

## The use of robotics applications in classrooms with students with cerebral palsy

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### ABSTRACT

In this article, we sought to survey the needs of students with cerebral palsy and their restrictions regarding the school assistance that is guaranteed to them under the Federal Constitution for a dignified life. It is discussed how these students are assisted in the school environment, whether there is adequate structure and equipment necessary for their development in an equal and dignified way. To this end, the present study will be supported by a bibliographic reference on the subject in order to analyze the distance opened by the unequal circumstances produced in the school context by factors such as: the lack of auxiliary equipment for learning, such as, for example, the use of **robotics**. Although the Public Prosecutor's Office of the State of Rondônia (MPE/RO), when called upon, has met such a demand at times, there is still much to be done. In this study, a parallel will also be made with the inequalities found in Brazil in a comparative analysis with another country, such as India, in order to verify if there are other underlying issues and what they are. In this context, we will seek to note whether Brazilian representative democracy only guarantees equality and formal freedom in the areas of politics and justice – from where they coexist with inequalities, thus hiding a disguised colonialism, in order to infer other possible ways to achieve possible concrete solutions and the correction of these inequalities in the educational context.

**Keywords:** Robotics in the school context, Students with cerebral palsy, Social inequalities, Representative democracy.

### INTRODUCTION

In today's globalized social context, there are often many social movements acting in favor of minorities. From this scenario, the present study will focus on discussing the needs of students with cerebral palsy and their restrictions regarding the school assistance that is guaranteed to them in the molds of the Federal Constitution for a dignified life.

This theme will be linked to the bibliographic reference on the gaps opened by the inequalities that occur in the school environment, especially when it comes to students with special needs, such as, for example, the lack of structure and resources in schools that provide these children with an egalitarian learning, especially with regard to the use of technological tools of robotics. Although such equipment is already available in Brazil at a more affordable price, and although the MPE/RO, when activated, has provided some schools with such equipment, there is still a long way to go in order to ensure a full education and, consequently, a dignified life for these children and their families.

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It is worth noting that there are many social transformations caused by the use of cybernetics in a robotized world. And, in the educational context, advances in teaching and learning abstracted from classes that use technological tools are notorious. However, from another angle, the provocations brought by Professor Jacques D'Adeski, in his book published in 2018: "Paths to Recognition, Equality and Respect", make us rethink the inequalities and asymmetries found in Brazilian education in comparative analysis with some countries in the world, such as: Senegal, Malaysia, South Africa and India.

Brazilian society is marked by deep inequalities of opportunities and access to fundamental rights. In this context, education emerges as an important vector for reducing these inequalities to the extent that it can interfere in the process of social inclusion, contemplating ethnic, social, cultural, intellectual, physical, sensorial diversities, among others.

However, the legal guarantee of everyone's right to education does not seem to be sufficient, given that a high number of students fail to succeed in school (BRASIL, 2021). In fact, school performance is even lower when it comes to education aimed at students with special needs, giving rise to great concern in relation to the learning of these students, thus revealing great inequality in Brazilian education.

With these assumptions in mind, we began to reflect and ask ourselves whether there is really equality of opportunities, principles of non-discrimination and merit in the face of affirmative action policies. These questions will be verified throughout this article, within the context of this approach and the incidences detected in the life history of the case under analysis, when answers to the following questions will be sought: why is there inequality in Brazilian Education? What does it stem from: race? colour? sex? religion? physical and intellectual condition? Or are there other underlying issues? What are they? Will the access and use of robotics equipment in school make a difference in the learning and development of children with cerebral palsy? Or will it widen inequalities with the lack of them?

Based on this cut, some questions arise, namely: does representative democracy guarantee only equality and formal freedom in the areas of politics and justice, from where they coexist with inequalities, but which, in its underpinnings, a disguised colonialism can be inferred? Or are there other paths to seek to reach a concrete solution and the correction of inequalities? Are there or are there not possibilities for change through positive discrimination policies and affirmative action? Will there be an equal leveling of opportunities with them and, due to these biases, will there be a reduction in distortions? Or will such a reduction come with public policies aimed at creating material and educational conditions available through robotics?

In this sense, the main question that is intended to be discussed is whether the praxis of these policies can really confer a projection with the achievement of a liberating equality, with real opportunities conferred, including to those with cerebral palsy, sufficient equipment and monitoring in adequate classrooms, so that they do not find themselves in the line of the disadvantaged. Therefore, it is



intended to analyze the real conditions that children affected by some physical or mental disorder face in the school environment. That is what we will try to see.

On this topic, it is worth noting that, due to the condition of special needs, many children are not even able to reach schools, increasing the conditions of inequality from which they are deprived of opportunities for employment and social life of equality. This fact leads to the question of how a representative democracy should act, in order to guarantee equality and formal freedom in other areas of society: in politics, in justice and especially in education, so that the existence and coexistence of these inequalities are not so glaring.

Thus, this work seeks to inquire whether there are other ways or forms to be followed to achieve the correction of these inequalities, in order to infer possibilities of change through positive discrimination policies and affirmative actions that really meet the peculiarities required for each concrete case present in the school context. Let us move on to the analysis.

## **METHODOLOGY**

In this dive in favor of knowledge, in the subtle mutant lines that link sociology to cybernetics, it is not enough to be researchers and spectators, nor just verifiers of real facts, because life charges us for our negligence in the face of factual reality, which, without fail, we will have to pay the bill: the neglect and/or inaction in the face of the social discrepancies that permeate the social and media media on a daily basis. Thus, in the search to meet the object of this article, it is intended to find the north of the possible paths so that we can follow them.

Therefore, the methodological characterization of this study is based on a qualitative approach and starts from the procedure of data collection and analysis from a bibliographic review of scientific articles, empirical observations and journalistic media for the interpretation of information. In addition, empirical observations and database analysis collected by 25 (twenty-five) questionnaires through the internet and a response received via WhatsApp about 02 (two) Schools in Porto Velho/RO that, according to the record, work, but without an attendant for students with restrictions and do not have any equipment to assist them. Let us move on to the analysis.

## **INCLUSIVE EDUCATION IN BRAZIL**

Historically, Brazilian Education faces many challenges to fulfill its main social role, which is: that of "forming individuals capable of critically analyzing reality, in order to perceive how to act in order to transform it and, at the same time, preserve social achievements" (Bossa, 2002, p. 19).

This scenario is even more challenging when it comes to inclusion aimed at students with special needs, contrary to the National Policy on Special Education in the Perspective of Inclusive Education, of



2008 (BRASIL, 2008a), for which all students with and without disabilities have the opportunity to live and learn together. In this bias, despite affirmative public policies, there are many challenges that Brazilian education still needs to overcome to guarantee the right to education and learning for all without any distinction.

Special Education is understood as the teaching modality that serves children, adolescents and adults with disabilities, global developmental disorders or high abilities. However, according to Mantoan (2015, p. 43), in fact, this modality of education was only integrated into the country's public education policies approximately in the early 60s (century. XX), being officially instituted with the denomination of "education of the exceptional".

According to the author, the history of Special Education, that is, education aimed at people with disabilities in Brazil, is divided into three major periods: the first marked by private initiatives, when important institutions emerged that attended to some specific disabilities, such as special schools for the care of deaf students. The second period was marked by government actions at the national level, through campaigns aimed at specifically addressing each of the disabilities. The third period began in the 1990s onwards, and is characterized by movements in favor of school inclusion. It was only from this decade, after the promulgation of the Federal Constitution of 1988, that it was guaranteed in law, according to Article 208, Item III of the Constitution, "[...] specialized educational care for the disabled, preferably in the regular school system" (Brasil, 1990).

Although this law obliges the educational system to offer, free of charge, Special Education, attributing to the Government the responsibility for compulsory enrollment in regular courses in public and private establishments of people with disabilities who are able to integrate into the regular education system, in practice, the new conception of education is still far from being translated into concrete and effective actions with regard to school inclusion. For example, with regard to Special Education, it still does not include all children with disabilities, considering that many students are out of the classrooms because they do not have any specialized professional assistance, and the teacher, alone, can do little (see report, at the end of the work).

From the survey tabulation, among the 25 (twenty-five) questionnaires collected through the Internet, the following was measured: in the 1st question, 52% of the survey participants know people with special needs; 48% did not. While in the 2nd question, 56% do not know any application aimed at people with special needs; 40% do know some of these apps. The 3rd question, which deals with auxiliary devices, 59.1% indicate the cell phone and 31.8% indicate the tablet. The 4th question refers to the States/Municipalities - whether they provide such application equipment; 88% answered no and the others find it difficult. The 5th question deals with the value of the equipment: 76% do not know about it; and 12% may know a little. The 6th question asks whether the State/Municipal Secretariats have received



training to use such technologies – 84% - no; 8% - maybe. The 7th question deals with knowledge of text-to-speech applications; 68% - yes; 20% - no; 12% - maybe. The 8th question deals with the gender of the app's voice, whether it is male or female - 64% - do not know; 24% - maybe; and 8% - yes; and the others accuse that it is the female voice.

From the data collected, it can be seen that government agencies have not invested in the care of students, specifically those with cerebral palsy, nor have they hired trained assistants. Thus, a change in attitude towards these children and their families is required, aiming to ensure human dignity for these people.

In this sense, to support the present approach, the arguments taken from bibliographic research will be analyzed, as well as the parameters of the subjects seen in the scientific articles in this specific case and in view of the data collected, whose statistics will be included in the approach, in addition to a report on two Schools in Porto Velho/RO (attached in the final part of the study).

In this way, the following questions will be answered: - Will there be equalization of opportunities for all in these schools, especially for students with special needs? Through these biases, will there be a reduction in inequalities and distortions in the context of inclusive education? Will inclusion be effective with the creation of educational policies aimed at enabling more material and educational conditions for this public? Will the practice of these policies really provide the achievement of a liberating equality, of true opportunities, to be granted to the disadvantaged and affected by this restriction because of the limitation caused by cerebral palsy? Let's see below.

## **HOW DOES FACTUAL REALITY CRUDELY LAY BARE THE FACTS?**

To broaden the discussion, it is important to present public policies adopted by some countries that served as an example for Brazil to follow this trajectory. Among them, it can be seen that in India, the first country to implement initiatives of this type to promote the social inclusion of DALITs<sup>3</sup>, the "untouchables". There are vacancies reserved for these individuals with quota concessions, since 1948.

Here in Brazil in the twenty-first century, affirmative policies like this have been applied, with access to university, for blacks, blacks, browns, indigenous people, and the poor. However, in Rio de Janeiro, for example, policies of representation for blacks have emerged in advertisements and advertisements since 1980 (last century).

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<sup>3</sup> India's DALITs are among the country's most marginalized citizens, condemned to the lower echelons of society by a rigid caste hierarchy. However, quotas in state institutions for these people have reduced gaps in education, income and health. Dalits now have a thriving chamber of commerce, and many organizations actively advocate for their rights. A significant number of DALITs, however, continue to do the jobs avoided by others, such as the disposal of dead animals and the cleaning of sewers. See more at: <https://www.bbc.com/portuguese/articles/ced7pvz4dkzo> - Accessed on: 01 Mar. 2024.



In this sense, it is appropriate to inquire what are the paths traced within the legislative legality here in Brazil for the inclusion of people with special needs in the context of Special Education, understood as a transversal modality at all levels and modalities of education.

In this way, in 1999, Decree No. 3,298 was ratified, which regulates Law No. 7,853/89, which provides for the National Policy for the Integration of Persons with Disabilities and consolidates the protection standards, whose main objective is to ensure the full integration of people with disabilities in the socioeconomic and cultural context of Brazilians.

At the beginning of the twentieth century, more precisely in 2001, Law No. 10,172 was established, the Law of National Guidelines for Special Education (Brasil, 2001a), which establishes the national guidelines for Special Education in Basic Education and defines inclusion as a process that presupposes the preparation and construction of a new educational system. involving human resources and including curricular adaptation strategies such as individual curricular adaptations (Herebero, 1999).

By basing itself on the principles of equality and non-discrimination based on the proclamation of Universal Rights and Human Rights of 1948, in its articles I and II, which, according to Geneviève Koubi, are: "Equal opportunities" and "opportunities of rights" (Haroche, Lopes, Déloye, 2015), from these principles it can be inferred that equality is not synonymous with egalitarianism capable of inducing the uniformity of conducts and behaviors; and that Formal Equality is equality in freedom.

In this sense, the question that arises is: what would be, then, the objective of the Principle of Equal Opportunities? From this contextualization, it is concluded that the main objective is that of Non-discrimination, which together with the Principle of "Equality" prohibits any form of distinction; This principle should be applied in all areas of society and in all situations of differentiation with a view to promoting equal opportunities in which the individual success of the human person is allowed.

In summary, the Principle of Equality more necessarily implies the uniformity of legislation; However, it does not impose treating all individuals in an "identical" way, but rather supplying the rights of all without distinction by the rules of law. This is, in fact, what justifies the adoption of affirmative policies aimed at diversity.

And it was precisely with the aim of contemplating diversity that it spread in several states of the North American Federation, revealing a decline in affirmative action, starting to be seen as undue preferential treatment, or favoritism, with advantages based on prejudices of the past and, fortunately, no longer existing.

It is worth noting that this set of legal provisions marks a milestone in Brazilian education, insofar as it defined specific legislation for Special Education and established a clear distinction between Inclusive Education and Special Education, defining Special Education as a teaching modality that does not replace schooling that crosses all levels, stages and modalities, and defines the target audience, that is,



the subjects entitled to this modality: students with disabilities, autism spectrum disorders and high abilities or giftedness.

## **THE USE OF DIGITAL TECHNOLOGIES IN SPECIAL EDUCATION**

For a more in-depth foundation and analysis, especially in view of bibliographic references, we have the contributions of Monica, Hansen, and Suárez-Blázquez (2021). In their book entitled "Democracy, totalitarianism and institutional management: transversal lectures", the authors expose the transformations that have occurred in contemporary society through the use of digital technologies. For these theorists, digital technologies are transforming the relationships and the ways in which we structure contemporary society:

[...] We see the inevitability of the use of technological mechanisms, given their advance in all areas of our lives, which leads us to the impossibility of living without current technologies (...) a subjectivity that emancipates itself with promises of freedom and autonomy, now find little compatibility with the current technological dynamics (Monica, Hansen and Suárez-Blázquez, 2021, pp. 12-13).

In this sense, it can be inferred that the advance in the use of digital tools has also generated many effects in relation to people's lives, to the extent that there are "little questioning of the effects in relation to individual freedoms [...]" (Ibid., p. 15). Such a fact opens the way for reflection on the need for democratization of access to digital technologies trying, as it is so, to recover a modern project of individual rights in the context of information society. This possibilidade de democratização "[...] it would guarantee the freedom of people to develop and express their own digital identity without interference, also guaranteeing the inviolability of the dignity of the person in digital media" (Ibid., pp. 28-29).

For the authors, this means that digital technologies are transforming relationships and the ways we structure contemporary society, especially through digital platforms and social networks. Furthermore, in the current scenario of virtual interconnections of cybernetics, the inevitability of the use of technological mechanisms is noted, given their advancement in all areas of our lives, making it almost impossible to live without technologies.

Considering this context, when we bring the discussion to the scope of Special Education, it is clear that the Brazilian legal educational bases guarantee people with disabilities the right to access technological tools and establish actions that enable digital and social inclusion. This is justified by the fact that the use of these technologies, specifically robotics, in the classroom brings contributions such as expansion in the communicative processes of people with disabilities, in the development of learning and, therefore, can be considered as enhancing resources in Special Education.



However, according to research carried out by the WHO (2012),<sup>4</sup> people with disabilities are more affected by social impacts and tend to present disproportionate conditions in relation to their economic, health and educational situation, which consequently leads to high rates of subjects in conditions of vulnerability and worse prospects in education. This translates into the distancing opened by the unequal circumstances produced in the school context by factors such as: the lack of auxiliary equipment for learning and specialized professionals, for example, in the use of robotics.

To eliminate these "barriers that prevent people with sensory disabilities from accessing programming in all means of communication and information, [...], as well as access to new systems and technologies" (BRASIL, 2009a, p.166), including robotics, it is necessary to direct social inclusion actions towards specialized educational assistance in the training of students with disabilities through the provision of services, accessibility resources, technological tools and strategies for the full development of their learning and their effective participation in society.

Thus, for people affected by brain diseases, there is a subjective possibility that can emancipate them, through the use of low-cost equipment made available by the Brazilian State, for their greater autonomy and freedom.

Within this context of digital technologies, much has been said about the need to democratize codes and algorithms, with application from the perspective of human rights, focused on the theme of digital law. To this end, this applicability would guarantee people's freedom to develop and express their own digital identity without interference, also guaranteeing the inviolability of the person's dignity in digital media; and for people affected by restrictions in movement, due to cerebral palsy, this equipment can guarantee their individual emancipation and, consequently, "citizenship in the virtual environment" (Monica, 2021).

Based on the Theory of Modern Law, it is proposed to verify, if it is possible and adequate of one of the main contemporary theories of Law, in an attempt to understand the limits and possibilities for the exercise of citizenship in the virtual sphere. In this bias, [...] "Jürgen Habermas' perspective on the logical genesis of fundamental rights can provide us with a look at the sustenance of the system of rights and verify the realization of a virtual legal code that supports the fundamental rights of 'virtual citizens'" (Monica, 2021, p. 9).

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<sup>4</sup> As defined by the World Health Organization, through the World Report on Disability issued by the Secretariat for the Rights of Persons with Disabilities (WHO, 2012), disability is part of the human condition. Most people will have some type of temporary or permanent disability during their lifetime. See more at: <https://portaldeboaspraticas.iff.fiocruz.br/biblioteca/relatorio-mundial-sobre-a-deficiencia/> - Accessed on: 02 mar. 2024.





According to the author, although national states have created their own regulations based on the normative and legal demands presented to them, and also in line with regulations already made by other countries,

[...] This concern with participatory and democratic spheres in the virtual environment is still very incipient and the first legal demands are beginning to appear, leading us to understand that we are forming, within the third category of fundamental rights, a virtual participatory political dynamic or a virtual citizenship [...] in the theory of law for the constitution of solid foundations to think of a national regulation for the subject of virtual law that is effective and efficient, consistent with the peculiarities of our social reality and that allows him to exercise the other rights arising from it, especially the exercise of his citizenship rights [...] this regulation could be understood as the basic document of human rights in the virtual space, with several basic individual rights necessary for the constitution of a sphere of guarantee of the rights and duties of the subjects, or the fundamental rights of the Brazilian citizen when present in the virtual sphere (Monica, 2021, pp. 16-17).

Based on this theoretical framework, this is the backbone of the data that, today, allows for digital governance. However, for MANTELERO (2018), digital governance may have an impact on individual rights, but also the presence of supra-individual interests, running the risk of discrimination.

It is known that the digital medium can represent many challenges for a theory of values such as human dignity, especially when it comes to people with mental restrictions caused by cerebral palsy.

From a more humanizing perspective, there is a possibility of characterizing the notion of subject in Digital Law by applying categories of Human Rights, within which some authors characterize as the "fourth wave of human rights, digital rights" (Martínez-Villalba, 2014, pp. 28-29). According to the aforementioned author, "This applicability would guarantee the freedom of people to develop and express their own digital identity without interference, also guaranteeing the inviolability of the dignity of the person in digital media [...]".

These authors therefore make an analysis of the problems we face today, in order to justify the need for institutional actions for the protection of the subject in digital environments, where they seek to safeguard individual rights aimed at protecting privacy and preserving security and freedom; and, in this way, through the category of individual rights, rescue and update the thesis of the limitation of power by fundamental human rights. Hence, synthesizing a new form of exercising power with the application of technology, with the materiality of bodies in people's subjectivity and consciousness.

## **THE HUMAN RIGHTS PERSPECTIVE ON THE DIGITAL RIGHTS OF STUDENTS WITH CEREBRAL PALSY**

When characterizing the notion of subject of Digital Law, the perspective of human rights in relation to digital rights can be applied to it. And such a perspective can guarantee the freedom of people affected by cerebral palsy, seeking, through robotics, their development to express themselves through



their own digital identity without interference, while ensuring the inviolability of the dignity of the person in digital media.

With regard to the school context, here in Brazil, the implementation of inclusive educational practices must be guided by the following principles: right to accessibility, consideration of subjectivities and needs of each student; educational system and practices based on different special characteristics; preferential access in regular schools, among others, so that inclusion effectively occurs (BRASIL, 2001). And, as already mentioned, in order to promote digital inclusion, the National Human Rights Program (2009) has as its main guideline to guarantee the "right to democratic communication and access to information", in order to consolidate "a culture of Human Rights". (Brasil, 2009a, p.166).

For specialized educational services in Basic Education, the function of Special Education is defined in the following terms: "to complement or supplement the student's education through the provision of services, accessibility resources and strategies" aimed at "their full participation in society and the development of their learning" (Brasil, 2009, s.p.). Therefore, Information and Communication Technologies (ICTs) must be accessible to students, especially those with disabilities or reduced mobility.

In addition to being a legal obligation, accessibility enhances the development of autonomy through interfaces that respect the special needs and preferences of these people and reinforces a break with exclusionary practices in the school context and in society as a whole (Conforto; Santarosa, 2002). However, there is still a long way to go in Brazil, as an exclusionary culture persists in which people with cerebral palsy are considered to be almost non-existent; because they stay out of the classrooms and end up not entering the educational statistics, because they find themselves at the mercy of their own life and social life, cloistered in their homes – abandoned to their own fate.

This inequality has a structural and systemic character, and persists with the fragility of public policies to address it. In this scenario, inclusion in Brazilian education is essential; It is an indispensable element for any change, so that without an effectively inclusive education it is not possible to think of an egalitarian society. Only with the application of public policies aimed at the effective implementation of digital technologies in specialized education in all its stages and of accessible value, will it be possible to break the social stain of exclusion that causes us so many disorders.

## **CONCLUSIONS LAY BARE THE FRAGILE AND OPEN RUPTURES**

In this journey through knowledge, in the pursuit of understanding and seeking plausible answers that answer all the questions raised in the introduction of this article, there is a need for significant changes in relation to the use of digital technologies in school – such as robotics – by people with disabilities. This need to adapt the educational system, giving due attention to the individual needs of special students shows that the use of digital technologies aimed at special students contributes positively



to their development, considering that they awaken new practices and stimulate the development of autonomy of students with or without disabilities (Santarosa, Conforto and Machado, 2014).

The studies presented contribute to the understanding of the need to promote broad access to digital technologies for students with disabilities (specifically cerebral palsy), since for Souza, Moita and Carvalho (2011), these technological resources are means of providing students with their desires and dreams, overcoming obstacles, regardless of whether they have mental or multiple limitations.

In this sense, the discussions brought up in this article show that the inclusion of people with cerebral palsy is still a recent topic and, therefore, needs to be addressed in more studies. Although the theme is still a slow process from the point of view of social conceptions, it brings a very important reflection on the possibility of effective inclusion of students with special needs, which contributes to the development of society and the insertion of these students in the special learning process, as well as reaffirms the need to train education professionals so that they can develop innovative pedagogical practices based on the use of technologies Digital.

Therefore, it is essential that there is continuity in research focused, above all, on the training of Education professionals who have been very committed to transmitting and sharing the best of their scientific knowledge mines in favor of science.



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## ATTACHMENT

Unknown. (2021, December 3). Report on two schools in the municipality of Porto Velho/RO [Audio recording]. Received via WhatsApp.

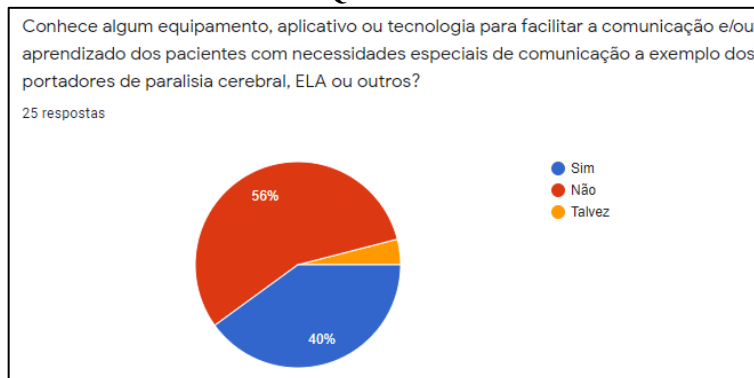
Unknown. (n.d.). Survey responses on the reality of educational support in Porto Velho [Survey]. Google Forms. [https://docs.google.com/forms/d/1CnJxHYBWaQ6bJixBIm4US7BGgMuFP\\_Be6l-CGvGVFn0/edit#responses](https://docs.google.com/forms/d/1CnJxHYBWaQ6bJixBIm4US7BGgMuFP_Be6l-CGvGVFn0/edit#responses)

### GRAPHS OF THE ANSWERS TO THE QUESTIONS OF THE SURVEY CONDUCTED WITH 25 PEOPLE

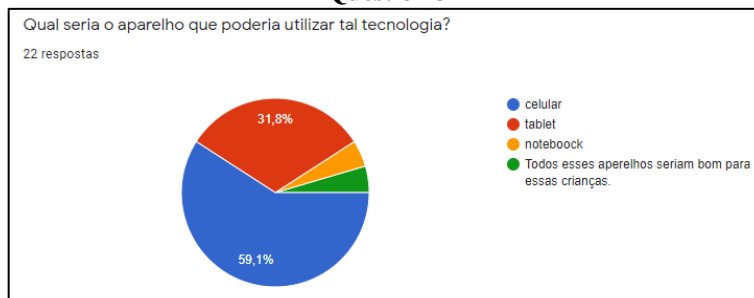
#### Question 1



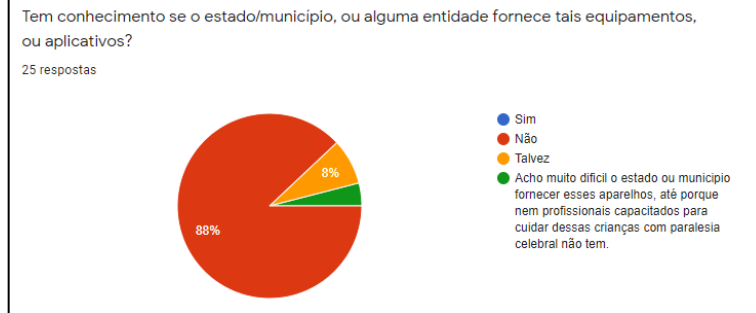
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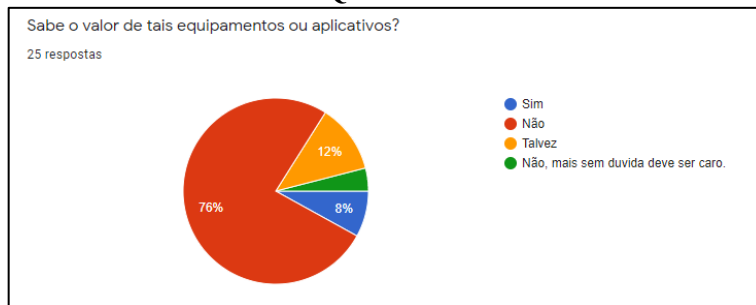
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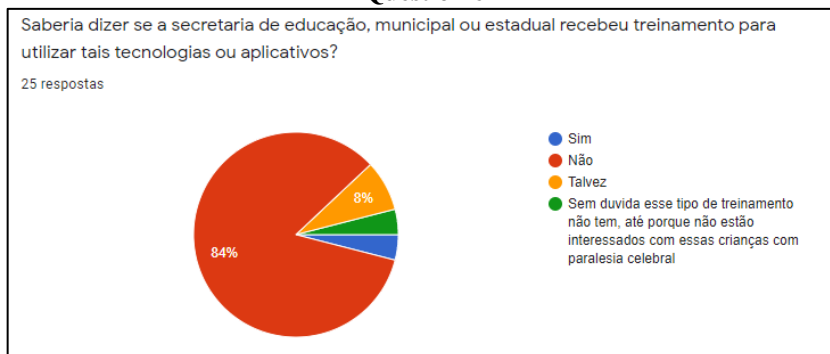
### Question 4



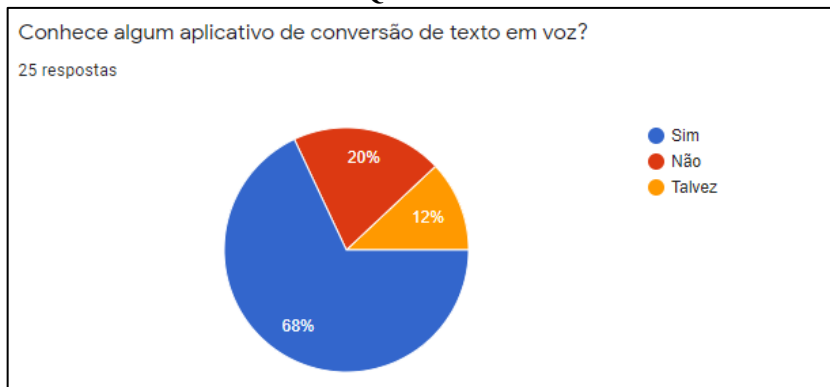
### Question 5



### Question 6



### Question 7



### Question 8

Sabe dizer se a voz usada em tais aplicativos tem distinção de gênero(feminino ou masculino)?

25 respostas

