is a constant struggle in the field for greater recognition, aiming to secure more space in the curriculum of these courses.

We recognize the need for teachers to constantly seek improvement in the curriculum component, and we believe that, through this, PE can achieve equity alongside other subjects in terms of workload. The study by Zandoná Junior and Carneiro (2018) found that PE had one of the largest workloads in the campus of the Federal Institute they investigated, with three weekly classes in the first two years and two classes in the third year. This information contradicts reports from some teachers, who stated that some courses only have one class per week, demonstrating a discrepancy between similar institutions.

We understand that the amount of workload alone doesn't predict the quality of PE education offered. Other factors should be considered, such as the teacher's didactics, the content covered, student involvement, and professional preparation. However, it is relevant that the workload is appropriate and sufficient to address the content specified in the guiding documents of BE and in the Course Pedagogical Projects, so that students can finish this level of education understanding the importance of PE and its knowledge, having experienced and engaged in activities that are enjoyable, meaningful, and long-lasting.

The Federal Institutes are characterized by organizational and pedagogical specificities, classified as both strengths and weaknesses, noting that the elements of one category do not exclude those of another. However, we take a critical look at the weaknesses reported by the interviewees, considering that they can be perceived not only in the Federal Network but also in Brazilian education as a whole.

Final Considerations

In pursuit of the objective set for this study, we noted that the Federal Institutes (FI) in the state of Paraná, to which the participating teachers and coordinators are linked, exhibit characteristics that justify their prominent position in national and international evaluations, as well as their distinction compared to other educational institutions in the country.

Among the potentialities observed in this study, the relationship between the 'tripod teaching, research, and extension stood out in the interviewees' responses, constituting one of the differentiating factors that influence the institution's daily activities and its results in the teaching and learning process.

We found that, through the relationship established between teaching, research, and extension, the education provided to students goes beyond what is commonly offered in regular basic education in the country, and even in other technical schools. The actions developed contribute to adding diverse experiences to both professional and human development, including in the field of PE, establishing various connections with future training and socio-historical-cultural aspects. On the other hand, a disparity was observed between PE and other areas, as teachers and coordinators stated that other fields have been involved in more projects and research within the FI.

It is known that the focus of these institutions is the development of PTE. As observed, they also offer a range of opportunities for PE. Although sports training projects stand out among extension activities, the teachers and coordinators interviewed recognize the possibility of offering diverse activities for PE beyond the sports aspect, with the potential to increase participation from both the internal and external community, as well as scientific production in the field of PE.

The teaching, research, and extension relationship is supported by the career plan in these institutions and the possibility of exclusive dedication, as well as affecting the functioning of the academic vertical integration of education and interdisciplinary actions. Autonomy favors the execution of teaching, research,

and extension projects, which are also influenced by physical and material structures, which, in some campuses, contribute to their functioning.

Regarding weaknesses, we identified significant characteristics that determine the organizational issues of teaching work. Issues related to physical spaces, material resources, and the organization and absorption of teaching and administrative functions emerged.

Even considering that most of the campuses building the FI are still in the implementation and development phase, we gathered evidence that such points will only be strengthened with the resumption of investments in education, specifically in the Federal Network. However, as pointed out by the research participants, recent budget cuts have negatively influenced development in the FI.

Peculiarities were highlighted here that make these institutions unique in the Brazilian educational scenario. Therefore, we understand that the findings of this study, from the perspective of teachers and coordinators, pertain to the specific reality of the campuses investigated, and generalizations should be avoided.

However, by identifying common characteristics in the identity of FI through studies conducted in other regions and realities within Brazil, we believe this study can contribute to the development of these institutions and PE in this context, even considering possible regional differences.

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INFORMATION ABOUT THE AUTHORS

Ademir Faria Pires: Degree in Physical Education, from the State University of Maringá (2017), Master's (2019) and Ph.D. (2024) in Physical Education from the Associated Graduate Program in Physical Education UEM/UEL (2019). He is currently a professor in the Physical Education course at Universidade Paranaense (UNIPAR), Cianorte Unit, and at Universidade de Londrina (UEL), Department of Human Movement Studies.
ORCID: https://orcid.org/0000-0003-4164-2942
E-mail: afariapires@gmail.com

Juliana Pizani: Degree in Physical Education from the State University of Maringá (2007), Master's (2011) and Ph.D. (2016) in Physical Education from the Associated Graduate Program in Physical Education UEM/UEL. Professor in the Department of Physical Education at UFSC.
ORCID: https://orcid.org/0000-0001-5489-1468
E-mail: jupizani@hotmail.com

Claudio Kravchychyn: Degree in Physical Education from the School of Physical Education of Assis (1985); Master's in Education from the Universidade do Oeste Paulista (2006); Ph.D. in Physical Education from the Associated Graduate Program UEM/UEL (2014). Professor in the Department of Physical Education at UEM.
ORCID: https://orcid.org/0000-0002-6743-5485
E-mail: claudiokrav@gmail.com

Ieda Parra Barbosa-Rinaldi: Degre in Physical Education from UEM (1988). Master's (1999) and Ph.D. (2005) in Physical Education from the State University of Campinas – UNICAMP. Professor in the Department of Physical Education at UEM and the Associated Graduate Program in Physical Education UEM/UEL.
ORCID: http://orcid.org/0000-0003-1258-7155
E-mail: parrarinaldi@hotmail.com

NOTE:
Ademir Faria Pires: was responsible for executing the entire research, from its conception, definition of methodological procedures, data collection, to the writing of the article and subsequent revision. Juliana Pizani: was involved in the conception and definition of methodological procedures, participated in data analysis and interpretation, and conducted the revision of the study. Claudio Kravchychyn: contributed to the analysis and interpretation of data, as well as the writing and revision of the manuscript. Ieda Parra Barbosa-Rinaldi: was responsible for the entire research, from its conception, definition of methodological procedures, to the writing and revision of the article.

Associate Editor in charge:
Terezinhha Oliveira (UEM)
ORCID: http://orcid.org/0000-0001-5349-1059
E-mail: teleoliv@gmail.com

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