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How 'Open' is Distance Higher Education for Students with Disabilities? A Literature Review

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Abstract: This paper attempts to answer the question of how "Open" Distance Higher Education is for Students with Disabilities (SwD) through a literature review. To this end, published books, journals, reports, and articles were examined using authoritative research sources such as Google Scholar, ResearchGate, and ERIC, based on specific inclusion and exclusion criteria. Laws related to Persons with Disabilities and education were also utilized. This paper is divided into four sections, where accessibility in Open and Distance Higher Education is analyzed in relation to SwD more broadly, concluding in the last section by discussing Open and Distance Higher Education and SwD in Greece. The existing literature and related research are very limited. The findings show that Distance Education offers significant opportunities for inclusive education, mainly due to the flexibility it provides. For students with mobility disabilities, Distance Higher Education offers the possibility of education without geographical limitations, especially when physical presence is impossible due to a lack of appropriate accessible building infrastructure. Furthermore, while multiform distance learning material can enhance accessibility, it can also pose barriers for SwD, as all tools and resources need to be accessible to everyone. Subtitles are an important accessibility tool, especially for deaf or hard of hearing learners. Additionally, examinations should be equally accessible to all learners, regardless of their disabilities. The distance learning material should be based on the principles of Universal Design for Learning. Also, assistive technologies and voice reading software play an important role, especially for visually

impaired learners. Assistive technologies and AI tools can help students depending on the type of disability. Under the current circumstances, the accessibility of SwD to Distance Higher Education, including in Greece, faces significant challenges. In conclusion, Distance Higher Education has the potential to support inclusive education, but it's necessary to implement appropriate accessibility standards and strategies.

Keywords: Open and Distance Education, Distance Higher Education, Students with Disabilities, Inclusive Education, Openness, Accessibility, Assistive Technologies

Introduction

Distance Education (DE) has a central role in the modern educational landscape nowadays and especially in the context of lifelong learning, offering a flexible framework for education and learning. Multiform DE is based on scientific principles of teaching and learning, utilizing distance learning material and appropriate digital media and tools in pedagogical terms with the ultimate goal of pushing the learner on a path of self-learning (Lionarakis, 2006). DE has the distinctive feature that learning material serve as the primary 'driver' of the teaching process (Lionarakis, 2001). The teacher has mainly a guiding, advisory and supportive role. The learning material must have a qualitative dimension and be formulated under specific conditions taking into account the individual needs of students. Moreover, in DE it is crucial to create flexible and multiform learning material (Keegan, 2000; Lionarakis, 2001), which includes, among other things, a variety of audiovisual media and new technologies (Lionarakis, 1998), characterized by flexibility, facilitation and learner-centredness (Lionarakis, 2001, 2006; Manousou, 2008), thus creating a guided didactic conversation that contributes to an active learning pathway (Holmberg, 1995) where the learner operates autonomously in a heuristic pathway of self-learning and knowledge (Lionarakis, 2001). This defines the effectiveness of the learning material and at the same time makes it a good or bad educational field of information sources and processing (Lionarakis, 2001). In the context of Open and Distance Education (ODE), equal and open access to education is crucial, regardless of time and space constraints, allowing each learner to actively participate and follow his/her own learning pace (Lionarakis, 2001, 2006). Equal opportunities and the right to learning for all individuals also represent inclusive education. The broad definition of inclusive education as articulated by UNESCO (2009, p. 8) is:

> *"a process of strengthening the capacity of the education system to reach out to all learners. [...] As an overall principle, it should guide all education policies and practices, starting from the fact that education is a basic human right and the foundation for a more just and equal society"*.

Inclusion requires the recognition of all people as members of society and respect for their rights, regardless of disabilities, age, gender, nationality or language (UNESCO Institute for Information, 2023). In UNESCO's 2030 Agenda for Sustainable Development Goals, effective implementation of inclusive education policies and programmes is considered a high priority (UNESCO International Bureau, 2017; UNESCO, 2023b). Persons with Disabilities (PWD) are among those most at risk of being left behind in education and society. The right of PwD to participate in society and education is often violated by a variety of barriers.

The Convention on the Rights of Persons with Disabilities (CRPD) includes the definition stating that

> *"Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others"* (United Nations, 2006, Article 1, para. 2).

The following articles of this Convention are directly related to the education of PwD and emphasize the need for appropriate adaptations and accessible structures to ensure their equal participation in society. The Medical Model of Disability approaches disability as a result of a "non-normal" body, leading to limitations in bodily functionality (Barnes & Mercer, 2010). On the other hand, the Social Model of Disability argues that disability is not found in the individual's body, but in society. Specifically, disability is considered to be a socially constructed phenomenon resulting from social and environmental conditions that create barriers for PwD (Oliver, 1990). Disability is a result of social construction and discrimination by emphasizing on social attitudes and institutions that create barriers by limiting the participation of PwD in various fields (Barnes, 2019). According to Oliver (1996), it is not the impairment of the individual that causes disability, but the failure of society to provide appropriate services and adequately provide for the needs of PwD.

Dewey (2008) considered that the main purpose of education is to enhance the participation of all students in social life and advocated uniqueness. He also emphasized that education should support the uniqueness and different characteristics of each student in order to have pluralism and equity in both school and society (Dewey, 2008). The culture, principles and policies represented by an educational institution are directly linked to quality in education. Bourdieu and Passeron (1990) and Bourdieu (2020) referred to Habitus, which is the commonly accepted principles, attitudes and beliefs that are repeated and characterize a field, such as education. The educational institution in question, through its culture, strategies, and policies, can marginalize and exclude certain individuals perceived to possess some kind of "deficit" (Bernstein, 1975; Bourdieu & Passeron, 1990). As a result, students are socially trapped, marginalised and excluded from integration into both society and education (Bernstein, 1996; Sakkoula & Lionarakis, 2024). The ODE promotes the democratisation of education, emphasizing democracy and the right to learn, ensuring that students feel valued and have a place in the educational community (Bernstein, 2000).

PwD often face significant challenges and barriers in accessing and participating in education, including Higher Education, which is crucial for their future careers. These challenges include physical, social and perceptual barriers that hinder their full integration into the educational community. To address these challenges, the need to implement appropriate strategies to promote equal opportunities and success in education is highlighted (Fernández-Batanero, 2022; Los Santos et al., 2019). In fact, the flexibility offered by DE enhances accessibility, allowing Students with Disabilities (SwD) to utilize assistive technologies and tools, including AI tools, tailored to their individual needs and types of disabilities during the learning process and throughout their overall learning experience (UNESCO, 2023a, 2023c, 2024). Distance Higher Education provides a meaningful and qualitative solution for PwD, breaking many of the barriers present in conventional higher education due to its inherent flexibility. According to Lionarakis (2001), the motto of the 21st century should be "accessible and quality education for all". However, the question remains: how accessible is it for SwD?

Problem Statement

Both laws and literature emphasize the need to design policies and strategies for the inclusion of PwD in society and education. PwD belong to vulnerable social groups that are at risk of marginalization,

both in education and professional life. Higher Education is directly linked to professional rights and employment opportunities. Moreover, DE appears to offer a variety of opportunities and possibilities for education and inclusion for all, including SwD. This study attempts to answer the question of how "Open" Distance Higher Education is for SwD, aiming to provide a comprehensive overview of Distance Higher Education and SwD more broadly, with a specific focus on Greece.

Research Aim and Research Questions

Taking the above into account, this article attempts to answer the question of how 'Open' Distance Higher Education is for SwD. To this end, a literature review was conducted based on the following research questions:

1. How does accessibility serve as an indicator of Openness in Distance Education particularly for Persons with Disabilities?
2. What are the challenges and opportunities faced by Students with Disabilities in Open and Distance Higher Education?
3. How do Assistive Technologies and Artificial Intelligence contribute to enhancing accessibility for Persons with Disabilities in Distance Education?
4. What are the challenges and opportunities faced by Students with Disabilities in Open and Distance Higher Education in the case of Greece?

Methodology

This paper attempts to answer the question of how 'Open' Distance Higher Education is for SwD, aiming to provide a comprehensive overview of Distance Higher Education and SwD more broadly, with a specific focus on Greece. To achieve this, a literature review was conducted based on the aforementioned research questions. In this context, certain inclusion and exclusion criteria were set, as listed below:

- Authoritative research sources were used: Google Scholar, ResearchGate and ERIC.
- Keywords used in the exploration and selection process included: persons with disabilities, students with disabilities, distance education, distance higher education, accessibility, openness, assistive technologies, artificial intelligence.
- Published books, journals, reports and articles were examined and selected.
- Written mainly in English and Greek language.
- Laws pertaining to PwD and education were also exploited.
- Announcements from official websites (e.g., universities) on the subject under investigation were also included.
- Undergraduate and postgraduate theses were excluded.

The collected data was organized, analysed and synthesised into four sections. The first section discusses accessibility as an indicator of openness in DE. The second section focuses on PwD in Open and Distance Higher Education. In the third section, the role of Assistive Technologies and Artificial intelligence (AI) in enhancing accessibility for PwD is discussed. Then, the fourth section focuses on

Open and Distance Higher Education in Greece and the case of SwD. Finally, the discussion and conclusions are presented from the author's critical perspective.

Results

Accessibility as an indicator of Openness in Distance Education

The concept of openness emerged in the 21st century with the establishment of the British Open University (Peter & Deimann, 2013). Openness is often referred to as a philosophy, strategy and political ideology, characterizations that are not well established due to the lack of a clear definition of openness (Baker, 2017; Lionarakis, 2008; Sakkoula & Lionarakis, 2024). According to Dewey (2008), acceptance of diversity is among the fundamental conditions for openness in education. A curriculum must be adaptable, have clear goals, and consider all the characteristics that represent students (Bernstein, 1960, 1961). According to Sakkoula and Lionarakis (2024), Bourdieu and Bernstein, two important theorists of the Sociology of Education, set out the criteria for openness, perhaps without realising it at the time, which can be summarised as follows: (a) free access to education without conditions or discrimination, (b) equitable exchange of knowledge and educational resources, (c) recognition of social and cultural differences in the creation of educational programmes, (d) flexibility and adaptability in curricula, (e) recognition of informal learning, (f) granting students control of space, time and pace of learning, and (g) adoption of student-centred learning (Sakkoula & Lionarakis, 2024).

Looking back at the laws related to PwD and accessibility to education, it is noted that the right to equal opportunities for all people is highlighted. The White Paper on the Rights of PwD defines disability as the impairment experienced by PwD due to the denial of access to structures, activities, opportunities, and social skills because of their reduced capabilities, when society and the state fail to enshrine their rights and address key issues that ensure equality among citizens (Department of Social Development, 2015). According to UNESCO (2023a, 2023b), Goal 4.5 in 2030 Agenda emphasizes the need to ensure equal access to quality education, economic resources, and lifelong learning opportunities, including Higher Education, for all, including PwD. The educational environment must provide inclusive education and effective learning environments for all (UNESCO, 2016a, 2023a). Therefore, the inclusion of SwD in DE is crucial to achieve these goals, since DE offers flexibility to learners with disabilities which is essential for their educational pathway (UNESCO, 2023a). These goals also highlight the importance of monitoring progress in providing inclusive education for PwD. In line with the ''leave no one behind'' principle of the 2030 Agenda, it is important to ensure that SwD are not excluded from the opportunities offered by DE and that they are provided with appropriate support to facilitate their full and meaningful participation in these learning opportunities (UNESCO, 2023a). The CRPD focuses on accessibility as a catalyst for education. In addition, the Universal Declaration of Human Rights (United Nations, 1948) states that all people have fundamental freedoms and basic inalienable rights that include civil and political rights, freedom and privacy, and the right to education. It is the human right to education that guides the agenda for inclusive practices and access for all by promoting inclusive and equitable education, including SwD, without segregation at all levels and in all forms (UNESCO, 2016a, 2023b). Furthermore, with regard to accessibility to education and PwD, the CRPD and the Optional Protocol states, inter alia:

> "*Promote other appropriate forms of assistance and support to persons with disabilities to ensure their access to information. [...] Promote access for persons with disabilities to new information and communications technologies and systems"* (United Nations, 2006, Article 9, para. 2).

As well as

> "*States Parties shall ensure that persons with disabilities are able to access general tertiary education, vocational training, adult education and lifelong learning without discrimination and on an equal basis with others. To this end, States Parties shall ensure that reasonable accommodation is provided to persons with disabilities"* (United Nations, 2006, Article 24, para. 5).

ODE can address important problems faced by PwD, such as geographical isolation from educational centres and mobility difficulties. However, it is underlined that it isn't considered appropriate to provide support based only on the type of disability and the need to identify common challenges and barriers in a coherent and systematic manner, taking into account the principles of inclusive learning design (UNESCO, 2023a). With the ultimate goal of 'learning for all', UNESCO emphasizes the need to apply the principles of Universal Design for Learning (UDL) in the context of DE (UNESCO, 2023a; UNESCO Institute for Information, 2023). UDL is an approach to addressing the diversity of learners' needs by proposing flexible objectives, methods, materials and assessment procedures that support teachers in meeting diverse needs. Curricula created using UDL are designed from the outset to meet the needs of all students, including SwD. Furthermore, it is noted that societies should seek to ensure that products, environments, programmes and services follow universal design principles to "*be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design."* (United Nations, 2006, Article 2, para. 5).

UNESCO (2023a) stresses the need for inclusive and accessible Open and Distance Learning for all, for learners with and without disabilities, highlighting some guidelines, as summarised below:

- It is important to consider issues related to policies and the development and maintenance of accessible content, learning materials and technologies. Additionally, the rights of SwD must be clearly addressed. A crucial aspect of this approach is the application of UDL principles by all stakeholders to support the educational process.
- Registration of PwD, using accessible open solutions at every stage of the registration process (access to public information on courses offered, registration, entrance exams, interviews, etc.).
- Initial assessment of all SwD and adaptation of educational programmes to provide full access.
- Designing distance learning material to be accessible to all learners and taking into account diverse needs and applying the principles of UDL.
- Access to Assistive Technology and Information and Communication Technology (ICT) for students with and without disabilities, without exclusion, to improve the learning experience in the context of DE.
- Developing tools and services adapted to the needs of PwD.
- Use of appropriate infrastructure for PwD in ODE.
- Designing and implementing internal policies and strategies for the systematic inclusion of students - as well as staff - with disabilities.

In addition, emphasizing the importance of accessibility in Open and Distance Learning, Open Educational Resources (OER), Free and Open-Source Software (FOSS) and Open Access (OA) to Scientific

Information offer the opportunity for SwD to learn, but also to contribute knowledge and skills to their communities, as well as to change negative attitudes, stigma and discrimination (UNESCO, 2023a).

ODE can address various accessibility-related barriers for PwD, such as geographical distance from learning centres and mobility difficulties. At the same time, the potential challenges related to distance learning material and online learning platforms are also noted, where the possibility of exclusion of SwD due to the high cost of assistive tools, extensive support needs and inaccessible online designs must be considered (Ferguson et al., 2019). The participation of SwD in the educational process is directly related to the material equipment offered and the student's own condition. That is, in order for the learner to be able to participate in the course, he/she must have access to the learning material. When learning materials are not accessible to all learners, including SwD, problems and barriers are created, reinforcing inequalities among learners. For all the above reasons, the continuous evaluation and redesign of distance learning materials are emphasized as particularly important, aiming to enhance accessibility for PwD and promote inclusive education for all (UNESCO, 2023a).

Persons with Disabilities in Open and Distance Higher Education

DE enables PwD as well as other populations at risk of marginalisation and social exclusion to participate equally in Distance Higher Education and related educational groups. Higher Education is also directly linked to the later professional life of graduates. At European Union (EU) level, less than half of people with basic activity disabilities are employed. The employment rate of PwD in main activity in the EU in 2017 was 50.6%, compared to 74.8% for people without disabilities. One of the main reasons for this gap is 'education or training' (UNESCO, 2023a), bringing into focus the barriers faced by PwD. Learning opportunities and corresponding educational programmes that take into account issues of inclusion and accessibility are vital to ensure that all citizens, including those with disabilities, actively participate and contribute to society. DE appears to be able to enhance accessibility opportunities for PwD against some of the barriers posed by conventional in-person education.

DE can improve access to Higher Education for SwD, but there are significant barriers. DE provides high flexibility, allowing students to study at a convenient time and place, tailoring their studies to their needs, while supporting their psycho-emotional well-being (Reyes et al., 2023). DE can offer advantages and disadvantages, depending on the type of disability of the students. For example, it seems that students with mobility and visual disabilities prefer DE because they can study in the comfort of their home, whereas students with intellectual disabilities have more difficulty (Dube & Belani, 2022). The need to explore needs and improve technological infrastructure and educational practices is critical to support SwD (Strelkova et al., 2020). However, one challenge is the issue of accessibility of learning material and platforms (Massengale & Vasquez, 2016; Reyes et al., 2023). The use of assistive technologies and software play a catalytic role in evaluating and improving the accessibility of online courses (Dube & Belani, 2022). In particular, it is important to simplify the content to be compatible with screen readers, avoid pop-up windows, and label tables and links appropriately. It is also suggested to adapt teaching strategies and train faculty to meet the needs of SwD, and to implement strategies to improve interaction and collaboration, such as the use of subtitled videos, as well as live subtitles in online courses and webinars (Ihuoma & Abaa, 2022; Reyes et al, 2023). To enhance accessibility by a Distance Higher Education Institution, appropriate internal policies, strengthening legislative frameworks and modifying distance learning material to make them accessible for all students are required (Strelkova et al., 2020). In addition, collaboration between academics and disability communities is important to enhance accessibility of services and formulate appropriate strategies (Jalovcic, 2019b;Levitt, 2017).

Professors and communication between themselves and students with and without disabilities play an important role in DE. Academic staff needs to be aware of the difficulties that SwD may face, flexibility and adaptability are critical to student success (Massengale & Vasquez, 2016; Reyes et al., 2023). Furthermore, socialization between SwD and their peers, as well as communication with academic staff, are critical to their academic success (Ihuoma & Abaa, 2022). A sense of belonging is very important for SwD (Jalovcic, 2019b). To improve the accessibility and effectiveness of DE, it is particularly important to conduct further research to assess the perceptions and challenges faced by SwD during online courses (Massengale & Vasquez, 2016). In addition, having multiple disabilities appears to have a greater impact on their learning performance compared to students who are blind or partially sighted, deaf or hard of hearing, speech impaired, and with invisible disabilities (Richardson, 2014). Psychological and emotional support, through counsellors and support services, are also important for the successful learning pathways of SwD by aiming to reduce anxiety, increase self-efficacy and more broadly enhance their learning experience (Ihuoma & Abaa, 2022; Reyes et al., 2022). In addition, the need to implement multiple methods of assessment and information provision to meet their different learning needs is emphasized because one-dimensional assessment methods do not serve all students equally well (Jalovcic, 2019a). Professors who teach online are largely unaware of the disabilities of students in their online classes, rarely employ inclusive learning pedagogies (Dube & Baleni, 2022). Accessibility and support are important factors in promoting the academic success of SwD in Distance Higher Education. For this reason, UDL is cited as the most appropriate method of adapting a distance learning material, emphasizing that it should be implemented throughout the education system to ensure that all students have access and can actively participate (Ihuoma & Abaa, 2022; Reyes et al., 2023). In addition, it is suggested that special training programmes and flexible and clear support instructions in various formats should be provided to assist SwD in the use of distance learning material and digital technologies (Ihuoma & Abaa, 2022).

Barriers to learning refer to difficulties within the educational system, the learning environment, or the students themselves that impede access to learning and development. In the case of SwD, an example of this is visual impairment affecting the information gathering process (Cleveland & Sewell, 2009). Students with visual impairments, regardless of the degree of impairment, should be able to fully participate in classroom activities. Despite the challenges they face, with proper design and adaptive equipment, their participation can be increased and maximized. On the other hand, in some cases, students with visual impairments face accessibility issues in ICT (Seale, 2020). Specifically, in DE, students with visual impairments don't have the vision required to access many of the multimedia resources. The accessibility of DE programmes for them depends on the availability of specific learning materials with features such as maximum clarity and usability (Arditi, 1999). It is necessary to systematically provide specialised services for students with special educational needs so that they can seamlessly continue their studies and graduate from university institutions (Murders, 2017).

The need to design the respective educational programmes according to UDL by allowing students with different abilities and disabilities to work together as peers is highlighted. They learn to understand differences in abilities, needs and strengths, including differences that aren't readily apparent (such as neurodivergent ways of thinking, communicating and perceiving). UDL is a way of improving educational practice through flexibility and reducing barriers. This concept has been extended to curriculum design: UDL is "*a set of principles for curriculum development that give all individuals equal opportunities to learn*" (CAST, 2018). UDL guidelines include providing multiple means of engagement, representation and action/expression. These principles can be used to redesign an existing online course or curriculum for DE. Professors should use a variety of media to ensure that information is accessible to all students and provide opportunities for practice and discussion. Use voice and written representations, graphics, symbols, recordings, and subtitled videos to enhance understanding and

access to learning materials (Frumos, 2020). Redesigning education based on UDL could lead to a more equitable, effective and inclusive education system that meets the needs of all students, including those with learning disabilities (Basham et al., 2020). Educators who incorporate UDL principles into their lessons tend to hold certain beliefs about teaching and learning, as summarized below (La et al., 2018):

- They recognise that in the courses there is likely to be a diversity of students.
- They believe that all students have the same right to Higher Education.
- They aspire to create equal access to learning for all students in their courses.

The principles of multiple means of engagement, representation, and action and expression form a model of instructional design that enables instructors to promote equitable access for all students. These principles provide options, flexibility, and goals to accommodate diverse learners, regardless of the discipline. In addition, UDL encourages teaching staff to consider how they might improve their own teaching practices, taking into account diversity in the classroom (La et al., 2018).

The use of ICT and other support tools can enhance students' academic success, regardless of whether they have disabilities or learning difficulties (Heiman et al., 2017). The use of ICT in DE is vital to the accessibility and success of SwD (Ihuoma & Abaa, 2022). Supporting teachers in the use of ICT and other assistive tools is critical to student accessibility and success (Boguslavsky et al., 2017; Heiman et al., 2017).

The Role of Assistive Technologies and Artificial Intelligence in Enhancing Accessibility for Persons with Disabilities in Distance Education

UNESCO argues that ICT can promote the inclusion of PwD both in the education system and in society at large. PwD face some of the most significant barriers to accessing quality education. Technology provides multiple means of representing information, expressing knowledge and participating in learning, which can support PwD by providing equitable and optimized access to the curriculum while developing their independence, agency and social inclusion (UNESCO, 2023d). According to UNESCO, ICT offers many opportunities for inclusive education including SwD (UNESCO, 2014, 2024; UNESCO Institute for Information, 2023). Inclusive and accessible ICT can be used to meet the needs of people with various disabilities as they encourage personalised lifelong learning, vocational rehabilitation and social inclusion. In addition, with the entry of AI into various areas of an individual's life, including education, UNESCO (2022) notes that AI can effectively support PwD for an inclusive education in the context of DE and in accessing distance learning materials more broadly, highlighting the need to utilize AI tools by implementing appropriate ways and strategies.

Digital platforms and tools can facilitate education and creativity for people with and without disabilities. Technological developments have enabled Microsoft to empower PwD: for example, it has provided learning tools that have helped students with dyslexia to learn more effectively. This broadened the scope of AI and machine learning. Recent developments in AI can enhance growth in the field of education and learning by supporting both people with and without disabilities (Microsoft, 2023a, 2023b, 2023c, 2024).

In the context of supporting SwD, there are various AI tools that help support students throughout their learning path, improving accessibility to learning material in case it is not accessible to all students with and without disabilities. Some of these tools identify and read text, identify objects and people, and describe images and diagrams (Luger & Sellen, 2016; Zou & Treviranus, 2015). Voice recognition and text-to-speech systems can assist students with reading and writing disabilities in accessing learning materials (Hong & Kim, 2024). In DE, SwD can use various support tools throughout their studies to

study the distance learning material, but also to complete their academic obligations, such as writing assignments. In this context, AI tools that enhance the promotion of inclusion and equity in education including Distance Higher Education are also utilized (Seale, 2020; UNESCO, 2023c). AI can be used for customized and personalized learning, creating personalized learning pathways that fit the needs of students. Indicatively, an example of an AI tool to support SwD is the ODL Visually Impaired Assessment Bot developed to help blind and visually impaired students write their exams. This Bot reads the exam questions to students and records their answers, which are then submitted automatically. The Bot provides voice recognition, question navigation, answer editing and speech rate control capabilities, making the exam process more accessible and efficient (Egenti et al., 2022).

In relation to UDL, it supports a focus on inclusive media for presenting information, expressing knowledge and engaging in learning and communication. Assistive devices and software help PwD overcome significant barriers that prevent them from fully and beneficially participating in education. To reach its potential, technology requires that appropriate pedagogy is simultaneously applied and personalized to meet the needs of different learners (UNESCO, 2021, 2023a, 2023c). A variety of assistive technologies -different tools and software depending on the type of disability- are available for PwD who face various barriers to education and learning (Lynch et al., 2022). Assistive and accessible technologies should be individualized according to the specific learning needs of learners, as not all technologies are applicable for learners with the same type of disability (UNESCO, 2023d). In the context of promoting inclusive education and access to DE for PwD, UNESCO (2021, 2023c) points out that there is a wide variety of tools and software that have a supportive role in the learning process and experience of SwD, effectively helping them to access information and acquire knowledge.

Open and Distance Higher Education in Greece and the case of Students with Disabilities

On March 30, 2007, the Greek State signed the CRPD, and on September 27, 2010, it also signed the Optional Protocol. Subsequently, on May 31, 2012, the Hellenic Parliament ratified the CRPD and the Optional Protocol with Law 4074/2012 (2012). States Parties shall ensure that PwD are able to have access to general Higher Education, vocational training, adult education and lifelong learning, without discrimination and on an equal basis with others. States Parties shall also ensure that reasonable accommodation is provided to PwD (Law 4074/2012, Article 24, para. 5). Law 4957/2022 (2022) on Higher Education Institutions, inclusion and accessibility strategies for SwD should include, among other things, appropriate accessibility options for both learning material and overall support during their studies, especially in the context of DE, e.g. in enrolment, assessment, support, etc. In this context, referring indicatively to the website of the Accessibility Unit (2020) for SwD of the National and Kapodistrian University of Athens (NKUA), we find a plethora of equipment, IT software and accessible textbook services that can be used by various groups of SwD or other special educational needs. In addition, this unit, like those of other institutions, has posted detailed guidelines for teachers and students with special educational needs for accessibility in DE as part of the implementation of the Covid-19 restriction measures.

According to the decision with protocol number 2070/24-04-2024 “Supporting Interventions for Equal Access for PwD at the Hellenic Open University (HOU)”, the creation of a "Unit for Equal Access for PwD and People with Special Educational Needs" is launched with the main purpose of ensuring the full participation of SwD and Students with Special Educational Needs in all educational, research and administrative activities carried out at HOU (Hellenic Open University, 2024). It should be noted that the HOU is the first and only Higher Education Institution in Greece that provides ODE at undergraduate and postgraduate as well as doctoral level. The HOU stands for the philosophy of ODE. In the Declaration for ODE (Lionarakis et al. 2020), the framework of principles is highlighted which identifies the most important requirements for the dimension and philosophy of ODE. In it, accessibility is also mentioned

which is important in ODE. In fact, it is noted that in the context of this Declaration, the principles of ODE have been founded on the basis of Article 26 of the United Nations which defines education as a basic Human Right, as well as the Icheon Declaration (Sakkoula et al., 2023). However, there is no specific reference in the Declaration to the inclusion and accessibility of SwD or other special educational needs. But the fact that there is no specific reference doesn't necessarily mean that it is not included in the principles espoused by the ODE and the HOU's policy, so further investigation is certainly needed.

On the occasion of the urgent need for DE due to the Covid-19 pandemic in 2020, when Higher Education was called upon to transfer in-person courses to online classes, the importance of designing online courses taking into account the principles of DE became even more evident. SwD noted positive attitudes towards DE (Staboltzi et al., 2020). However, in the case where professors didn't adapt their teaching methods with appropriate techniques for DE, students couldn't actively participate, there was a lack of interaction, as well as in the case of online courses without cameras, the feeling of isolation was more pronounced (Seiradakis, 2024). The advantage of DE for SwD is noted by offering them flexibility of time and space, but also in terms of the use of additional supporting software to improve accessibility (Kritikou & Koutsoumpa, 2011; Liakou & Manousou, 2013, 2015; Mantzikos & Lappa, 2020).

Communication and interaction between students and teaching staff is vital for effective DE. It is mentioned that they have the intention to support SwD, but at the same time their inexperience and the need for training them to properly support these students is also highlighted (Kritikou & Koutsoumpa, 2011; Mantzikos & Lappa, 2020). In addition, psychological support is particularly important, for SwD or other specific learning difficulties, for this reason the existence of support and counselling services is necessary (Kourea et al., 2021; Staboltzi et al., 2020). It is also important to provide the necessary resources and technologies to support them and to create more flexible and accessible educational environments (Mantzikos & Lappa, 2020; Staboltzi et al., 2020).

In online courses, the availability of subtitles is crucial, especially in the case of students who are deaf and hard of hearing (Mantzikos & Lappa, 2020). It is noted that in in-person courses, these students rely on lip-reading, while in online courses this isn't possible most of the time, further emphasizing the need for subtitles, therefore it is considered particularly important to use subtitles and live translation when attending courses (Mantzikos & Lappa, 2020). Regarding students with visual impairments, they encounter difficulties in using the learning material, especially when it isn't properly adapted, so it is necessary to appropriately design the distance learning material to make it accessible. In particular, students find it difficult to access the information and the learning material as a whole, reinforcing as a consequence their social exclusion (Liakou & Manousou, 2013, 2015). It is therefore necessary to design distance learning material with appropriate educational standards. In particular, it is suggested, among other things, to use high contrast between background and text, large font size, simple font style, screen magnification software, and text-to-speech functionality (Liakou & Manousou, 2013). Also, attention should be paid to the format of the exams, since they are not always adapted for SwD (Kritikou & Koutsoumpa, 2011).

Most university buildings, including the HOU, are often not accessible for SwD. In this case, DE offers flexibility without these limitations. The need for foresight in procedures and better organization is noted to avoid accessibility problems. It is suggested that a special form be filled out during the registration of SwD to identify and meet their educational needs, as is the practice at the British Open University (Kritikou & Koutsoumpa, 2011). The accessibility of DE programmes is largely determined by the format of the distance learning material and the support provided by university staff (Liakou & Manousou, 2013, 2015). Finally, the design of courses and distance learning material based on universal design principles is highlighted as particularly important in order to create an accessible and inclusive DE for all (Kourea et al., 2021; Mantzikos & Lappa, 2020; Seiradakis, 2024). It is also emphasized that

the university community needs to develop policies and practices that are more inclusive and accessible for SwD (Kourea et al., 2021).

Discussion

According to the literature review, DE can provide an educational environment that promotes inclusive education for all, including PwD. However, the appropriate specifications are needed to achieve this. There are laws that support the right of PwD to education, as well as relevant guidelines for educational institutions. Specifically for DE, there are laws, but also guidelines for universities and academic staff regarding the strategies to follow in order to create an inclusive educational environment for all, and accessibility for SwD is considered necessary. Especially in DE, where the distance learning material is the main 'driver' of the educational process (Lionarakis, 2001), it must be designed in an appropriate way to be accessible to all students regardless of whether they have disabilities or not. It is suggested, both by some research (Ihuoma & Abaa, 2022; Reyes et al., 2023) and by UNESCO (2023a), to adopt the principles of UDL in the context of designing learning materials and teaching methods, thus forming an inclusive DE and learning environments for all. The design and adoption of practices promoting the equal right to education for all is linked to the culture represented by the Higher Education Institution concerned. This culture that promotes inclusive education is also linked to Habitus, which refers to the commonly accepted principles, attitudes, and beliefs that are repeated and characterize a sector, such as education (Bourdieu 2020; Bourdieu & Passeron, 1990), and therefore an Educational Institution. Additionally, it can be said that disability approached as a result of barriers set by society (Barnes, 1992; Oliver, 1996) can also be related to Habitus. The principles, attitudes and strategies represented by a university can either reinforce the barriers and social exclusion of disabled people, or promote inclusion and the right to education for all, thus enhancing social inclusion. It should also be noted that Higher Education is directly linked to the labour market, so PwD are at an even greater risk of social exclusion and a reduction in their professional rights and independence, especially if their right to participate in Higher Education is hindered. ODE provides many opportunities for shaping an accessible and inclusive educational environment by promoting the democratization of education which is related to democracy and the right of access and participation of all individuals in learning (Bernstein, 2000).

In the Declaration for ODE (Lionarakis et al. 2020), accessibility is mentioned in the framework of the ODE principles, but there is no specific reference to the inclusion and accessibility of SwD or other special educational needs, as UNESCO mentions as a key factor in education for all (UNESCO International Institute, 2023) and especially in ODE since there are specific accessibility standards (UNESCO, 2023a). However, the fact that there is no specific reference doesn't mean that it isn't included in the principles espoused by the ODE and in the policies of universities that implement these principles, such as the HOU. Instead, the decision to create the Unit for Equal Access Access for PwD and People with Special Educational Needs is particularly important. According to the CRPD, no distinction should be made and disability education should be considered as a separate case that needs a special implementation framework. However, if the respective DE programmes and learning materials are not accessible to all including SwD, then it may need to be included in laws, declarations, etc. a reference to the implementation of principles and appropriate strategies for accessibility for all. Based on all this, combined with the very limited literature on accessibility of SwD in Distance Higher Education, and especially in Greece, where all research points out accessibility barriers by type of disability, highlighting the evident need for further investigation in this field.

Accessibility is an important indicator of openness in ODE. Regarding the accessibility of SwD in Distance Higher Education, it is also directly related to some of the openness criteria (Sakkoula & Lionarakis, 2024) such as free access to education without conditions or discrimination, equal exchange

of knowledge and educational resources, recognition of social and cultural differences in the creation of educational programmes, flexibility and adaptability in curricula, providing students with control over the space, time and pace of learning, and the adoption of an open and inclusive learning environment. To achieve these, however, the appropriate design of distance learning material in DE is crucial, as is the access of all students to all educational activities and academic obligations (homework, online courses, examinations, etc.). According to the literature review, there is limited literature and research on Distance Higher Education and SwD, with even more limited research in Greece, where it is particularly scarce. All studies emphasize the need for further investigation into the accessibility of SwD to DE and highlight the necessity of formulating appropriate strategies and methods for improvement. The multiform distance learning material, which contains a variety of media and resources, can enhance accessibility for SwD, but it also presents a challenge, as it can become a barrier to the successful learning path of these students if not properly designed and implemented. In particular, in the case of educational videos, subtitles should be provided; otherwise, students with hearing impairments cannot fully participate. In addition, the text in the distance learning material should adhere to certain specifications to ensure accessibility. For example, students with visual impairments might not be able to access it if it doesn't meet these standards. Indicatively, some features that the distance learning material should have include high contrast between background and text, large font size, simple font style, screen magnification software, and text-to-speech functionality. SwD can also utilize additional software, such as AI tools for voice reading. For these tools to function effectively, the basic learning material should be in a simple format. Furthermore, it is important that the university in question takes into account SwD and has the appropriate assistive technologies, tools and software at its disposal, aiming at the successful learning path of all students, regardless of whether they have disabilities or not. UNESCO (2023a, 2023c, 2023d, 2024) highlights the important role of ICT and AI assistive tools in enhancing accessibility for SwD and their social inclusion. Especially in the case of AI, the list of such tools and software is constantly growing, and many of them can be found and used by students in the context of their studies, depending on the type of disability. However, there is a lack of sufficient literature on the utilization of AI tools by SwD in the context of Distance Higher Education. It is also worth noting that, in addition to the basic learning material, accessibility in online courses must be taken into account, where the availability of subtitles is particularly important. Accessibility should also be considered in exams. For in-person examinations, even in the case of distance learning programs, access to the buildings must be guaranteed for all students, as SwD will be the first to encounter problems in participating. Examinations should be accessible to all, and in the case of DE examinations, it should be ensured that everyone, regardless of disability, can participate without barriers. Otherwise, it may become an obstacle to the successful completion of their studies. It is important to inform and train teaching staff so that they can support SwD throughout their studies and promote inclusive education for all through appropriate teaching methods. In this context, it is recommended that teaching staff adopts the principles of universal learning design by promoting the right of all students to education by embracing student diversity (La et al., 2018; UNESCO, 2023a). Diversity and inclusivity should be supported, according to Dewey (2008), to ensure pluralism and equality both within educational institutions and in society at large. In conclusion, it should be emphasized that the available literature and research on the topic of this article are very limited, which restricts the generalizability of the results and highlights the need for further research in this field.

Conclusions

This paper attempts to answer the question of how 'Open' Distance Higher Education is for SwD. According to the literature review, the existing literature and related research are very limited, particularly in the case of Greece. The findings indicate that DE offers significant opportunities for inclusive education, primarily due to the flexibility it provides. In the case of students with mobility

disabilities, Distance Higher Education offers the possibility of education without geographical constraints, which is an important advantage especially when physical presence is impossible due to the lack of appropriate accessible infrastructure in the buildings. Additionally, it appears that the multiformity in distance learning material can enhance accessibility, but at the same time, it may pose a barrier for SwD, as all media and resources need to be accessible to everyone. An illustrative example is educational videos, where subtitles must be provided. Subtitles are an important accessibility tool, especially for students who are deaf or hard of hearing. Live subtitles are also important in the context of online courses for hearing-impaired students, as they enhance their sense of belonging to the educational group. Furthermore, examinations should be equally accessible to all students regardless of their disability. In addition, the distance learning material should be in a simple format and font, and it should be based on the principles of Universal Design for Learning. Also, assistive technologies and tools and voice reading software play an important role, especially for visually impaired students. Developments in the field of AI have provided a long list - constantly growing - of assistive technologies, software and tools that students can use depending on their type of disability. The importance of communication and interaction between students and teachers is also highlighted, emphasising the need for information and training for the academic staff of the university concerned, so that they can support SwD throughout their studies.

Based on all of the above, it is not easy to answer the initial basic question definitively, but the preceding literature review highlights the need for further investigation in this area. Under the present circumstances, the accessibility of SwD to Distance Higher Education, including in Greece, faces significant challenges, often depending on the type of disability. This underscores the need to investigate and implement appropriate specifications and strategies to create an inclusive Distance Higher Education environment for all students, with and without disabilities. In conclusion, there is no doubt that Distance Higher Education has the potential to support inclusive education due to the flexibility it offers, but it is necessary to implement appropriate accessibility standards. Finaly, DE is a 'fertile ground' for the development of an open and accessible educational environment for SwD.

Suggestions for Future Research

Based on the findings and results of this paper, it is necessary to further investigate the opportunities and challenges that SwD face in Distance Higher Education, particularly in Greece. Specifically, it is proposed to conduct research to explore the perceptions and learning experiences of SwD within the context of DE. Additionally, there is a need to examine the specifications and accessibility strategies of distance learning material. Furthermore, due to the significant lack of literature, it is important to research the assistive technologies and AI tools that SwD use in their learning process in the context of enhancing accessibility in DE.

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