Challenges in the pedagogical practice of technical courses

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Abstract

Teaching is a complex and challenging practice that requires great knowledge, constant training, and refreshing. Given the relevance of the theme, the research aimed to identify the challenges of pedagogical practice and to train teachers at Senac Itapetininga. It was held a focus group on the challenges of pedagogical practice and training, using the problematization methodology (MP) with the Maguerez Arch. As a result, teachers pointed to the MP as a strategy for broadening students' ways of learning, encouraging autonomy, protagonism, and collective construction.

Keywords: teachers; education; professional and technological education; teacher training.

Introduction

According to Leite et al. (2018), teaching is complex, wide-ranging, and very challenging, due to its demands and impact on people and society, as it requires specialized technical and pedagogical knowledge, differentiated teaching technologies and methods, as well as a continuous process of training and refreshing.

According to Freire (2009), teaching still poses many other demands, such as professional competence, commitment, understanding that education is a form of intervention in the world, always with criticality and ethics.

In the professional and technological education (EPT, acronym in Portuguese), the challenges of teaching are amplified, as it encompasses a variety of curricula in

its courses and a great heterogeneity in the profiles of its students and teachers, according to Pena (2016). In the Law on National Education Guidelines and Framework (Law of Guidelines and Bases of National Education) No. 9.394 (BRASIL, 1996), updated by Law No. 11.741 (BRASIL, 2008), EPT covers courses in: 1) initial and continuing training or professional qualification; 2) technical and professional education at secondary level, and 3) undergraduate and graduate technological professional education.

The COVID-19 pandemic and the current scenario of Brazilian education have increased the challenges for teachers, as they have brought the need to apply new digital information and communication technologies (TDICs) to classes, which bring the specificities of the distance modality and new demands on the teacher, who often enters it without a pedagogical basis (SOUZA; RODRIGUES, 2017).

The National Commercial Apprenticeship Service (Serviço Nacional de Aprendizagem Comercial – Senac), the scenario for this study, emerged with Decree-Laws 8.621 and 8.622 of January 10, 1946 (BRASIL, 1946a, 1946b). In 1947, the first technical and professional courses were introduced at the São Paulo unit. In its pedagogical proposal, Senac SP points out that education is an intentional and political action that enables individuals to develop the skills to know, live, and better coexist in society.

To meet the objectives outlined in Senac's pedagogical project, particularly in its Itapetininga unit, the research aimed to identify the challenges of the pedagogical practice and promote teacher training using the problematization methodology (MP) with the Maguerez Arch.

Material and method

Theoretical foundation

This is an exploratory-descriptive, prospective study, with a qualitative approach, understanding research as a dialogic and communication process, since man communicates permanently in the various social spaces in which he lives (ABREU, 2009).

For Gondim (2002), the qualitative approach admits that man is capable of reflecting on himself, and through social interactions (mutual play of inter-influences), he comes to constitute himself as a person. Instead of focusing on generalized and universal knowledge, the qualitative approach is concerned with what is valid for a specific group, social, and cultural context.

The focus group technique was chosen to gather information, undertaken with careful planning. For the focus group to properly function, the following rules stipulated by Gondim (2002) were followed: 1) everyone spoke, one participant at a time; 2) parallel discussions were avoided so that everyone could express themselves freely; 3) polarization by one of the members was avoided; and 4) focus and discourse remained on the theme in question, with respect to divergences.

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For data analysis and interpretation, the content analysis of Laurence Bardin (2011) was used, which represents:

> [...] a set of communication analysis techniques aimed at obtaining, through systematic procedures and objective description of the content of messages, indicators (quantitative or not) that allow the inference of knowledge regarding the conditions of production/reception (variables inferred) of these messages (BARDIN, 2011, p. 47).

To process the results, the criterion of categorization was used, with the simplification of the raw data in a structuring process divided between inventory (isolation of the elements) and classification (distribution of the elements, imposing an organization of the messages), which allows raw data to be transformed into organized data.

Participants

Eight teachers out of a possible 21 from different areas of Senac Itapetininga participated in the study. The inclusion criteria were: being a teacher with regular contract and at least one-year teaching experience. Those who had already participated in a similar study and those on vacation or sick leave were excluded.

Ethical aspects

Data collection began only after the research project was approved by the Research Ethics Committee (CEP) of the Faculty of Medical and Health Sciences of Pontifícia Universidade Católica de São Paulo (FCMS-PUC/SP), under CAAE 405.285.20.5.0000.5373.

Data collection procedure

The teachers who agreed to participate in the study signed the Free and Informed Consent Form (TCLE) in two counterparts. The participants' sociodemographic information, such as age, time since graduating from higher education, time working in the teaching area, and specialization area, was obtained using a form.

The guiding questions that underpinned the discussions were: 1) Do you have difficulties in developing didactic and pedagogical activities in the teaching practice? What are they?; and 2) How do you try to solve these difficulties in your teaching practice?

The group lasted until the until the saturation of ideas.

With the express authorization from the group, the dialogue was recorded and transcribed in full by the lead researcher. A laptop and two smartphones were used for the recording.

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Data organization and analysis

The content of the focus group was transcribed and organized in a table with the central ideas of the subjects' discourse. This was followed by a content analysis based on Bardin (2001).

The results were processed by simplifying the raw data, dividing it into an inventory (isolating the elements) and classification (distribution of the elements, imposing an organization of the messages), enabling the discourses to be categorized. Then, based on the results presented by the focus group sample, a 20-hour training plan was prepared for all teachers.

To meet the objective of the study, the scope of the training was developed through MP, including the steps of the Maguerez Arch described by Berbel (2012). The choice for MP with the Arch was made as it is an active teaching-learning method that problematizes reality based on a concrete difficulty and provides one of the best ways of intervening in it. Thus, a five-step path is outlined to search for creative and original solutions to the problem, articulating theory and practice at various levels of knowledge and applicability, namely: observation of reality and definition of the problem, definition of key points, theorization, solution hypotheses, and application to reality (practice). The schematic of the Maguerez Arch is shown in Figure 1.

Figure 1. Maguerez Arch
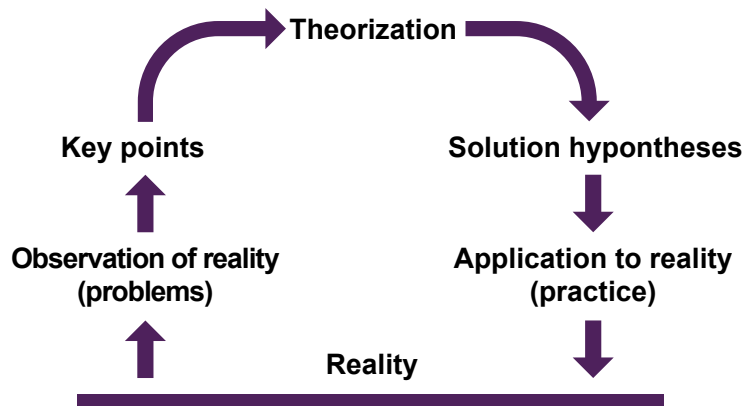
Source: Authors.

Teaching-learning methods used in the training

Training took place three months after the focus group, mediated by the researcher, via the Microsoft Teams platform, in addition to the creation of a WhatsApp group and an email group, starting with the following didactic strategies: presentation with slides, contextualized lecture with active participation about the research, active learning methods with an emphasis on MP, the Maguerez Arch, and the construction of each step.

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The participants experienced the practical application of the five steps of the Maguerez Arch

There were ten meetings, each lasting two hours, from 3/20/2021 to 7/6/2021, with eight participants.

To promote interaction, methodological enrichment, dynamization and interactivity, research was carried out on reliable database sources (Google Scholar, CAPES Journals, SciELO, PubMed, among others), mind map construction, and the use of digital tools (Google Forms, for creating and sharing forms and research online and analyzing the answers in real time, Jamboard, which is a smart screen that allows for the work to be automatically saved in the cloud, and Mentimeter, for creating and sharing slide shows, offering interactive features such as word clouds and shared questionnaires). With different features, it is possible to interact, even virtually, to collect information, insights, and build ideas in a more attractive, enjoyable, and motivating way. For Mcglynn and Kelly (2019), universal design is a teaching strategy that can be used to meet the different learning needs of students and that requires teachers to apply a variety of tools and approaches.

During the meetings, the participants experienced the practical application of the five steps of the Maguerez Arch, chose the real problem to be investigated, researched, dialogued, reflected, presented reports, slide shows, mind maps, interview forms, tables, and graphs of the results of their research with education specialists, teachers, and students.
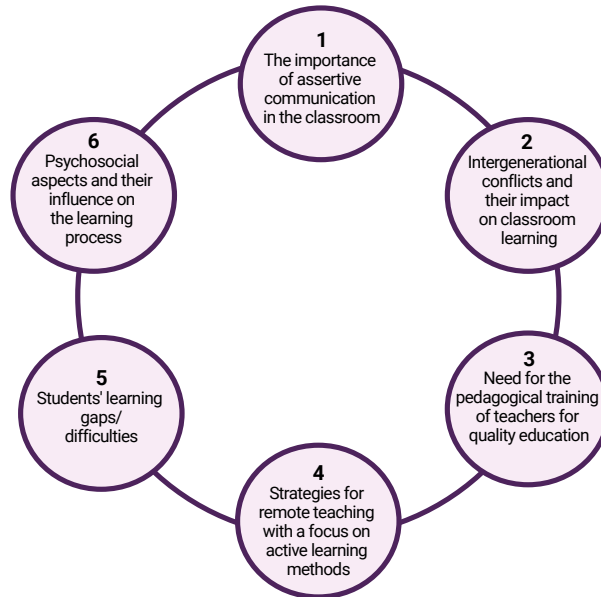
At the end of the training, its evaluation was sent privately to all participants through Google Forms.

Results

The age range of the participants in this research was between 28 and 49, with an average of 40 years of age. With regard to graduate degree, with the exception of one teacher, all the others have one, two, or even three specialization courses, one of them with a master's degree. Among specializations, two teachers have them in the field of education. The time spent teaching varies from 3 to 25 years, with an average of 10.37 years. As for other professional activities, three of them work in jobs other than teaching. Teachers have the following backgrounds: physical education; systems analysis and development; business administration; social communication – public relations; and pedagogy. These data reflect the teachers' commitment to training and refreshing.

Regarding data categorization, six categories of analysis were built, which are shown in Figure 2. They mostly represented the difficulties faced in the teaching practice.

B. Téc. Senac, Rio de Janeiro, V.49, e23005, 2023

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Figure 2. Categorias de análise que espelham as dificuldades enfrentadas na prática docente

Source: Authors.

In addition to Figure 2, Chart 1 includes the main definitions of the categories.

Chart 1. Thematic categories

Thematic categories	Excerpts from the reports
1) The importance of assertive communication in the classroom	"[…] the difficulty that I see, which I… perhaps most of us here have, is finding a universal way of treating the student individually. I see a student's difficulty and I say: 'I didn't understand.' And then I always think: 'Wow! This was an awesome class. An awesome class.' But not really. And I think one of the main difficulties I have is finding a language that everyone can understand. And then, during the pandemic, it got worse, right? Because they have no access, no resources."
2) Intergenerational conflicts and their impact on classroom learning	"So there are people between 18 to 60 years old in a classroom. […] given this age difference, some have that school tradition that they brought with them, and our methodology is different. So they have to have patience, and this generation does not have that patience.
3) Need for the pedagogical training of teachers for quality EPT	"[…] when we're in the classroom, one of the most difficult things for me to show is how knowledge goes beyond the professional and can bring other perspectives, including solving many of the problems mentioned here by my colleagues. Do you get it? And which can make their lives more consistent from the point of view of humanity. So the teaching practice goes much further."

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4) Strategies for remote teaching with a focus on active learning methods	"[...] when we're in the classroom, one of the most difficult things for me to show is how knowledge goes beyond the professional and can bring other perspectives, including solving many of the problems mentioned here by my colleagues. Do you get it? And which can make their lives more consistent from the point of view of humanity. So the teaching practice goes much further."
5) Students' learning gaps/ difficulties	"My greatest difficulty in relation to the learning age begins - some colleagues have even mentioned it - with overcoming the gap that some students already have in relation to education, to basic education. And after they join the technical course, perhaps the first barrier I try to break down is these students' awareness regarding knowledge.
6) Psychosocial aspects and their influence on the learning process	"Psychosocial issues. We have students with many disorders, be they anxiety disorder, panic disorder, and they end up experiencing these disorders in the classroom and we have to deal with this situation, so learning becomes difficult, right? Because we suddenly have to stop a class to attend to this student. [...] And our young people are increasingly bringing these disorders, they don't take care of themselves."

Source: Authors.

Discussion

Category 1 showed that communication failures in the interaction between students and teachers negatively affect the learning process.

According to Silva and Santos (2017), communication is a determining element of human relations, and from it comes the construction of culture and the progress of humanity, which also represents an essential condition for the construction of learning. According to these authors, furthermore, in the school context, assertive communication will depend on the relationship between teacher and student, student and student, and the interactions and influences that the student receives from his environment.

For Andrade (2012), it is through good communication between teacher and student that motivation and learning can be achieved, and the more open, positive, and constructive the communication between teacher and student, the more effective the pedagogical relationship.

Matos (2017) reports that it is necessary to plan the class and the lecture, as it is through it and dialogue that learning and knowledge are built. A class that begins and ends only with the teacher's speech establish neither dialogic communication nor learning.

Another factor that impacts the learning process and interferes with communication concerns intergenerational conflicts, highlighted in category 2. Different generations

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are meeting not only in families, but also at work and in schools, and it is not uncommon for conflicts to arise over conceptions of right and wrong, ways of learning and doing things, appropriate and inappropriate behavior for each era.

It can be said that proper mediation of these conflicts will contribute to valuing the learning of different generations

In a study with Youth and Adult Education (EJA) students at a state school in Rio de Janeiro, Silva (2020) points out that the starting point for working on intergenerational conflicts in the classroom is to understand the Brazilian and global scenario, in which a climate of tensions, polarization, extremism, fragility in the constitution of the self, perception of the other and, consequently, human relations are evident. The work should therefore enable students to reflect on their place in the world, on the paths they may or may not want to take and who they can learn from. Thus, important concepts such as the self, the other, stories, experiences, and references are more easily understood.

In this sense, it can be said that proper mediation of these conflicts will contribute to valuing the learning of different generations, as well as bringing a climate of cooperation, respect, tolerance, and greater creativity in the classroom, as Silva (2020) states.

In line with what was exposed by the participants in this research, and explained in category 3, about the need for pedagogical training for EPT teachers, researchers Abreu (2009) and Campos (2010) point out that students' education is positively impacted by better preparation of teachers in conceptual/technical aspects aligned with professional practice and pedagogical training contextualized to the changes in the world.

Moreover, Machado (2011) states that teacher training for EPT requires interdisciplinary and intercultural pedagogical practices, constant connections with technology, science, and culture, broad contextualization, work as an educational principle, and a perspective of emancipation and autonomy for the student.

The COVID-19 pandemic has accelerated many changes in various aspects of human life, the environment, and business. According to Moreira (2018), social and pedagogical relations have undergone major transformations due to the TDICs. Online teaching has become a reality for students and teachers, which has posed many challenges and broke with practices and behaviors that until recently were considered unshakable.

In this regard, and according to category 4, the consolidation of strategies for remote teaching in real time, with a focus on active learning methods, stands out as an insightful alternative for the teaching process. In a study by Dosea et al. (2020), it was found that academic students assessed remote learning as relevant when it is based on the active method and when it promotes active student participation. Technical problems with the internet and the conditions of the student's environment can have a negative influence on the teaching and learning process, posing major challenges for teachers and students.

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In this sense, Nienov and Capp (2021) point out that keeping students attentive and focused, adapting content, doing body readings, as well as building a more interactive and attractive environment are barriers that remote teaching poses and which require different combined strategies, planning, and objectives linked to the contents of the teaching unit. On the other hand, this teaching format creates opportunities for outreach and innovation in pedagogical practices.

In the words of Soares and Miranda (2020), emergency remote teaching (ERE) has become an agent of change, as it has demanded new ways of teaching and learning from teachers, as well as re-signification of their practices. Berbel (2011) teaches us that active methods promote students' protagonism and autonomy, and when the teacher enables listening, valuing opinions, exercising empathy, and answering to students' questions, it contributes to motivation and a favorable climate for learning.

Reviewing the pedagogical practice could be a step forward in remedying some difficulties

However, according to category 5, the learning gaps/difficulties brought by students were more evident in the remote modality. Additionally, according to Cruz, Tavares and Costa (2020), the existing social inequality among students and the gaps in the access to and use of the TDICs for teaching and learning, both for teachers and students, have become evident, thus increasing the challenges.

For Yamanaka and Gonçalves (2017), learning difficulties are caused by a variety of factors (biological, psychological, neurological, emotional and social, among others), and creating conditions for students to learn, considering the specificities of each one, is a major challenge, but reviewing the pedagogical practice could be a step forward in remedying some difficulties.

In addition to the pedagogical issues that negatively interfere with students' learning, psychosocial aspects and their impacts are highlighted by teachers and have been gaining more prominence in discussions, giving rise to category 6. It should be noted that the COVID-19 pandemic has exposed many other problems neglected by different spheres of society, such as domestic violence and the mental and emotional health of children and adolescents, who have been greatly affected and became vulnerable in this scenario. And to reduce the disastrous consequences of this situation, it is necessary for these issues to be addressed, worked on, and escalated more effectively, as pointed out by Lucas et al. (2020).

In the study by Soares and Miranda (2020), psychosocial problems and psychological support for those involved in the process represent another challenge, since, besides the students, teachers are also in a condition of illness, as they quickly had to appropriate a lot of information and digital tools, having to deal with an image overexposure and work overload. In this context, there are countless challenges for teachers, which require constant training and refreshing.

The five steps of the MP were developed using the Maguerez Arch.

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Step 1 – Observation of reality: contextualization of the research, its objectives, and presentation of the MP with details of each step. The results of the problematization with the focus group were then recovered, with notes and dialogues about each difficulty presented and the strategies to overcome them. Then the problem to be studied by the group was chosen: how to remedy the learning gaps/difficulties brought by the students?

Step 2 – Key points: a survey of the most important factors and determinants of the problem, when the participants pointed out various reasons that cause and maintain the problem, such as: cultural devaluation of education in the country, lack of attractiveness of a career as a teacher, poor training, lack of public policies for quality education, economic and family needs to ensure survival, which can cause people to abandon their studies. Thereafter, some key points were defined for the study in order to better understand the problem: learning gaps/difficulties - what are they, causes, types; role of the school, family and governments; strategies used by teachers in the face of these gaps; students in the face of difficulties; and the view of education experts on the difficulties.

Step 3 – Theorization: the participants researched the key points raised in the previous step, seeking consistent and current theoretical references on the subject, and conducted interviews with five teachers from the institution, 44 students from the technical courses, and three education specialists, using the Google Forms. The forms were evaluated by two specialists before being sent to the three groups surveyed via WhatsApp groups. The data obtained at this step is summarized in Chart 2, from the point of view of the three education specialists, in Chart 3, with the dialogue about education from the point of view of the five teachers interviewed, and in Chart 4, which shows the students' reflections on the difficulties in the teaching-learning process.

In the words of the three education specialists (Chart 2), learning gaps/difficulties represent a failure to keep up with the proposed competencies, a failure to learn, and a lack of prerequisites that come from the beginning of school life. The family must support, accompany, and encourage the child. The school must adopt an individualized parallel development plan and bring teaching closer to the student's reality. In the words of Yamanaka and Gonçalves (2017), the teacher needs to create conditions for students to learn, considering the specificities of each one. According to the specialists interviewed, public policies and support for families, multidisciplinary teams in schools, and valuing of teaching professionals are important strategies for improving the quality of education.

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Chart 2. Learning and its challenges from the point of view of education specialists

ID	What are considered learning gaps/difficulties?	What are the main learning gaps/difficulties observed in high school and technical school students today?	Faced with the main learning gaps/difficulties presented by students, what actions should families take?	Faced with the main learning gaps/difficulties presented by students, what actions should families take?	Faced with the main learning gaps/difficulties presented by students, what actions should governments take?	What can be done in institutional and public policy terms to tackle learning gaps/difficulties?
1	Learning gaps would be failures or moments when learning was not effective or did not achieve the proposed competencies.	Students have gaps and difficulties mainly in the educational bases of writing, interpretation of texts, and logical mathematical thinking.	The family must always accompany, support, and encourage the educational improvement of the apprentices.	The school must offer all possibilities for the comprehensive development and permanence of learners in the educational development environment.	Public authorities must develop public policies to encourage the improvement and permanence of children in school, as well as supporting families to ensure the comprehensive development of the individual.	Public and private institutions must maintain permanent initial and continuing education programs for the improvement of their employees, further helping the entire community to remedy educational problems and seeking the continuous improvement of the individual, which will reflect not only on the institutions but on the entire society.
2	Lack of prerequisites that children have not received since early childhood education.	Good competence in the literacy process, including a lack of phonological awareness, in mathematics on foundations of the four operations, which need to be worked on well.	Stimulation from early childhood, assessment and intervention when delay or lack of acquisition of important skills are observed.	An individualized development plan, which may take place during another period.	Implementation of a multidisciplinary team for each school.	The performance of the multidisciplinary team in each school, as one team for the whole municipality does not work.

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| 3 | They are the "lacks" that remain, the non-learning that is not remedied. | What I have noticed over the years in education, having worked in early childhood education up to the 5th grade, is that many children leave elementary school with poor literacy skills. | Adults themselves need to learn to see children and adolescents as thinking beings who will act in society. Every human being's base of reference is in the home, in the family nucleus. If this child is listened to and seen as valuable in this environment, they will learn how to asset themselves, express themselves, and, consequently, they will enjoy learning. | Teaching has to be closer to the student's practical reality. | Valuing all education professionals starting with cleaners, who are also part of education, because a clean environment brings organization. | It would be a long way to go, to start looking at the reality of education beyond the theoretical basis, which often does not match the reality of schools. |

Source: Authors.

At least three of the five teachers (Chart 3) pointed out that their initial training is not enough for their pedagogical practice and believe that, in order to remedy the students' learning gaps/difficulties, it is important for the family to accompany, encourage, and create a culture of valuing knowledge with their children. Additionally, adopting active learning methods and support/reinforcement classes can also help. For Silveira, Santiago and Rodrigues (2020), faced with the current challenges of EPT, it is necessary for teachers to have spaces for collective learning and reflection, as well as technical and pedagogical knowledge and dialogues on ethical, political, and curricular issues.

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Chart 3. A dialogue on education from the teachers' point of view

ID	Dear teacher, do you consider your initial training to be sufficient for your educational work?	Do you have opportunities to improve and refresh your teaching practice?	What do you associate with students' learning gaps and/or difficulties?	What actions do you take to reduce students' learning gaps and/or difficulties?
1	No	Yes	Educational gap	Active methods
2	No	Yes	Basic difficulties in elementary school	Reinforcement classes
3	Yes	Yes	Difficulty in basic education	Collaborating to social inclusion
4	Yes	Yes	Lack of knowledge and family structure, motivation on the part of students themselves, in other words, no prospects of a better future, lack of interest, lack of motivation on the part of teachers or perhaps lack of interest on the part of teachers themselves in working on creativity and student performance.	In my opinion, focusing on family education, encouraging children to be awakened to study, to develop, to have culture and knowledge. I also believe that investing in the position of teacher will greatly help development.
5	No	Yes	I believe that most undergraduate courses direct professionals towards the market and do not take classroom experience into account.	I look for courses and parallel training.

Source: Authors.

Among the 44 students (Chart 4), the majority pointed out that they have a learning gap/difficulty, and the number of answers referring to "difficulty with mathematics" was notable. Difficulty with the Portuguese language also appears in the sequence. Other problems also came up: staying focused, internet connection, online classes, and learning difficulties more generally. It caught the attention that many reported that studying more, having help from well-prepared teachers, and using different strategies to learn the content could solve these difficulties. And confirming the students' observations, for Santos and Abar (2020), the difficulty in learning mathematics is not something new and every year it has been the subject of discussions in academic circles and in education management bodies, suggesting that more effective actions should be implemented.

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Chart 4. Um diálogo com os alunos sobre as dificuldades de aprendizagem

No. of students	In your educational life, do you think there have been learning gaps and/or difficulties?	What kind of learning gap/ difficulty did you face most often?	Of the main areas of knowledge, in which were there learning gaps and/ or difficulties?	Write down the main action to reduce or solve the learning gaps and/or difficulties experienced.
1	Yes, a few	Mathematics and technology	Mathematics and related areas; information technology	Courses
2	Yes, some	I couldn't pay attention	Language and Portuguese language	Better understand the situation
3	Yes, a few	Memorize some situations	Mathematics and related areas	Conseguir compreender melhor a situação
4	Yes, some	Difficulty to learn	Mathematics and related areas	I've always had trouble understanding things
5	Yes, some	Complexity of the work	Electronics	Concentration
6	No	None	None	None
7	No	I had no difficulty	None	I do not know how to answer this question
8	Yes, some	Mathematics	Mathematics and related areas	Greater focus on activities and classes
9	Yes, some	I believe that a major gap was the lack of joint practice and experiences without the classroom due to the pandemic	None	I believe that we were well managed as a student body within Senac, even with all the limitations and difficulties imposed by the moment. There are always points for improvement, but I consider everything that I've experienced to be fully satisfactory
10	Yes, some	Mathematics	Mathematics and related areas	Help from teachers
11	Yes, some	Difficulties in learning, understanding certain topics	Mathematics and related areas	A teacher with patience and empathy.
12	Yes, a few	I believe that having no face-to-face classes caused the situation	Mathematics and related areas	An exclusive teacher for the subject applied

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13	Yes, some	Repeated subjects, lack of communication with the teacher	Language and Portuguese language;	Greater communication between teacher and student
14	Yes, a lot	Day-to-day difficulties, reconciling work with studies and restricted access to the internet network	Portuguese language and language; mathematics and related areas	Collaboration and understanding on both sides, students/collaborators, to understand each other at this difficult time.
15	Yes, some	Difficulty with computers, platform	Mathematics and related areas	I do not know how to answer this question. Because of the problem we are experiencing due to the pandemic. Thank you
16	Yes, some	Calculus	Mathematics and related areas	Study more
17	Yes, a few	Lack of focus, diversion of attention	Language and Portuguese language	Focus and attention, acquiring technical knowledge for this, knowing that the affective relationship and the action of the advisor influence this difficulty
18	Yes, some	Expressing my doubts in a coherent way or, when formulating the question, understanding the subject without leaving any doubts and, based on that, asking the correct question and/or feeling part of what I was being taught.	Portuguese language and language; mathematics and related areas	Ask if there are any doubts left, reinforce the subject of the class, give feedback, ask them to explain what was taught in general
19	Teachers who repeatedly expressed their dissatisfaction with the service, and rightly so	Mathematics and related areas	Use formulas and calculations that will be used in everyday life, not "science" formulas.	Use formulas and calculations that will be used in everyday life, not "science" formulas.
20	Yes, a lot	Not having a dedicated space/time for studying at home. I did not understand the content taught at school. Lack of teachers. Poor attendance (high school)	Human and social sciences; mathematics and related areas; natural sciences	Review the content at home when possible. Participate in/create study groups

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21	No	Time	None	Attention
22	Yes, a few	I haven't had many	Portuguese language and language; mathematics and related areas	A good explanation, detail by detail
23	Yes, a lot	Lack of internet	Mathematics and related areas	Interaction with students
24	Yes, a few	Calculus	Mathematics and related areas	Improve the explanations
25	Yes, a lot	Online classes	None	Face-to-face class
26	Yes, some	My lack of concentration	Human and social sciences	Turn off my cellphone
27	Yes, a few	PHP	Create distinctive websites and programs	I am already taking online courses in JavaScript, PHP, and Flutter
28	Yes, some	Difficulty for the students to attend classes	Human and social sciences	A change of mentality due to the new world reality, unfortunately we will increasingly have to live with remote work
29	No	Internet connection only	None	There were no difficulties
30	Yes, some	Handle and carry out activities on the computer, internet	None	Good internet and learning and understanding Windows, Excel, i.e. an up-to-date course
31	Yes, a few	Have the time to attend the online classes	None	Work on mental health
32	Yes, some	I had problems with Portuguese language	Language and Portuguese language	I learn more from videos
33	Yes, some	Anxiety	Mathematics and related areas	Study
34	Yes, a few	Remote modality, I learn better face-to-face	Mathematics and related areas	Face-to-face classes
35	Yes, a lot	Lack of attention from teachers, lack of teacher training, and lack of persistence. Very didactic explanations	Mathematics and related areas	Simple explanations
36	Yes, a few	Difficulty in geography. Because it was the subject with more teacher absences, having to be replaced by teachers from other subjects	Human and social sciences	I am not sure, maybe if I had more contact with map design and more explanation

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37	Yes, a lot	Mostly money to invest in studies	None	It is not the subjects, but the difficulty of paying for the studies
38	Yes, some	Focus, attention, interaction difficulty	Mathematics and related areas	I look for the quietest times to study
39	Yes, some	I always had difficulty with physics and chemistry, as in high school they taught me only the basics of the basics.	Natural sciences	Study on your own by watching videos, reading, doing exercises, etc.
40	Yes, some	In exact sciences	Mathematics and related areas	Study more to solve and understand the difficulties
41	Yes, a lot	Having internet available	Mathematics and related areas	Having the willpower and trained teachers to help
42	No	Everything OK	None	Everything OK
43	Yes, some	Computer	Mathematics and related areas	More means of communication
44	Yes, a lot	Lack of practical examples and/or situations in which concepts would be used in the personal and professional life; explanations with very a heavy language, difficult in understanding and having access; calculations that were too long without techniques to shorten	Mathematics and related areas; natural sciences; human and social sciences; language and Portuguese language	Search in other texts, audios, and videos

Source: Authors.

Proceeding with Step 3, theorization, it was observed that the study problem "learning gaps/difficulties" is actually very complex, and according to the reflections of Hemsing and Skrsypsack (2016), it is worrying and difficult to solve, as it causes high rates of school dropout, indiscipline, and low quality of teaching, requiring in-depth and specific analyses to understand and address it.

For Algeri (2014), learning is dynamic; it takes place in different spaces and depends on the family, school, and society. Therefore, it is important to consider that each student has capacities, skills, and singularities that need to be observed and taken into account, especially in the face of some difficulty.

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According to these suggestions and to Oliveira, Zutiao and Mahl (2020) and Moojen, Bassoa and Gonçalves (2016), it is essential for teachers to know and understand the differences between learning difficulties/problems and disorders, thus adopting an investigative stance on the neuropsychobiological, cultural, socioeconomic, pedagogical, family, and emotional conditions of all students. A good prognosis also depends on various facilitators, early diagnosis, and family and school environments.

Step 4 – Solution hypotheses. The teachers pointed out as possible solutions to the problem: knowing the learning difficulties to identify them earlier and thus make referrals; strengthening the project methodology already developed at the institution; establishing partnerships with the community, more frequent pedagogical support workshops, especially in the area of reading, writing, interpretation of texts, and mathematical calculations, as well as dialogues with teachers from other schools to exchange experiences.

Step 5 – Application to reality: for a commitment to practical application, it was suggested a text interpretation workshop, because according to the teachers, difficulties in reading, writing, and interpretation of texts compromise learning in all areas of knowledge. The proposal was therefore to carry out a diagnostic assessment of the students during classes, over a period of three weeks, with different teachers, with activities and indicators of the following skills and elements of competence that comprise the curricular units of the courses. They are:

1) Reading ability (can correctly read the words, accents, and punctuations of the texts presented);

2) Vocabulary breadth (knows basic vocabulary in their context);

3) Text comprehension ability (understands the explicit ideas presented);

4) Text interpretation ability (can understand the ideas between the lines of the text – the message/moral of the text);

5) Critical analysis ability (can argue with more depth about the issues raised);

6) Ability to establish relationships between ideas and concepts.

After the diagnostic assessment and the identification of the students with learning gaps/difficulties in reading, writing, and interpretation of texts, they are referred to the Pedagogical Text Interpretation Workshop, which lasts four hours and includes the following activities: reading of texts, identification of unknown words, identification of the main ideas, and interpretation of the texts.

The results of the assessment of the training with the MP with the Maguerez Arch revealed that half of the participants had no knowledge of the MP, i.e. four out of a total of eight. Only one partially understood the MP in the training.

All teachers believe that the training has brought new learning, such as:

> Experiencing this pedagogical practice allowed for the development of an action-reflection-action process of the activities carried out by us teachers; observation of reality, which included a

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> survey of problems, clarification of active methodologies, and broadened the possibilities of applying these methods with clearer objectives (p. 2).

In line with the teachers' statements, Berbel (2012) points out that the MP causes some change in all subjects already during the process, in addition to the possibilities of applying the solution hypotheses developed aimed at transforming the reality being researched. Students and teachers learn from concrete reality and there is a stimulus for the formation of citizens who are more aware, critical, and committed to their environment.

As for the difficulties in putting the steps of the MP with the Arc into practice, three participants pointed out that:

> [...] the MP with the Maguerez Arch requires us to greatly perform in understanding the concepts, and it does not allow for a superficial analysis. Thus, besides demanding this knowledge from us, it shows us how much more assertive we can be in the construction of knowledge in the classroom (p. 2).

> Another important difficulty to be emphasized was discerning the problematization and its steps (p. 3).

> That said, identifying the problem is the initial challenge, and finally ensure the reliability of the information to support the studies (p. 4).

In this sense, Villardi et al. (2015) indicate that, in order to choose a problem, it is necessary to consider certain criteria: what is most urgent, what is relevant, what requires study, what allows for greater action and possible contributions to reality. The development of the other steps will always take into account the problem, its determining factors, the solution hypotheses, and the practical application.

During the five steps of the MP with the Arch, which was the proposal of the training, a real problem was identified and studied: how to remedy the learning gaps/difficulties brought by the students? Many lessons also remained, according to the participants: "Responsibility in the construction of knowledge" (p. 3). "Observation of reality and the problem" (p. 2). "Problematize and get involved" (p. 2). "That there is a deficit in high school and elementary school systems" (p. 7). "Adapting to the student's reality" (p. 7). "Observation of the context and environments in which the students are inserted and the individuality of the student regarding their development" (p. 8).

They all agree that the MP with the Arch can improve their pedagogical practice and that it has brought examples that can be applied on their day-to-day, including regarding the development of curricular units.

Participation in the synchronous training meetings was irregular, due to schedule unavailability, absences due to COVID-19, and other commitments. The teachers delivered their reports, slide shows, and spreadsheets of the surveys with students, other teachers and education specialists, according to the proposed steps. Six of them rated the training and the mediator as excellent.

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Although it was the first time they had used the MP, they say it contributed to a reflective and collective construction of knowledge. The following themes are suggested for future training courses: 1) learning gaps/difficulties for teachers in the Senac SP network; 2) KPIs (key performance indicators) for quality education; and 3) learning assessment processes.

Ideally, each school would create its own indicators, considering its reality

The problem "learning gaps/difficulties" is a complex one, with many consequences and implications that can affect a person's entire life. According to Oliveira (2021), who conducted a study with children during the pandemic, the problem has become more evident and frequent, as well as with new contours, due to social isolation, greater exposure to digital technologies, thus causing more anxiety, dispersion, emotional and mental illness, and consequently more vulnerability. A situation also reported and experienced by Senac Itapetininga students. Thus, extending the training to other Senac SP teaching units will provide a more consistent and up-to-date repertoire for better coping with the situation.

With regard to KPIs for institutional assessment, they can represent an important strategy for improving the teaching-learning performance. However, according to Almeida and Bueno (2021), discussing quality in such a large educational system with different decision-making bodies is a highly complex task. Ideally, each school would create its own indicators, considering its reality. Another criticism from these authors concerns the Basic Education Development Index, the IDEB, which only considers student performance in external assessments and school flow to establish the quality of teaching in an institution.

As for learning assessment processes, according to Menezes (2021), assessing is part of an extremely important pedagogical dimension, given its complexity, dilemmas, and tensions for teachers and students. It is a problem that is amplified in remote teaching and which requires other adaptations, digital tools, and strategies.

Conclusion

The study allowed for broadening the knowledge on the competencies needed by EPT teachers. With the COVID-19 pandemic, the challenges for these professionals have intensified and will increasingly require preparation and continuous training, as besides the rapid changes that are taking place, many new TDICs are being applied to enable the students' learning and teachers' work.

Despite the small number of teachers in the research sample, the focus group brought a rich opportunity to listen to the real challenges of the pedagogical practice, as well as inputs to improve future actions for the continuing training of teachers. However, for a more accurate validation of the results identified, it will be necessary to expand the survey to the other units of Senac São Paulo, involving a larger number of teachers.

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A proposal to implement training with the Maguerez Arch in other Senac-SP units could be started with other groups from the same work unit and then expanded using the same tools already tested in this study.

When teachers had the floor and could speak freely about the issues that were raised, they felt valued and recognized in their role of building bridges and solutions.

Then, during the training, through a pilot training group, all steps were worked on with the aim of solving the problem raised, which brought a wealth of learning throughout the ten meetings with guidance, feedback, research, and interviews with students, teachers and education specialists, which allowed for great reflection and analysis, making it possible to think of solutions hypotheses that were really applicable to the problem.

The positive assessment of the training with the MP with the Maguerez Arch also made it clear that great learning can be added and applied in the context of the classroom and in the development of curricular units, thus broadening the students' ways of learning, stimulating initiative, protagonism, collective, and creative construction to deal with the problems experienced.

Thus, the two objectives were achieved: identification and categorization of the didactic and pedagogical difficulties in the teaching practice and training based on MP with the Maguerez Arch.

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