INCLUSIVE HIGHER EDUCATION (IHE): APPLICATION OF ASSISTIVE TECHNOLOGIES

ENSINO SUPERIOR INCLUSIVO (IES): APLICAÇÃO DE TECNOLOGIAS ASSISTIVAS

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ABSTRACT: In a context of growing social concern with issues of diversity and inclusion, the authors intended to explore the potential of assistive technology for the promotion of inclusion of students with disabilities. The research seeks to analyze not only the inclusion of the student during his/her academic experience, but also its role in moments when a potential candidate with disability is considering entering higher education, or considers continuing their studies, once acquiring this disability while attending the course. To this end, higher education teachers in Portugal were questioned on their experience or expectations regarding the teaching of students with special educational needs, and students with special educational needs, and the latter about their experience and expectations from the moment their application, or from the moment they become aware of their disability during the disability already during the course, until the moment they complete or abandon it. It was possible to conclude that there is a great need for pedagogical training of teachers in higher education in Portugal, both in general terms and specifically to prepare them for teaching students with special educational needs. In students' perspective, the difficulty in reaching information that supports the decision to apply for higher education (inclusive practices and accessibility of the institutions they are considering applying to, rights guaranteed by legislation and assistive technology that may facilitate their inclusion), as well as some difficulty in finding accessible or adapted assistive technology and teaching materials. It was also possible to identify needs in terms of assistive technology.

KEYWORDS: Assistive Technology, Inclusion, Students with Disabilities, Higher Education.

RESUMO: Num contexto de crescente preocupação social com as questões da diversidade e inclusão, os autores pretendem explorar o potencial da tecnologia assistiva para a promoção da inclusão de alunos com deficiência. A pesquisa busca analisar não apenas a inclusão do aluno durante sua experiência acadêmica, mas também seu papel nos momentos em que um potencial candidato com deficiência está pensando em ingressar no ensino superior, ou em continuar seus estudos, uma vez que adquiriu essa deficiência durante o curso. Para o efeito, foram questionados professores do ensino superior em Portugal sobre a sua experiência ou expectativas face ao ensino de alunos com necessidades educativas especiais e alunos com necessidades educativas especiais, e estes últimos sobre a sua experiência e expectativas desde o momento da sua candidatura, ou desde a desde o momento em que toma conhecimento de sua deficiência durante a deficiência já durante o curso, até o momento em que o conclui ou abandona. Foi possível concluir que existe uma grande necessidade de formação pedagógica dos professores do ensino superior em Portugal, tanto em termos gerais como especificamente para os preparar para o ensino de alunos com necessidades educativas especiais. Na perspetiva dos estudantes, a dificuldade em obter informação que suporte a decisão de candidatura ao ensino superior (práticas inclusivas e acessibilidade das instituições a que pretendem candidatar-se, direitos garantidos pela legislação e tecnologias de apoio que possam facilitar a sua inclusão), bem como alguma dificuldade em encontrar tecnologia assistiva e materiais didáticos acessíveis ou adaptados. Também foi possível identificar necessidades em termos de tecnologia assistiva.

PALAVRAS-CHAVE: Tecnologia Assistiva, Inclusão, Alunos com Deficiência, Ensino Superior.
1. INTRODUCTION

The first author, a student with disability himself, identified the difficulty of obtaining information during his hospitalization. Namely what possibilities he would still have to complete his higher education program.

The term inclusion does not appear spontaneously as a solution for someone who is confronted with the fact of having a disability. Searching for similar experiences and for solutions and factors that promote success is not immediate either. The combination of factors such as the demotivation that come with the newly acquired disability, the diagnostic reserve of doctors, and the relativization of academic and professional objectives by the family, made it very difficult for the student not to give up their course, and to have the motivation to face his own treatments.

Thus, the object of study of this research is the inclusion of students with disabilities in higher education in Portugal. In this context, the research question is justified:

How can higher education institutions (HEIs) take advantage of the information and communication technologies (ICT) to enhance the full inclusion of students with disabilities?

The purpose of this research is to enhance the use of ICT to promote the inclusion of students with disabilities in higher education.

2. CONTEXT

2.1 IMPAIRMENT, DISABILITY, HANDICAP AND FUNCTIONALITY

In 1980, the World Health Organization (WHO) presented the International Classification of Impairments, Disabilities and Handicaps (ICIDH) (World Health Organization, 1980). According to the ICIDH, in the context of health, a disability is any loss or abnormality of psychological, physiological, or anatomical structure or function. It is characterized by temporary or permanent loss or abnormality, including the abnormality, defect or loss in a limb, organ, tissue, or other body structure, including mental function systems.

The ICIDH was revised, being replaced by the International Classification of Functioning, Disability and Health (ICF) (World Health Organization, 2001), developed after five years of systematic field studies and international consultations, having been approved by
the 54th World Health Assembly for international use on 22 May 2001, through resolution WHA54.21, signed by the 191 WHO member countries.

A commonly used diagnostic guide in the field of mental health is the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) (American Psychiatric Association (APA), 2013). It offers criteria and instructions for diagnosing mental diseases, some of which may be connected to functional limitations and disability, while it does not define disability as a distinct category.

Each mental disorder is included under a distinct set of diagnostic criteria in the DSM-5, which are typically symptoms, duration, and functional impairment. The handbook emphasizes that mental illnesses can significantly hinder social, vocational, or other critical areas of functioning or cause severe distress.

It should be noted that the ICF changes the definition of disability to a problem in the functions or structures of the body, such as a major deviation or loss.

The DSM-5 places a strong emphasis on the necessity of determining how symptoms affect a person's general functioning. It acknowledges that functional limitations might appear in a variety of contexts, including jobs, relationships, self-care, and other daily activities. Depending on the individual, and on the mental disease, there can be a range in the severity of disability or functional impairment.

While the DSM-5 offers a framework for diagnosing mental disorders and evaluating functional impairment, it's important to keep in mind that disability is a more comprehensive term that goes beyond mental health. Physical, sensory, cognitive, and intellectual impairments are just a few of the conditions that can lead to disabilities. These conditions can be evaluated and defined by a variety of frameworks and organizations, such as the International Classification of Functioning, Disability, and Health (ICF) of the World Health Organization.

2.2 DIVERSITY, INCLUSION AND DISCRIMINATION

The term diversity originates from the Latin word *diversitāte*, meaning the quality of being diverse, variety or difference (Merriam-Webster, 2023). Thus, the term usually used to promote equal opportunities for all, in education and employability, is based not on the equality of all people, but on the acceptance and recognition of differences.
Students and staff at a university may be diverse without necessarily making that community inclusive. Inclusion refers to diverse backgrounds being valued in a group or institution, which as a prerequisite need to raise awareness about differences and privilege (Jørgensen & Claeys-Kulik, 2018). According to this definition, inclusion is based on recognizing differences and raising awareness of the need for some positive discrimination measures to ensure equality for all. Antoninis address inclusion in education and its framework in the United Nations 2030 Agenda for Sustainable Development, considering education a gateway to inclusive societies if policy makers and educators can see the diversity of learners not as a problem but as a challenge: identifying individual talent in all its manifestations and forms and creating conditions for it to flourish (Antoninis et al., 2020).

In short, full inclusion starts from the acceptance of difference, and passes through the creation of conditions of equal opportunities, means and evaluation criteria to enable equal goals to be achieved or surpassed. The individual does not have to become equal to others with whom he or she coexists but has the right to feel that he or she has achieved the same goals as everyone else.

Calderón argues that all children and young people have the capacity to learn and develop and are born with the potential to be educated. Their research, following the life experience of one young learner and his parents’ struggle to gain equal opportunities for their child provides evidence that intellectual disability and aptitude are not characteristics of the learner, but characteristics of a situation (Calderón-Almendros & Habegger-Lardoeyt, 2017).

2.3 ACCESSIBILITY

Freitas and Carvalho raised the issue of engineering courses being within the reach of students with disabilities such as visual or hearing impairments (Freitas & Carvalho, 2020). For these researchers, this accessibility in higher education implies the elimination of architectural barriers, adoption of readability criteria (or alternatives such as audio), understanding in the production of teaching materials and operation of informative and administrative digital platforms of higher education institutions and adoption of assistive technology.

Accessibility can therefore take several forms, such as digital accessibility. The reference website for information, training, resources, tools and regulations regarding accessibility is, since 7 October 2020, acessibilidade.gov.pt (Agência para a Modernização
Administrativa, 2020), where it is possible, for example, to perform the compliance tests with the accessibility criteria defined via Decree Law No. 83/2018, of 19 October, in Portugal, which transports into national law the European Standard EN 301549, (CENELEC, 2020) which implements the W3C WCAG 2.1 standard (Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C), 2018).

Silva refers that Software Accessibility, Web Accessibility, Digital Accessibility and Mobile Accessibility are currently trends within scientific production. For these authors, digital accessibility has a huge potential to change the lives of people with different types of disability, ensuring them a more active participation in society (Silva et al., 2019).

Regarding the production of accessible teaching materials, the University of Porto provides an accessibility platform with information regarding good practices, offering tutorial guides for the creation of pedagogical content with accessibility criteria (Universidade do Porto, 2023) and the SEN section of the Polytechnic Institute of Leiria which provides a manual for teachers (IP Leiria, 2014).

2.4 PROFESSORS’ TRAINING

Bazon conducted a study on the training needs of teachers and the trainers themselves who can train them in inclusive practices, concluding that the training of trainers needs to be reviewed and that, in addition to academic and research production, teachers should be concerned with the type of professionalization they are providing to their students. It is urgent that teachers turn their gaze to pedagogical forms of knowledge, and not only to the curricular contents of their disciplines (Bazon et al., 2018).

3. METHODOLOGY

The research design was based on the conceptual structure and statistical statistical study that was intended to be done (Devi, 2017), including: i) the sampling design, which highlights the items to be selected for observation during the study; (ii) the observational design under which the conditions under which the observations are made are defined; iii) a statistical design that defines the sample size and sampling method/techniques and iv) an operational design that implements the previous three phases.
Two questionnaires were constructed and applied, one to 33 professors of higher education and the other to 30 students with disabilities. The questionnaires were sent, in the form of a link that directed to Google Forms, to higher education institutions with the collaboration of Confederação Nacional de Organismos de Pessoas com Deficiência (CNOD), Associação Portuguesa de Pessoas com Deficiência (APD), Associação Salvador, and Associação Portuguesa dos Deficientes das Forças Armadas (ADFA).

The methodology follows a qualitative approach, although completed with questions that aim to measure and quantify certain characteristics, which also gives the study a quantitative approach. Hence, it is used a mixed methodological approach (Araújo & Cota, 2016).

4. RESULTS

4.1 QUESTIONNAIRE CONDUCTED TO UNIVERSITY PROFESSORS

The questionnaire to teachers starts analyzing how many teachers in higher education have had some experience of teaching students with disabilities. Of the 33 teachers, 17 (52%) answered yes, and 16 (48%) answered no.

In the second question, professors were asked to indicate the types of disabilities of students who had already taught. It was found that 16 (48%) of the teachers did not contact with any disability, 12 teachers (36%) contacted with one type of disability, two teachers (6%) contacted two and three types of disability, and only one teacher had contact with four different types of disability.

Regarding the distribution of the different types of disability observed, disability in neuromusculoskeletal and movement-related functions appears 9 times, representing 35% of the observations; visual sensory impairment 6 times, or 23% of the total; disability in voice or speech functions 5 times, or 19%; disability in mental functions 3 times, 12%; Auditory sensory incapacity appears 2 times, 8% and disability in functions of the cardiovascular system, hematological and immune systems and respiratory system 1 time only, 3%.

When it was verified whether the 17 teachers who had experience in some type of disability had any training oriented to the teaching of students with special educational needs, 14 (82%) answered no. Of these 17, six were themselves who signaled the deficiency of the
students, which took away time for them to prepare and adapt pedagogical materials for the students concerned.

This was followed by a question about the success of the students' evaluation by each of the teachers. For seven teachers (41%) their student obtained success in the first period of evaluation. For three teachers (18%) obtained success in the second evaluation period. For two (12%) failed but obtained later success, one (6%) failed and did not repeat the curricular unit, and another still (6%) will have achieved success in sports practice. Three of the teachers (18%) indicated that they already had extensive experience in the teaching of students with disabilities, having cases distributed by all possible levels of success, with very approximate frequencies.

The main challenges faced by the teachers were communication barriers and consequent delays in the program, higher tutoring times, adaptation of pedagogical and evaluation materials and image descriptions.

In the description of the accessibility care taken into consideration, what was most frequently mentioned was the availability of the documents in Moodle. The most frequently mentioned precautions are those of accessibility for sensory disabilities of a visual nature, about which there is some sensitivity to font sizes and contrast, as one teacher points out: "In a student with a retinal problem and 5% visual ability, all electronic documents were transformed into black background and white letters. The assessment was transferred to oral evaluation."

About the type of assistive technology already used or experienced by teachers in the preparation of classes, the categories of assistive technology defined in ISO 9999:2016 were used as hypotheses of answers, and teachers mostly identified the use of technologies for communication and information management, and most teachers have never used an assistive technology or know what one is. The confusion between the concept of assistive technology and collaborative platforms was notorious, with the most illustrative response being the use of Moodle, Zoom and Teams.

When challenged to identify a need that assistive technology today still cannot meet, the only need correctly identified was the description of images and mathematical expressions. In addition, the use of larger monitors, reduction of physical obstacles in accessing classes and reading of facial expressions of the student, for example through neurological sensors that allow it, were also mentioned.

As for the feeling of preparation for teaching students with special educational needs, when asked to indicate the types of disability for which they have already had specific training
to prepare to teach students with these special educational needs are obtained as results: 26 teachers (79%) had no training to deal with any of the types of disability, 4 teachers (11%) will have been trained to deal with disability in neuromusculoskeletal and movement-related functions, 3 teachers (9%) will have been trained to deal with visual sensory impairment, 1 (3%) to deal with disability in mental functions, another to deal with sensory disability associated with pain, another to deal with disability in voice or speech functions, and one to deal with disability in functions of the cardiovascular system, the hematological and immune systems and the respiratory system.

Regarding the types of disability for which teachers feel prepared to teach, regardless of the training they may have had, teachers appear to be more confident with the less visible types of disability, or those that are not concerned with the reduction of sensory abilities or mental functions.

Among all, 18 teachers (55%) feel prepared to teach students with disabilities in neuromusculoskeletal and movement-related functions, 14 teachers (42%) feel prepared to teach students with disabilities in voice or speech functions, 12 (36%) disability in functions of the cardiovascular system, hematological and immune systems and respiratory system, another 12 with sensory disability associated with pain, 10 (30%) to teach students with disabilities in genitourinary and reproductive functions, and 10 only to teach students without any type of disability, nine (27%) to teach students with disabilities in functions of the digestive tract and the metabolic and endocrine systems. Only three (9%) are prepared to teach students with visual sensory impairment, and another 3 with auditory sensory impairment. Only two teachers (6%) were prepared to teach students with disabilities in mental functions.

Finally, it is still possible to observe that as for sensory deficiencies and those of mental functions, teachers will only feel prepared to teach after receiving specific training. Of the total respondents, 21 teachers (64%) manifest previous need for training before teaching students with visual sensory impairment, 20 teachers (61%) require training to teach students with sensory impairment and also 20 teachers (61%) indicate that previous training is necessary to teach students with disabilities in mental functions, 12 teachers (36%) manifest the need for training to teach students with disabilities in neuromusculoskeletal functions and related to movement, and another 11 (33%) to teach students with disabilities in voice or speech functions, 9 (27%) to teach students with sensory impairment associated with pain, six (18%) to teach students with disabilities in functions of the digestive tract and the metabolic and endocrine
systems. Another six teachers indicate that they need training to teach students with disabilities in genitourinary and reproductive functions, and finally five teachers (15%) manifest the need for training before teaching students with disabilities in functions of the cardiovascular system, the hematological and immunological systems and the respiratory system.

When asked about the accessibility care they have in their pedagogical materials, most teachers indicate care related to the digital accessibility of the documents to be adapted for students with visual sensory impairment. In the questionnaires, 66.67% of the teachers indicated that they did not have the pedagogical materials prepared for the eventuality of receiving students with special educational needs.

Among the teachers surveyed, 24 teachers (72.7%) never used assistive technologies or observed a student using assistive technology.

**4.2 QUESTIONNAIRE CONDUCTED FOR STUDENTS WITH DISABILITIES**

Of the 30 students who responded, 18 (60%) revealed to have disability in neuromusculoskeletal and movement-related functions, five students with visual sensory impairment (17%), and the same values for auditory sensory disability, two students (7%) with disability in functions of the digestive tract and metabolic and endocrine systems and two with disability in mental functions. Only one student (3%) had a disability in functions of the cardiovascular system, hematological and immune systems and respiratory system, another with sensory disability associated with pain, and one with disability in voice or speech functions.

Of the students surveyed, 26 (86.7%) acquired the disability(s) before applying for higher education and four (13.3%) already during higher education.

Of the 26 students who acquired the disabilities before applying, 16 (61.54%) indicate having partially known the accessibilities guaranteed (physical or other), by the higher education institutions where they intended to apply, seven students (26.9%) claim to know them in full 3 (11.5%) say they were not aware.

Of the students with disabilities acquired before access to higher education, 11 (42.3%) stated that they had no knowledge of the assistive technologies that could be applicable to them, 11 students (42.3%) demonstrated incomplete knowledge and only four students (15.4%) stated that they knew these technologies fully.
It was identified greater use of assistive technologies, with greater ease and correction by students than by teachers. Although physical accessibility has preponderance, audiovisual assistive technology and automated reading of documents is present.

Regarding access to these types of assistive technology, 13 students (50%) answered that they had access, 8 students (30.8%) did not have access because they did not know them, three students (11.5%) did not have access because they did not find them available, and two students (7.7%) did not have access because it represents an unaffordable financial investment.

When the students were asked to identify some assistive technology that did not yet exist and that could overcome any need they felt, the reduction of fatigue caused by lip reading, the description of images, or some needs of everyday life, such as access to lower vending machines or the suppression of the absence of autonomy in personal hygiene, stood out among these needs.

Among the 26 students with disabilities acquired before access to higher education, 14 (53.8%) said they partially knew the rights that the law confers on them, six students (23.1%) know them perfectly and another six (23.1%) do not know them at all.

The students revealed that they knew their rights: the additional time for the execution of the tests, or access to the contingent of students with special educational needs or to university residences with adapted rooms, or access to scholarships for those with disabilities greater than 60%. As for other rights that the law could/should contemplate, the students' claims even require the total exemption of tuition fees and fees, similar to what happens with health expenses. The scholarship awarded by DGES to students with disabilities greater than 60% does not effectively cover all tuition fees.

Of these 26 students who already had the disability before considering an application to higher education, 22 (84.6%) made this application, and only four (15.4%) did not. Determination and self-will are the factors that most contributed to the decision of students with disabilities to proceed with their application.

The 22 students with disabilities who applied for higher education were admitted, of which 12 (54.5%) did not benefit from a special access contingent while the other 10 (45.5%) benefited from this contingent.

The 4 students who acquired the disability in the course of higher education are analyzed below. Two had access to their classmates' notes during their absence from class. One student was able to attend classes in videoconference, had access to the notes of colleagues and
personalized monitoring by their teachers. Only one student completely lost touch with the classes. Regarding the evaluation moments, two students completed them remotely, one student was suggested alternative elements of evaluation and for another student it was not possible to complete the evaluations that would only take place in person. This student pointed out that this happened in 2004, before remote learning became widespread.

During the absence of classes, a student was informed that his university would guarantee him the necessary accessibility and was aware of the rights that the law would grant him. One student had only the information that the university would guarantee accessibility and two students were unable to have any information regarding the conditions under which they could finish their course.

Among the students who were away for health reasons, asked about the level of motivation they felt they received from their medical teams regarding the return to their studies, on a scale of 1 (Discouraged him or limited his hope) to 5 (They encouraged him and nurtured the hopes of completing his studies), one student indicated level 2, another mentioned level 3 and two students reported level 5.

When the motivation to continue studies is measured, originating in the social circle of the students (family and friends), one student manifested great demotivation originating in the family, through the excuse of dropping out of the course, another student placed this motivation at level 4 and two students responded with level 5.

Asked how close they were to dropping out of the course, on a scale from 1 (Never considered this hypothesis) to 5 (Strongly considered this hypothesis), one student answered with level 3, another student answered with level 4, and two students answered with level 5.

As for the completion of their courses, a student did not resume the course because although he considered that it would be possible to complete, he would not get the necessary supports. Another student after trying to resume his studies, failed to complete them, another student continued his studies and continues to attend the course, and finally a student continued and completed his course.

The following group of questions seeks to describe the academic experience of all students with special educational needs, representing the twenty-one students with disabilities acquired before they applied, and the four who acquired the disability in the course of attending higher education.
Students with special educational needs were asked to describe the degree of preparation of their universities to receive them, on a scale of 1 (Not prepared) to 5 (I was perfectly prepared). Eleven students (44%) responded with level 3, five students (20%) with level 5, four students (16%) with level 1, three students (12%) with level 4 and two students (8%) with level 2.

Asked to record the degree of preparation of teachers to teach inclusively, on a scale of 1 (Were not prepared) to 5 (They were perfectly prepared), seven students (28%) indicated level 4, levels 3 and 5 were indicated by five students (20%), levels 1 and 2 were indicated by four students (16%).

Asked to record the level of receptivity of their peers, on a scale from 1 (Demonstrated rejection) to 5 (They were fully inclusive), 11 students (44%) responded with level 5, five students (20%) answered with level 3, four students (16%) with level 4, three students (12%) with level 1, and two students (8%) with level 2.

We sought to measure the impact of the preparation of higher education institutions, the degree of preparation of teachers, and the receptivity of colleagues on the academic experience of students with special educational needs, at a level of 1 (Very negative influence) to 5 (Very positive influence).

Regarding the impact of the preparation of higher education institutions, 14 students (46.67%) indicated level 3, five students (16.67%) indicated level 5, three students (10%) indicated level 4, two students (6.67%) indicated level 1 and one student (3.33%) indicated level 2.

Regarding the impact of teacher preparation, 10 students (33.33%) indicated level 3, seven students (23.33%) indicated level 4, six students (20%) indicated level 5 and two students (6.67%) indicated level 2. No students indicated level 1.

Regarding the impact of the receptivity of colleagues, 10 students (33%) indicated level 5, eight students (26.67%) indicated level 3, four students (13.33%) indicated level 4, two students (6.67%) indicated level 2 and one student (3.33%) indicated level 1.

From the responses of students with special educational needs, it is possible to identify a list of inclusive practices, which have in common, accessibility and belonging to a group. As an example, we cite: The teachers tried whenever I had enough material to read, "They tried to speak in my direction, in order to facilitate lip reading", "Some teachers accept the presentation of the works with audio inserted by computer", "The remote access to the materials of the
classes and the recordings of the same, including during the hospitalization" or "The acceptance of the presentations supported by text readers, and, the response to the Q&A in writing.

When asked about any inclusive practice that has remained unpracticed, there is still room for the presentation of negative examples that continue to occur, such as: "Some colleagues still enjoy how I speak, and act as if I make them waste time. When I present a paper I can only look at the professor and my friends.", "Ensure wheelchair mobility to the entire university grounds."

When asked if they feel the need, in their educational process, for positive discriminatory measures, such as more time during evaluation moments or objectives adapted to their condition, 13 students (52%) answered yes, while 12 students (48%) answered no.

Asked about having ever waived any status or measure of positive discrimination available for their condition, 17 students (68%) answered no, while 8 students (32%) answered yes. Among the most frequently dispensed discriminatory measures is the additional time for the performance of the evaluation moments by students whose disability does not make them need this extra time.

About how they felt about the moments of teaching and evaluation of the course in relation to colleagues without disabilities, on a scale from 1 (Disadvantaged or impaired) to 5 (Favored or benefited), 18 students (72%) indicated level 3, levels 1, 2 and 4 were indicated by two students (8%) and one student (4%) indicated level 5.

Regarding their perception of how they are seen by peers without disabilities on the scale of 1 (Disadvantaged or impaired) to 5 (Favored or benefited), 16 students (64%) indicated level 3, 5 students (20%) indicated level 5, 3 students (12%) indicated level 4 and 1 student (4%) level 2.

When asked about having been able to complete the course or feeling confident in its completion, 24 students (96%) are confident and only one (4%) is apprehensive. Willpower itself is the most pointed factor as a critical success factor.

When students are asked to identify the biggest obstacle to their academic success, the most frequent responses include teachers' pedagogical inflexibility and their resistance to producing accessible teaching materials. These answers are supported by the teachers' own answers obtained previously.
When classifying their expectation of employability, on a scale from 1 (Extremely Negative) to 5 (Totally Positive), levels 1 to 3 were selected by four students (26.7%) each, level 5 was the choice of two students (13.3%) and one student (6.7%) indicated level 4.

The difficulties they expect to encounter in their recruitment are related to the difficulties of communication with the interviewers and expectations of prejudice regarding disability.

When asked to suggest the development of new assistive technology, students highlighted the following responses: "Study assistance with artificial intelligence that monitors what the student is reading and is able to select pedagogical means or alternative or complementary bibliography", "An exo-skeleton that would allow me to move without the aid of a wheelchair" or an "autonomous minivan with wheelchair access ramp".

5. CONCLUSIONS

Antoninis addressed inclusion in education and its framework in the United Nations 2030 Agenda for Sustainable Development, warning of more or less subtle decisions that lead to exclusion, including the designation of irrelevant learning objectives, which is consistent with results that point to special education that does not promote the progress of students with special educational needs, having been mentioned by some students who considered some policies and practices of positive discrimination, such as the special contingent of access as palliative measures that do not promote the proper preparation of the students with disabilities for higher education.

None of the students or teachers who answered the questionnaires reported cases of discrimination such as those reported in recent years in the media in Portugal, however, there were teachers who mentioned full motor and sensory skills as prerequisites for attending the course, contrary to the provisions of Law 46/2006.

The professors mentioned knowing the accessibility care to be taken in the production of pedagogical materials for students with disabilities, and some of the care mentioned will be more oriented to students with one type of disability than to others, however, and although some teachers support themselves in the use of images, most revealed to know some accessibility care directed to students with visual and auditory sensory impairment, as exposed in the accessibility platform of the University of Porto, but most revealed not to use them in the
production of pedagogical materials or digital content, despite the existence of a set of good practices and also legislation applicable to the accessibility of pedagogical materials.

Regarding the legal framework for students with disabilities, these indicate in the answers to the questionnaire that no additional legislation will be necessary, if at least the existing legislation is complied with, namely the regulation of the allocation of support products, which includes assistive technology.

Bazon point to issues related to teacher training needs, and the need to revise existing training to include the pedagogical training of teachers, as well as the need to incorporate preparation for teaching in the curricular plans of postgraduate courses, which was entirely confirmed by the training needs revealed by the teachers who answered the questionnaires.

The personal experience of the author showed that all the investment in its inclusion, by Atlântica - Instituto Universitário and Direção Geral do Ensino Superior (DGES), more than an expense and an effort, was an investment of proven positive return, supported by high academic results, attesting to the social responsibility of the institutions.

Conducting surveys targeting students with disabilities and higher education professors during the COVID-19 pandemic social isolation period was harder than initially planned, and that hindered the samples dimensions.

**FUTURE RESEARCH**

This research spun-off the Inclusive Higher Education Training Program (i-HETP) project, co-funded by the European Union, under the Erasmus+ KA220 agreement number: 2022-1-PT01-KA220-HED-000086344. This project extends the original survey in content and scope, reaching the higher education professors in Portugal, Spain, Italy, Czech Republic, Romania, Poland, and Turkey and aims to provide professors with training in pedagogic skills in general, and in particular pedagogic skills oriented to tutoring students with diverse disabilities, digital accessibility, and universal learning design.

The author’s dissertations and thesis will carry on this work exploring the feasibility of inclusive academic information platforms, inclusive intelligent learning systems, and inclusive intelligent learning assistants.
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