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The Inclusion of People with Disabilities in the Labour Market: An Experience with Active Methodologies

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ABSTRACT

The present research highlights the snippet of a master's dissertation executed with people with disabilities inserted in the Young Apprentice Program. With the intent of investigating how participants (re)articulate mathematical knowledge in situations related to the labour market, a Learning Laboratory was used for the fulfilment of simulated and practical activities, opportuning learning and experience. The qualitative approach was chosen for the data collection because it allows higher proximity and particular details of the participants. Thus, it was divided into 3 phases: the moment of investigation of the previous mathematical knowledge, the organisation with the price setting, the exhibition, and sales strategies and the experience to accompany the work routine in the Learning Lab. With the interactions, the existence of mathematical knowledge conceptualised in different ways was identified, allowing greater autonomy and involvement of all with the proposed activities, in the same way, that the potential of each person was emphasised involving the different knowledge that can be articulated for the labour market.

Keywords: Mathematical Education; Professional Education; Inclusive Education; Disabled Person.

Inclusão da Pessoa com Deficiência no Mercado de Trabalho: uma Experiência com Metodologias Ativas

RESUMO

A presente pesquisa destaca o recorte de uma dissertação de mestrado realizada com pessoas com deficiência inseridas no Programa Jovem Aprendiz. Com o intuito de investigar como os participantes (re)articulam os conhecimentos matemáticos em situações relacionadas ao mercado de trabalho, utilizou-se um Laboratório de Aprendizagem para a realização de atividades simuladas e práticas, oportunizando experiências profissionais. A abordagem qualitativa foi escolhida para a coleta de dados por permitir maior proximidade e detalhes particulares dos participantes, sendo dividida em 3 fases: investigação dos conhecimentos matemáticos prévios, organização com definições de preço, exposição e estratégias de venda e acompanhamento da rotina de trabalho no Laboratório. Com as interações, identificou-se a existência de conhecimentos matemáticos

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conceituados de diferentes formas, permitindo maior autonomia e envolvimento de todos com as atividades propostas, destacando também as potencialidades de cada participante da pesquisa, envolvendo os diferentes saberes que podem ser articulados para a atuação no mercado de trabalho.

Palavras-chave: Educação Matemática; Educação Profissional; Educação Inclusiva; Pessoa com Deficiência.

INTRODUCTION

The meaning of work in its context and history continuously points to evolution, social growth, collaboration, and societies' involvement for bigger and better production. It is suggested to those inserted in this process constant adaptations, as well as the willingness to learn and improve.

Regardless of the type of labour activity exerted, work, as defined by Albornoz (1994), is capable of delivering a life purpose to the individual who feels productive, because it allows the perception of the utility, of how much it interferes and contributes to life in society. Because of its importance for the individual, the search for different strategies to develop essential skills for work activities has become necessary, allowing the execution of the tasks while respecting the peculiarities and potentialities of each person. Furthermore, this mindset contemplates the insertion of the disabled person,[1] ensuring equality to all, as proposed by the Federal Constitution of 1988, accessible and without prejudice.

Mathematics plays an essential role in society, as it enables greater autonomy in the workplace, which Skovsmose (2001) calls social formatting, empowering the individual to make decisions in a planned, assertive and critical fashion.

Hiring people with disabilities was made mandatory through the Quota Law nº. 8213/91,[2] expanding not only qualification opportunities and career-building but also the personal and professional development of these individuals.

In order to collaborate with the insertion and training of the disabled person for the labour market, programs like the Young Apprentice[3] arise, organised to promote learning through experiential apprenticeship situations, instigating the professional profile and potential of each person.

Mathematics is involved in various processes and activities and, therefore, the focus of the development of these competences must be connected to the reality of the company,

[1] According to Decree No. 3.298 / 99, art. 3rd, approved by CONADE (National Council for the Rights of People with Disabilities): Disability is any loss or abnormality of a psychological, physiological or anatomical structure or function that causes an inability to perform an activity, within the standard considered normal for human beings.

[2] Article 93 explains that "companies with 100 (one hundred) or more employees are required to meet 2% (two percent) to 5% (five percent) of their expenses with rehabilitated beneficiaries or people with disabilities, enabled in the following proportion: up to 200 employees 2%, from 201 to 500 employees 3%, from 501 to 1000 employees 4%, above 1001, 5% (Brasil, 1991).

[3] The Young Apprentice Program "prepares young people to perform professional activities and have the insight to deal with different situations in the working world, and, at the same time, enables companies to train skilled labor" (Brasil, 2011. p.11).

considering the social context in which the disabled apprentices are inserted. Thus, it will allow interaction, internalisation of the acquired knowledge and socialisation, so they can present their promise in the workplace, enhancing their cognitive development (Vygotsky, 1998).

In this context, the present research[4] investigates how people with disabilities, that are part of the Young Apprentice Program, (re)articulate mathematical knowledge for work environment routines. A Learning Laboratory was used – LL, providing opportunities in its practical activities to engage with mathematical competencies acquired throughout life, highlighting its applicability and usability in workplace activities.

PROFESSIONAL EDUCATION AND MATHEMATICS FOR LIFE

The development of competencies for work and life are based on knowing how to do, how to be and how to learn, along with the articulation of this knowledge when the individual mobilises them to carry out a task or to make a decision in a particular situation. Zabala (1998) connects content categories to knowledge, those being conceptual when related to the use of logical reasoning and practical theories. The attitudinal contents are related to knowing how to be, their attitudes and values, as well as their way of living and relating to society. On the other hand, procedural contents are connected to knowing how to do, their choices to put into practice and the autonomy to mobilise their cognitive resources while searching excellence in delivering what set out to be done.

With this perspective in mind, it is possible to identify the need of articulating knowledge in favour of personal development, thus allowing the subject to perceive the relations between them for the work routine, be it in decision-making, organising activities or even in relationships between co-workers. In these aspects, mathematical competencies also emerge, being rich in relations which, according to Skovsmose (2001, p.27), are "relations with an already lived reality, as opposed to a fake reality, whose sole purpose is to serve as an example of application".

Regarding activities performed in the workplace, it is clear that mathematics is integrated into routine tasks, such as time management and decision-making autonomy. This is because when the individual articulates their mathematical knowledge due to actions in the workspace, they end up demonstrating accomplishment and mobilising individual results (Silva & Geller, 2017a).

Vygotsky (1993) considers the importance of the context in which the subject is inserted and the fact that autonomy emerges through its interaction when it appropriates itself of understanding and establishes relations with knowledge and its applicability. This is why highlighting the usability of mathematical knowledge for work collaborates to the construction of meanings to what is learned, identified when trying and articulating the lore acquired or already developed.

[4] This study was approved by the Ethics Committee under protocol number CAAE: 61307916.8.0000.5349.

To Albarello (2014, p.26) "teaching mathematics requires a connection between discipline and its utilisation on daily tasks and this relation must be made so that success is obtained". Moreover, it is in this sense that the work environment becomes conducive, as it profits from countless situations that require mathematical knowledge, some implicit and some explicit.

It is possible to see what Skovsmose (2001) defines as critical mathematical education, which provides subsidies for the formation and performance of the individual in society. Therefore, it allows the development of mathematical competencies from necessity and interest, as well as identifying the importance of learning in addition to feeling like a part of the educational process, because "competence cannot be imposed on students, it must be developed based on the already existent capacity" (Skovsmose, 2001, p.18).

Skovsmose (2001, p.101) when referring to critical mathematical education, believes that it is related to "an investigation of conditions for the obtainment of knowledge; an identification of social problems and its evaluation; and a reaction to problematic social situations", intertwined to social interests and transformations.

People with disabilities may be unable to perform specific tasks when executed in conventional and traditional methods. However, this does not mean that they are unable to learn and develop. Considering the context in which they are inserted, the stimuli that were offered along their trajectory and their experiences amongst society, disabled people will keep on learning, on their way and according to new learning opportunities that are offered to them (Vygotsky, 1998).

According to Sassaki (2005, p.9), "the concept of deficiency cannot be confused with that of inability". With technological and accessibility advances, teaching strategies might be closer to the student´s realities, favouring their potential and knowledge.

Getting ready to work is one of the most memorable milestones in adulthood and, as stated by Bins (2007, p.81), is an essential requirement for living in society. Just as it is connected to the constant evolution of the subject, it also establishes "the construction of different behaviours, thus making the subjects more responsible and aware of their citizenship". In this regard, its singularities must be respected, as they are a part of the person´s life story and, consequently, of their adult development and biological, social, and cognitive changes.

Professional Education plays a vital role in this construction, using teaching strategies that, applied to lived experiences, relates practical learning situations to the work environment. It makes sense to explore mathematical competences in this context because, as Skovsmose (2001, p.103) states, it is "quite common to understand Mathematical Education as an essential workforce preparation and, in a broader perspective, as an indispensable factor for economic growth".

Professional Education can collaborate in the formation of critical individuals and, in this perspective, Skovsmose (2001) emphasises the importance of mathematical learning and how much this knowledge can bolster the development of citizenship. For

this author, the lack of mathematical knowledge jeopardises their interaction with daily chores and interferes with the subject´s relationship with the world, hindering their critical posture and decision-making, assets which are increasingly being demanded by society. All of this, of course, considering the speed of technological advances and the frequent usage of mathematical models for testing, planning and enabling changes. Mathematics can make a real intervention in reality, not just in the sense that new insight can change interpretations, rearranging it (Skovsmose, 2001).

Mathematics has a formative power from the moment activities such as "calculating taxes, child support, wages, production strategies, and so forth" are performed (Skovsmose, 2001, p.81), thus becoming a part of a routine and everyday situations of daily life.

Mathematics is a part of people´s lives, being directly or indirectly present to bring meaning and support to social interaction. When it comes to its importance and usability to people with disabilities, it is fortunately no different, as can to contribute to the personal and professional growth of the individual when learning is offered. Moreover, the potential of each person is valued, and it is understood that disabilities are not an obstruction to learning, which develops in another way (Vygotsky, 1998).

ACTIVE METHODOLOGIES

The perspective of professional education and the inclusion of people with disabilities in the labour market has as an objective elaborating "actions that stimulate the formation of values and behaviours that respect the uniqueness of the students" (Senai-DN, 2011, p.90). Simultaneously, it also needs to keep up with technological changes, in the labour market and the own diversity present in families, and therefore, deficiency represents solely one limitation to be surpassed. With access to activities that make disabled people feel productive, it is possible to contribute to breaking the stereotype about the active and productive occupation in the workplace.

According to Moran (2018, p.2), the learning process is unique to each individual and, regardless of which resources were used, "each person learns from what is most relevant and makes sense to themselves, which generates cognitive and emotional connections". Thus, disregarding their particularities, it is possible to develop competencies at different rates.

Therefore, new teaching processes can be (re)thought, because, with easy access to information and the constant necessity of adaptations and improvements, it becomes clear that only content-based instruction does not meet society´s expectations. To Wagner (2008, p.06), the seven "survival skills" must be developed with the intent of preparing students for life´s challenges. Said skills are "critical thinking and problem-solving ability, collaboration, agility and adaptability, initiative and entrepreneurship, good oral and written communication, ability to access and analyse information and lastly, curiosity and imagination".

With this mindset, strategies and educational processes must address diversity, adapt to each of their student´s peculiarities and collaborate in the qualification of the disabled person, as well as their insertion and permanence in the labour market. A school that allows the articulation of knowledge is necessary, which, as defined by Gondim and Cols (2003), is knowing how to be, how to do and how to act, that are a result of each individual´s internal resources.[5]

It is crucial to allow the connection between content and methodology so that both promote a meaning for learning. The didactics, designed to insert the student, must be modelled based on their characteristics, profile, and in which social context they live in. Moran (2018, p.4) believes that it is necessary to highlight the role of a protagonist student in all stages of his or her education. In this regard, methodologies must be organised to orientate "teaching and learning processes, being also embodied in concrete, specific and differentiated strategies, approaches and techniques".

Also, according to Moran (2015, p.17), "methodologies must follow the intended objectives". In other words, developing proactivity requires activities that not only instigate students while making decisions but also during the constant evaluation of the obtained results. It is fundamental to explore creativity to motivate students to experience situations that show initiative, collaborating to making them able to learn at their own pace and present their aptitudes and interests in the learning process.

Thus, one can note the need for new learning structures with diverse didactics, privileging student performance. For this reason, taking inspiration in active learning methodologies, in the sense of modifying classroom space and creating learning situations that make education more dynamic and exciting for the student, is one of the alternatives for the development of competences, whether being for the construction of a professional career or for the establishment of his or her role in society, preparing the student for life.

Vygotsky (1998) refers to learning as active, in the sense of provoking the subject´s action in their learning process, in the importance of their participation and in the incentive to seek knowledge. Though, this would only happen when taking into consideration the proper environment for education, which should naturally allow the student to move from the passive to the active stage of learning.

In this perspective, setting up activities with real problems and situations of everyday life in which students can experience and test their knowledge, in addition to interacting and articulating in decision-making, is a valuable strategy to promote the students´ inclusion in the educational process. Hence, students can perceive their effective contribution and participation in the development of their skills. With this proposal, it is possible to contribute to the development of logical reasoning, critical sense and ability to

[5] To Perrenoud (2013, p.46), the "internal resources are those that the individual has within themselves, that, in a certain way, are recorded in their memory, including 'body memory'".

argue, especially when it comes to teaching mathematics to a student who is not motivated to seek knowledge, who repeatedly performs exercises without truly understanding its validity or application (D'Ambrósio, 1989). Teachers could contextualise teaching activities, thus assimilating contents making them their own, through activities that internalise lived experiences (Luckesi, 2002).

Mathematics plays a vital role in the evolution of society. At the same time that it is a part of the individual´s routine, be it in time management, in the tasks to be performed or in the financial planning, it is also humanity as a whole that depends on mathematics. Additionally, articulating mathematical knowledge and abilities contributes to autonomy, performance and effective results of the individual.

When a mathematical relation between knowledge and its applicability in the workplace is established, it is possible to integrate any student into their learning process, because experience offers the construction of meanings for what is learned. This, according to Vygotsky (1993), occurs through the context in which their participation is inserted and the activity that will appropriate itself of knowledge with autonomy.

Work routine is filled with countless implicit and explicit situations that require the application of mathematical knowledge. Therefore, regardless of the content or activity fulfilled, "teaching mathematics demands a connection between the subject matter and its use in everyday tasks, and this relation must be made so that success can be achieved" (Albarello, 2014, p.26).

According to Perrenoud (2013), developing competencies is not the same as studying a specific content. As fixation exercises are insufficient, it is necessary to respect each one´s own time to assimilate knowledge and bring about synergy between the various resources, whether they are learned or acquired at other times in life. It is essential to comprehend that a learning situation is not required to have pre-established outcomes, as students are part of the learning process and make their own decisions. Furthermore, the same activity proposal may present different solution opportunities, hence making it necessary to accept what is new, reflect about the applied practice, welcome adversity and consider the social context in which the students are inserted.

It is essential to highlight that the Young Apprentice Program aims to prepare "the young person to perform professional activities and possess the insight to deal with different situations in working life", disregarding their limitations (Brasil, 2011, p.12). Thus, the teaching dynamics proposed for the insertion of people with disabilities in the labour market must be geared towards the development of skills, using the acquired knowledge to mobilise them, and applying them in practice in the workplace. Professional education through the Young Apprentice Program establishes a pedagogical model that collaborates to build knowledge, abilities, and attitudes valued by the labour market. This is, however, different than training specialised labour, as it seeks to enhance the multiple intelligences and make the developed competencies into support for work and for life itself (Senac-RS, 2009).

To make the process of insertion of the disabled person in companies easier, it is crucial to elaborate learning situations that demonstrate the student´s professional capability, which is often acquired throughout life, with practical experience while performing tasks. Therefore, when using the LL, with its space that allows various adaptations, there are always opportunities for interaction and freedom so the students can find themselves. In the Lab, the influence of active methodologies is perceived through the mobility in actions and through the focus on enhancing the subject's self-confident attitude, entrepreneurial attitude, and efficiency in results, as well as motivating them creatively and innovatively.

In this context, it is possible to emphasize the application of mathematical knowledge and to instigate their usage in different situations, such as while elaborating ways of thinking and organizing ideas, while establishing logical relations for the functions and activities that need to be performed and even while judging or making economic, political and social decisions. Vygotsky (1998) sought to show that disabilities[6] only become a hindrance when the subject is deprived of engaging and living in society. Thus, their development is a social consequence and is directly linked to the strategies used so that they do not possess an inferior social position. Therefore, alternative measures to include them are necessary, as disabled people only realise they have limitations when they fail to meet societal standards.

METHODOLOGY

The present research, with the intent of investigating inclusion students from the Young Apprentice Program, sought to investigate how mathematical knowledge is (re) articulated for the labour market, starting from practical activities accomplished in a Learning Laboratory – LL (Silva, 2018).

The Learning Laboratory is a simulated space, a room organised with equipment and materials from a clothing store so that the students can experience learning situations of the workspace.

Qualitative research was chosen, as it provides a thorough approach with data richness, allowing insights and observations in the usual research environment. Moreover, it also inserts the researcher into the context of the participants, since qualitative researches require the world to be examined with the mindset that nothing is trivial, that there is

[6] Relating to a disability, Vygotsky (1998) emphasizes that society imposes limits that hinder their development. In his studies on defectology, he explains the existence of compensatory processes in which "cultural techniques and skills come into existence, concealing and compensating defect. They make it possible to tackle an unfeasible task by using new and different paths" (Vygotsky & Luria, 1996, p.221). So, if there is the loss of some sense, naturally other mechanisms are created to compensate for the deficiency. The term defectology was used by Vygotsky (2001) to define his studies accomplished with disabled children at the start of the twentieth century.

potential to build a clue that would allow the researcher to establish a clearer understanding of the object of study (Bogdan & Biklen, 1994).

For the qualitative research methodology, the benefit of the case study was used as an inspiration, as it collaborates with the research in so-called complex situations and possesses detailed study observations. Yin (2005) considers qualitative research as valuable because of its diversity in data collecting strategies and descriptions, which consequently lead to a higher and deeper comprehension of the research problem.

To this end, the research was conducted in three main phases: the 1st with the recognition of the LL and the investigation of the mathematical knowledge, which was previously acquired by the participants, the 2nd with the organization and relevant adaptations in the LL space and the 3rd with the accompaniment of the work routine built in the space (Silva & Geller, 2017a).

The survey participants were randomly selected, being students with disabilities participating in the Young Apprentice Program, in a Professional Education School located in the North Zone of the city of Porto Alegre. Six participants were chosen, all possessing medical reports with an ICD 10,[7] falling into category F, which is attributed to mental and behavioural disorders so that the report descriptions were not considered for the organisation of this research's activities.

To ensure confidentiality and to preserve the participants´ identities, it was decided to name them as follows: NEU, MAR, DAN, JOR, JON, and FIL. They were followed over 90 hours of research, the period of module III of the course.

DISCUSSION OF RESULTS

To increase the subjects´ participation, accompany the interaction between them and provide greater integration, the research was divided into 3 phases, in addition to the initial observation period for the coexistence between the subjects and the researcher.

Through observations and analysis, the activities performed in each phase sought to identify mathematical knowledge and value the potentialities of the subjects, highlighting the application of this competency in the labour market.

With this perspective, the activities did not establish an execution time which respected the pace of each participant.

Phase 1 sought to investigate the participants´ mathematical knowledge while using the LL. It is essential to emphasise that there is a work routine in the LL, which evolves the interaction with space, involvement with clothing collection actions,

[7] ICD 10 – International Classification of Diseases: proposes the standardization of diseases by providing codes that classify diseases according to their characteristics.

pricing, organisation, elaboration of sales actions and customer service. For this, it was necessary to contextualise the activities proposed in the research, involving everyone in the circumstances of the LL.

In phase 1, an inventory was organized to investigate the participants´ perceptions of the inventory and sales area, because while being in the practical work environment, they interact with inventory, organization, and replacement of goods, thus being tasked with describing and accounting for the physical parts of the existent inventory of the LL. Each participant established their criteria for carrying out the activity; for instance, JON used the division between male and female pieces, saying he realised stores are divided in this way. The division by equipment was at the discretion of NEU and MAR, who separated the equipment, numbering them to count, although doing it without separating the materiel into categories. JON, NEU, MAR and JOR sought to find the most comfortable way to accomplish the task that, according to Barbosa and Moura (2013), is an active way for the learning process, allowing students to fulfil mental functions that impact their intelligence and consequently, the results presented through interactions become more coherent and assertive. The participants FIL and DAN not only showed no interest in participating but also demonstrated to have difficulties with reading and writing. Therefore, it was necessary to find another strategy to involve them.

In phase 2, the subjects were orientated towards the organisation, being involved in exposure activities, pricing, and sales strategies.

Initially, the participants were divided into pairs, were then invited to move the space, organise the equipment, distribute products according to their perceptions and seek to identify prices.

Some improvements noted by the group were: to MAR and NEU, space should have a female and a male sector, because by dividing the sectors, "costumer" service would become easier. For this, they suggested dividing the room in half, as well as dividing the merchandise by categories such as shirts, pants, skirts, dresses, suits, coats, shoes and accessories, based on the product inventory attained in the previous activity. This suggestion had to be adapted when they realised that the number feminine pieces were considerably larger than the one of male pieces, resulting in one part of the room is empty while the other felt "tight".

To DAN and FIL, a price table and a separation of the clothing to the food stock was required, which were received as payment for the sold pieces. They showed concern about having a space for food, to follow the reserves and check the sales. On the other hand, JON and JOR saw the space, decoration, and comfort as an argument for selling more.

The participants´ perceptions of this environment might be connected with their own previous experiences, that logically bring meaning to the context of work which, according to Vygotsky (1998, p.108), "is more than just the ability to think, it is the acquisition of many capacities to think of various things". Moreover, this is how we engage in mathematical knowledge "in order to solve every day practical problems", (re) articulated and applied to meaningful action for the subject.

In the practical activity, FIL and JOR arranged the mannequins and, between trial and error, realised the need for using the size criterion. Consequently, they discovered that the dummies wore 38 (thirty-eight) and proceeded to check the sizes of the pieces before experimenting them on the mannequins.

In moments in which it was necessary to cut wallpapers to cover equipment, walls, and drawers, DAN and JON, which were responsible for the decoration, sought to measure using their tools. The pair received a box with various wallpaper sizes, and the solution found was to use as a base for cutting new paper, the old ones. In such a way, they made a comparison between the sizes they would replace.

Throughout the activities, they found various mathematical relations involving scientific concepts with the practice performed. Furthermore, this is the purpose of active methodologies in mathematics, to value the students´ potentialities and regard them as protagonists that can rescue "existing relations that can create alternative conditions, seeking comprehension and intervention in this social context where knowledge is produced" (Mendes, 2009, p.124).

Concerning the exchange currency, the students were asked to price the clothes of the LL, and for that, they created the following categories: the most expensive, the mid-priced and the cheapest. For each category they chose one food, the most expensive was beans, the cheapest was rice while the mid-priced was pasta.

JON acknowledged the necessity of taking care of the payment with pasta because one package of pasta did not possess 1kg like the beans and rice, but 500g, requiring two packages to establish the same proportion (Figure 1). MAR used a supermarket catalogue to identify the prices and figures, encouraging DAN and JOR to use the same, instrumentalising the connection between the related knowledge. Moreover, it is in this sense that we identify the usage of Vygotsky´s (1998) signs if combined with the interaction between individuals, inducing the development of superior psychological functions, opportuning experiences and bringing meaning to the use of mathematical knowledge, in addition to creating new meanings to the exposed situations.

Figure 1. Learning Laboratory – price ratio.

Phase 3 was directed to experience the LL routine, following the work daily and observing participants in the context of the LL.

This phase focused on the participants´ choices about their duties, none of them choosing a similar function to the ones they had already performed in the company during practice. According to the participants´ choices, the established positions were manager, sales representative, cashier, customer service agent and inventory associate.

The students had the freedom to choose which, according to Berbel (2011), directly impacts their autonomy, the sense of individual independence, being moral and intellectual. This reinforces active methodologies and the moment when "the subject realises that they were the one who caused the desired change" (Guimarães, 2003, p.38).

To establish routines, participants were giving tables to track the inventory, sales and the flow of people attending the LL. This initially caused discomfort in some participants, such as MAR, who fumbled with the organisation, then needing to set standards such as counting before actually performing the service and was not able to provide customer service while also organising the inventory control.

On the other hand, DAN and FIL, who chose to be cashiers, were asked to rethink the prices, which were previously non-perishable food (beans, rice, and pasta). The proposal was to execute the new pricing with milk and DAN´s suggestion for this, in a practical way, was only to trade the products, but keep the prices. According to this participant, "the most expensive merchandise would still be more expensive because they were worth more milk". The subject also worried about the time length of stockpiling, considering that the clothes should not be kept for long, as two days would be enough.

FIL trusted DAN´s decisions, and even without being sympathetic to the changes, they were nonetheless confident that DAN had made a good exchange.

The interaction between the participants and space allowed several mathematical connections, not only in the collaborations between participants when supporting the constructions of others but also in the possibilities of establishing mathematical relations in real work situations, able to (re)articulate the knowledge acquired with new ones.

The competencies, knowledge, skills, and attitudes in professional education must be articulated to achieve good performance in the workplace. This present research focused on the category involving mathematical knowledge, highlighting situations experienced by the participants in the LL, favouring the rescue of the various mathematical knowledge of comparison and counting of addition and subtraction operations, as well as ratio relations.

The elaboration of mathematical criteria was also described in situations such as the organisation of shelves. In this particular case, the participant reports comparing the space and size of products before replacing them, and when packaging, accommodating the products by balancing the bags´ weight.

In another moment, the participants acknowledged quantities and the fact that the size of the female space should be bigger than the male space, as it had a larger quantity of products. Werner (2008, p.26) points out that "the act of comparing requires a notion of size, distance, and quantity". Being involved with these needs made them look for a way of organizing, classifying and choosing a criteria "according to a rule or principle, that is, to separate objects by their similarities and/or differences, gathering the ones that look alike in one attribute and separating them from the ones that distinguish themselves in this same attribute" (Werner, 2008, p.28).

When invited to organise the LL, the participants used mental schemes to represent equipment, identify quantities, manipulate the space and tools, subdivide the areas and so forth. While pricing, they identified equivalences and even compared and pinpointed the price of products and food. In the inventory, they dealt with the inclusion of classes, the product types´ categories. Several mathematical paths were found for problem-solving, facilitation of communication to establish routines and organisation.

Moreover, the use of mathematical conservation was fundamental when the participant realised the difference in pricing, as the pasta package was 1 unit but weighted 500g, not 1kg. In other words, the product´s "build" was one pack, but the quantity was not the same. When changing the price, they exchanged the food for litres of milk and kept the quantities, thus changing kilograms to litters.

These activities could help in the construction of mathematical knowledge, creating possibilities for the individual to be able to establish logical relationships, transforming the reality with which they interact. The interactions and mathematical relations built by him will be present in the workplace, just as they already collaborate on new relations in everyday situations. Mathematics, to Skovsmose (2001), has an extensive interference

in social relations and, when looking to the disabled person, it is important to highlight their potential and connect situations that make sense, having been a part of their life, as well as their social and professional context.

Individual researches were conducted for participants to present their opinions about the work developed in the LL, and also, a multiple-choice test was applied, where they would need to identify the proportions of quantities of clothing x the quantity of food that should be used for payment, with increasing difficulty with each test activity. The test presented the same conditions of the pricing built by all the subjects so that we could verify if they assimilated the articulated knowledge during the activities, such as figure 2, for example.

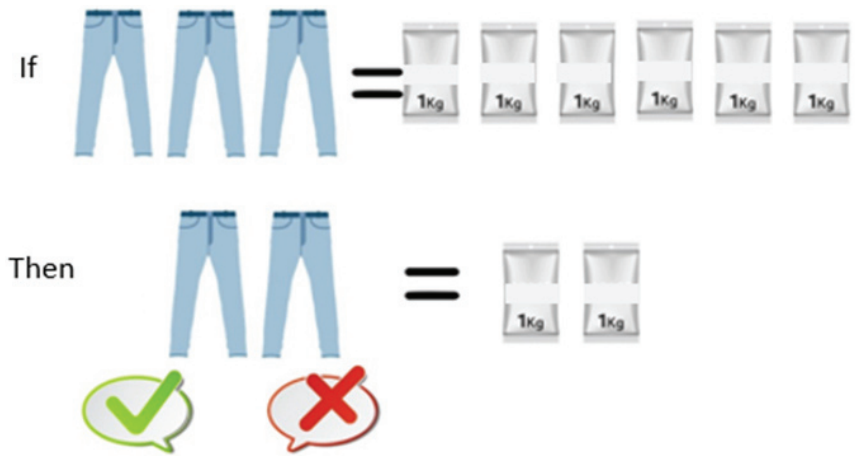

Figure 2. Example of a test question.

JON, who has the role of the packer in the company, reported that*: "the psychologist said that each bag weighs 7kg, and I use two bags when a client buys bottles so that the weight is divided"*. Indicating that mathematics is related to the cashier and costumer change, the subject stated that *"on the cashier, I separate the perishable from the non-perishable products, the cleaning products and bottles in different bags"*. The participant chose to work at the reception and attendance for liking to be among the customers. When performing the test, JON presented difficulties for mental calculation, and however, when using the concrete material in the LL (such as clothes or kilos of food), the divisions were achieved correctly.

JOR, when questioned about the work routine, said: *"I arrive at the company and go to my manager to ask what I need to replace, then I head down the aisle of non-perishable food and count how many bales are on each shelf and lastly, I go back to the stock and put in the cart the missing quantity and complete the shelves"*. The participant was pleased with his work in the LL, as he performed sales actions in the male sector and worked

alongside JON at the reception. JOR was happy to organise the group schedule for visits, found his work to be important in making other students from school aware of attending the LL and of consumption, the subject completed the test with agility and believes that mathematics is essential to people´s lives because they need to manage money.

According to Senac-RS (2009), the result of the subject´s interaction with the world constitutes learning, which occurs in the relationship of the subject in an internal process that produces changes, gradually integrating itself with each individual´s behaviour. Learning is related to the interactions that the subject has with the environment, demanding an investigative attitude towards the context in which it is inserted. In this manner, learning takes on a permanent character, leading the subjects of this process onto an "always learn" mentality – being restless, asking questions and seeking answers.

MAR works on the clothing sector at the company and said*: "I open the boxes in stock and put the alarms on the pieces, and sometimes, the manager even allows me to fix the hangers and put the clothes in the equipment", (...) "I do not like to work in the stock, I prefer to do customer service and stay at the store"*. In the LL, the participant chose to stay in the female sector and liked helping customers the most, confessed that the control tables were confusing, but that with NEU´s help, MAR was able to do them and, in the last few weeks, completed them faster, eventually solely worked on customer service. The subject performed the entire test without difficulty, getting all the right answers.

NEU shared: *"in the company, I put the alarms on the goods, and the manager hands me the products in the carts o put the alarms, but it is very hot in the stock"*. When questioned about work in the LL, the participant answered*: "I was worried when they chose me as supervisor because it is a difficult task, but if my colleagues ask me, I do it"*, in their activity at the company, says that they do not feel good about being in the stock, as they would much rather do other things, see people. With the activities in the LL, NEU had a single absence and attributed their commitment to being happy and liking people. When performing the test, the subject did not present any difficulties. To Berbel (2011), the students´ engagement related to their new learning, be it for comprehension or interest, is an essential condition to expanding their possibilities of exercising their autonomy in decision-making, organising themselves for professional practice.

DAN stated: *"my functions are opening the store, checking the articles of clothing and prices, letting the customers know the prices and, what I liked the most, meeting different people"*. It was clear to see the affinity he had with his functions so much that, on the day a transportation strike was planned, he scheduled to wake up earlier and walk to school, considering that at work he did not get along with people much. DAN has difficulties in writing and reading, which is why his test was performed with assistance; however, with mental calculations, he did not present any difficulties.

By observing the participants´ reports, it is possible to verify Vygotsky´s (1998) vision when relating the importance of social relations, considering that the subject needs another to exist, being able to communicate, act, think, build meanings and collaborate with the environment in which they are inserted. Moreover, from the moment one interacts

with the other, both of them can learn. The different results in the test, which was applied to all participants, in the same way, reinforce the need to provide the construction of knowledge in different ways. While they failed to understand the requirements of the tasks in the test, this does not mean they do not know how to accomplish them, as when inserted in another context and presented differently, they showed better comprehension of what needed to be dome.

The LL allows, as a mediation, cooperation, and interaction between the different subjects, that (re)organize learning processes that impact on the improvement of mental structures, first on the social level and later, on the individual level; first, interpsychological (between people), and then intrapsychological (inside the child). This applies equally to voluntary attention, to logical memory, and the formation of concepts. All the higher functions originate as actual relationships between individuals (Vygotsky, 1998).

In this context, professional education through the Young Apprentice Program collaborates in the insertion of people with disabilities, helping them become economically active and providing them with the skills required on a daily basis, offering training in competencies that respond to social and communication demands, as well as the expectations of adulthood (Sassaki, 1997). And it is with this perspective that mathematics has become fundamental for the construction of the independent and competent subjects, which, everyone knows that, before society, are holders of a capital of competencies, that must continue in constant development so that they are valued and develop autonomy in the labour market (Perrenoud, 2013).

The same test was applied to all subjects, and the results were different. The fact they were unable to answer all questions correctly does not mean they do not know how, because in the LL they were able to connect the knowledge, but in a different context, adapted to each one of them, according to the choice of function and potential of each participant.

CONCLUSIONS

Professional education through the Young Apprentice Program provided flexible teaching practices for the insertion of people with disabilities in the labour market that, besides adapting the spaces to allow experiences, seeks to build meanings and relations between learning stages and processes, respecting the uniqueness of disabled students, promoting their evolution according to their own time and potential. It is considered that data collection has broadly brought several opportunities for continuity, as each participant presented different results and perceptions, mainly relating to the learning interests of the individuals and how work relationships are established for each person. Even with the mindset of investigating mathematical knowledge, it was possible to notice the constant interference of the participants´ motivation for the accomplishment of the tasks. Identifying the specificities of each subject and mobilising resources for their active participation, presented results that could carry on developing.

By analysing data and tracking the subjects during the research, it was possible to perceive the participants´ growing involvement with their tasks. As they felt safer and more comfortable, the individuals showed greater interaction and interest in learning and proposing improvements. Initially, it was noteworthy that the group generally had concerns about how the tasks should be performed and felt insecurity and shame when expressing their ideas. Over time, due to the engagement in activities, decision-making and especially the transfer of responsibility to each person, the students gradually requested less aid and evidenced their potentialities, both in the skills that were perfected and in the search for new knowledge that emerged in every single interest.

With the proposal of investigating mathematical knowledge, the impact on the subjects´ autonomy was identified. While the knowledge was gradually explored and applied in some routine work activity in the LL, they demonstrated assurance and felt appropriate to perform their tasks. Another relevant observation was the reduction of absences in the course because since each participant chose their position, they understood their responsibilities and how their nonattendance would hinder the tasks and the team as a whole. It is possible to reflect about the impacts that the knowledge, sense of belonging and their consequent meanings to the individuals can have on the decision of continuity in the company, because they realize that their work is meaningful and can then perform it correctly, feeling like an actual part of it and, consequently, proposing improvements and seeking other skills.

One can see how much mathematics is involved in simple everyday situations, and especially how much it can engage the participants with the functions of the LL, providing greater interaction and autonomy that can contribute to better performance and development of skills needed for the labour market. Another considerable gain was the elaboration of stages and the development of research inspired by active methodologies, as the inclusion of disabled people in the labour market requires detaching from patterns. This allowed participants to expose their already acquired skills, just as it made it possible to customise the workspace according to the subjects´ interests, thus complementing the professional education of this adult. In this manner, the report to elaborate activities was considered irrelevant and hence, with no pre-set teaching methodologies or interferences, being a part of the activities of the LL came from the autonomy and interest of each participant.

The study here presented, related to the inclusion of the disabled person in the labour market and mathematical knowledge, may raise concern and/or questions. However, by regarding active methodologies, not focusing on the students´ limitations, but rather, on the different ways of involving them in the proposed activities, this experience aimed to find meaning in their choices. This came to pass by emphasising the knowledge the participants built throughout their daily life, exercising their rights and duties in society, as well as pursuing the development of their autonomy and the feeling of being productive in the labour market.

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AUTHORS CONTRIBUTIONS STATEMENTS

The two authors conceived the article. L.F.P.S. adapted the methodology, performed the activities and collected the data. M.G. was responsible for supervising and guiding the work development. Both authors discussed the results and contributed to the final version of the manuscript.

DATA AVAILABILITY STATEMENT

Data supporting the results of this study will be made available by the corresponding author, L.F.P.S., upon reasonable request.

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