SUITABILITY OF ONLINE HIGHER EDUCATION FOR LEARNERS WITH DISABILITIES: THE STUDENTS' VOICES

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Abstract

Online higher education has the potential to offer extra benefits for students with disabilities in comparison with campus-based universities, but it can also cause them some challenges. This case study addresses why students with disabilities choose online studies and how a fully online educational model fits their expectations and needs. Twenty-four students living with physical, sensory, mental, and learning disabilities participated in semi-structured interviews from which we identified six main themes: flexibility, accessibility, curricular design, online interaction, online collaboration, and psycho-emotional wellbeing. These students find online studies flexible, accessible, and helpful for their psycho-emotional wellbeing, but still challenging for interacting and collaborating. Our findings emphasize the importance of applying the Universal Instructional Design for Online Learning in combination with the Universal Design for Learning principles to enhance the inclusion of students with diverse profiles in online learning, as well as offering personalized support for those with severe or multiple disabilities.

Keywords: college students, inclusive education, online learning, universal design for learning, universal instructional design, learners with disabilities

Introduction

The expansion of online higher education (OHE) has contributed to an increasing presence of students with disabilities (SWDs) (Fichten et al., 2020; Kent, 2015; Roberts et al., 2011). Like most OHE learners, these students have been attracted by the array of benefits that online learning promises to offer in terms of flexibility, in both place and time of study (Richardson, 2016). However, these students may appreciate other characteristics apart from flexibility, such as accessibility, pedagogical and psycho-emotional support, interactivity, and collaboration. The specific needs resulting from their disability are a key factor that may influence their preference for online learning (Kent, 2015; Verdinelli & Kutner, 2016). As Lee (2017) pointed out, supporting disadvantaged students in OHE requires recognizing their expectations and needs, which promotes their real inclusion.

The academic literature has partially approached the matter of the suitability of online learning for SWDs in higher education. Most research on this topic has employed quantitative approaches focused on describing some factors that influence SWDs' involvement in OHE (Alamri & Tyler-Wood, 2017; Kent, 2016; Kent et al., 2018) or analyzing these students' perception in blended learning environments (Verdinelli & Kutner, 2016). Such studies showed how online and blended learning may help (or not) to address SWDs' needs, but there is still little research analyzing how they adapt to a fully online learning environment and why some issues such as flexibility, accessibility, and interaction are essential in promoting their inclusion. Researchers have usually examined the experiences of students with a single type of disability in online universities. For instance, Kent (2015a), McManus et al. (2017), and Murphy et al. (2019) described students with mental health conditions' perceptions around challenges and benefits, thus approaching some directions to address their particular needs. But exploring and comparing SWDs' diverse experiences according to each type of disability, thus identifying differences and similarities among them in terms of needs

and possibilities, is a real necessity to employ effective strategies and policies aimed to support them all.

Thus, a deeper qualitative study that captures the experiences and contexts of students with different profiles is needed to achieve a broader and clearer perspective to fill this knowledge gap. In this research we have explored the experiences of students with different types of disabilities taking studies through a fully online university, focusing on the reasons why they chose to study online, as well as the benefits and challenges they experience when compared to their initial expectations. Analyzing these students' initial expectations and subsequent experiences and perceptions is crucial to understanding their aspirations and needs in such a way that we can point to certain pedagogical, technological, and psycho-emotional supports on which online universities should work to foster their inclusion.

Instructional design principles for online learning

Universal Design is an approach that offers theoretical and practical guidelines to address the inclusion of SWDs in OHE (Burgstahler, 2015; Catalano, 2014). Accordingly, Rao et al. (2021) and Singleton et al. (2019) emphasized the application of the Universal Design for Learning (UDL) principles in online learning environments in order to provide students with adequate flexibility, specifically in how the contents are presented and how students can express what they have learned. Likewise, Elias (2010) adapted the Universal Instructional Design (UID) and UDL to propose the Universal Instructional Design Principles for Online Learning (UID-OL). This framework is focused on designing accessible and flexible learning environments and courses for all users based on their needs and capabilities, as well as on promoting a learning climate in which all stakeholders can interact and collaborate. By applying both the UID-OL and the UDL principles, online universities can provide courses and environments that fit students' needs and capabilities and ensure that everyone can access, participate, and be successful.

Together, these frameworks suggest considering four themes when designing and teaching courses: accessibility, flexibility, interaction, and collaboration. These themes are all linked to each other. For instance, presenting online learning resources in diverse and flexible formats facilitates students' interaction with contents and integrating diverse communication tools and usable discussion spaces encourages all stakeholders to interacting, collaborating, and supporting each other. Every learning activity should be designed considering accessibility, flexibility, interaction, and collaboration issues to promote active participation by every student. We review the previous literature regarding these four themes in the following subsections.

Online learning accessibility

The evidence available shows that online learning in higher education presents both benefits and challenges for SWDs, depending on their type of disability. One of these students' concerns is accessibility, which is a broad and complex issue. In the case of OHE, accessibility is linked to technological and pedagogical aspects (Reyes et al., 2022). Technological accessibility refers to designing learning management systems (LMS), websites, assistive technologies, and tools that people with disabilities (as well as other users without disabilities) can use effortlessly, everywhere, at any time (Kocdar & Bozkurt, 2022). Current online learning environments make the education process more accessible to some students, but less so to others, depending on their disability (Edwards, 2019; Kent, 2016; Reyes et al., 2022). In this regard, the available literature suggests that designing straightforward and intuitive LMS that enable interoperability with assistive technologies, as well as that facilitate students' performance by working online and offline, minimizing efforts, and warning of potential mistakes are highly convenient for all learners (Catalano, 2014; Elias, 2010). The Web Content Accessibility Guidelines (WCAG) 2.1 also recommends offering accessible and understandable information, interfaces easy to navigate,

and contents easy to interpret when designing LMS to meet all learners' needs (Kirkpatrick et al., 2018).

Making OHE fully accessible, however, also entails designing learning courses and resources such as contents, teaching materials, and assessment activities that are easy for everyone to access (Lee, 2017; Rodrigo & Tabuenca, 2020). The UDL outlines very specific guidelines on how to design a course suitable for all students by following three principles: multiple means of representation, multiple means of action and expression, and multiple means of engagement (Rao et al., 2021). Thus, an accessible course design must include alternative text for non-text materials and audio options for text-based contents, as well as subtitled videos, transcriptions in braille, and bearing in mind that some students are assistive technology users, so adjusting text-based materials improves their accessibility (Catalano, 2014; Elias, 2010; She & Martin, 2022). Apart from accessible content, online courses should also facilitate students to demonstrate what they have learned. By following UDL principles, instructors are encouraged to use multiple forms of assessment –taking advantage of the available digital tools– so that students can demonstrate their learning and competencies in a way they feel comfortable (Rao et al., 2021; Singleton et al., 2019).

Designing accessible online learning environments, courses, and resources requires taking into account students' needs and preferences (Batanero et al., 2019; Burgstahler, 2016), as well as providing students access to immediate assistance to sort out technical issues and guidelines on how they can request accommodations (Burgstahler, 2016). Furthermore, in most countries, some laws regulate the accessibility of services and products. In Spain, for instance, the regulation stipulates that digital communications and information technologies must be accessible, so that all persons can comprehend, communicate, and interact equally and autonomously ([General Law on the Rights of Persons with Disabilities and their Social Inclusion], 2013).

Online learning flexibility

Like most students in OHE, SWDs choose online learning because they find it highly flexible (Richardson, 2016; Verdinelli & Kutner, 2016). However, there may be other factors associated with their disability or health condition that could affect both their decision to choose online learning and their subsequent experience in OHE. Most of the existing literature has only described SWDs' situations in terms of managing work and home duties, but online learning flexibility can directly help those students in other areas. For instance, online learning flexibility might help them manage their disability-related difficulties in situations such as coping with pain and other issues whilst studying (Verdinelli & Kutner, 2016), or working at their own pace (Kotera et al., 2019; Murphy et al., 2019).

Online interaction

The available evidence highlights that teacher-student and peers online interactivity is important for students' learning and academic success in OHE (Kember et al., 2022). In the case of SWDs, they often attempt to interact with their instructors to get feedback on their learning (Alamri & Tyler-Wood, 2017). Besides, personal contact with their instructors and peers can help students to improve their psycho-emotional wellbeing by reducing anxiety and frustration (Oh & Lee, 2016) or increasing motivation to learn (Kotera et al., 2019), as well as to achieve academic success (Alamri & Tyler-Wood, 2017; Reyes et al., 2022; Richardson, 2016).

Asynchronous interaction turns out very convenient for SWDs (Reyes & Meneses, in press). Elias (2010) and Kember et al. (2022) recommend instructors increase their presence through videos and webinars, foster interaction with students by adopting an approachable and responsive role, and encourage students to interact with peers in discussion spaces. Encouraging students to participate in discussion spaces may lead them to strengthen their bonds, thus creating an online community of learners that can be useful for solving technical,

curricular, and emotional situations linked with online learning (Elias, 2010). Personalizing emails for specific queries between instructors and students is also necessary, bearing in mind that SWDs may need a timely response and so adopting synchronous interaction when possible is also convenient (Lowenthal et al., 2020; Reyes & Meneses, in press).

Online collaborative learning

Online collaborative learning promotes learning opportunities for students, helping them to develop richer points of view (Capdeferro & Romero, 2012) and to focus on key issues to complete academic tasks (Westbrook, 2012). However, it may also arouse feelings of frustration due to troubles in coordination and communication between peers and a lack of support from instructors (Capdeferro & Romero, 2012). Concerning SWDs, research shows that synchronous collaboration in which instructors participate along with students is highly efficient (Gehret et al., 2017; Keane & Russell, 2014), although collaboration with peers could be harder to manage without the instructors' presence (Kotera et al., 2019).

Research context

This research was performed in a Spanish university, based on online learning since its inception in 1994, and grounded in an open-entry policy. The study focuses on the expectations and experiences of SWDs related to the educational model developed by this online university, which is a student-based model encompassing four features that may facilitate students' inclusion: flexibility, asynchronous interaction, collaboration, and personalization. This institution offers students an interactive LMS, a pedagogical methodology based on collaboration and competency-based learning, and a continuous assessment model. Students' involvement includes interacting with contents allocated in diverse formats and asynchronous text-based interaction with instructors and peers via LMS and Google Workspace.

Study purpose and research questions

The previous summary of the literature showed some benefits and challenges experienced by SWDs in online learning. But developing a more complex approach that considers their perspectives and experiences in OHE would enable us to understand how to further promote their inclusion. A study focused on their voices could contribute to deepening our knowledge about what they expect from online learning and, most importantly, exploring in detail the issues in which they find difficulties or that prove beneficial to continuing their online studies. This knowledge may be helpful to reflect on the improvements that OHE institutions should implement to promote these students' inclusion. Hence, the primary aim of this paper is to analyze the SWDs' perspectives related to why they choose OHE and their experiences in the context of a fully online university educational model. In this regard, the study addressed the following research questions:

RQ1: How suitable is online learning for SWDs considering their experiences in the educational model of a fully online university?

RQ2: How does the type of disability influence the SWDs' experiences and perceptions of online learning?

Methods

Research Design

This qualitative research is based on a case study design (Yin, 2009). Thus, the unit of analysis was the educational model of a fully online university. This research design is suitable to address our research questions, which are focused on answering "why" the decision of studying online has been taken and "how" this learning environment affects the participants' experiences. This methodology enabled us to focus the study on understanding participants' experiences in the context under examination.

Participants

A purposive sample was designed to achieve a better understanding of students' expectations, experiences, and perceptions. We considered two criteria to choose our participants: the type of disability they are living with, including physical (n=6), sensory (n=6), mental (n=6), and learning disabilities (n=6); and their academic trajectory, including first-year (n=8), intermediate (n=8), and final stages (n=8).

Once the university's Ethical Board approved the study, the research team sent an invitation to participate in the study to all the students registered in the Student Services Office, of which 101 replied to this invitation and expressed their interest in participating. These students received all the information about the study (i.e., purpose, duration, confidentiality, and procedure), and then 24 students (Table 1) were selected following the sampling criteria considering participants' type of disability and academic stage.

Table 1. Participants' demographic information

Participant	Gender	Age	Disability group	Disability type	Stage of study	Programme
P1	F	40	Sensory	Hearing	First year	Digital design and creation
P2	F	54	Sensory	Hearing	First year	History, geography, and art history
P3	M	34	Sensory	Visual and hearing	Intermediate	Psychology
P4	M	47	Sensory	Speech (acquired brain injury)	Intermediate	History, geography, and art history
P5	M	57	Sensory	Visual	Final	Humanities
P6	F	51	Sensory	Hearing	Final	Psychology
P7	F	37	Physical	Chronic illness	First year	Catalan language and literature
P8	F	33	Physical	Chronic illness and physical	First year	Labour relations and human resources
P9	M	39	Physical	Physical	Intermediate	Telecommunications technologies and services Eng.
P10	F	51	Physical	Chronic fatigue and Fibromyalgia	Intermediate	Arts
P11	M	40	Physical	Physical impairment	Final	ICT security

P17	M	54	Physical	Physical impairment and Dyslexia	Final	Social education
P13	M	40	Learning	Dyslexia	First year	Telecommunications
P14	F	22	Learning	Dyslexia	First year	Psychology
P15	F	37	Learning	Dyslexia	Intermediate	Communication
P16	F	26	Learning	ADHD	Intermediate	Psychology
P12	F	45	Learning	Dyslexia and ADHD	Final	Psychology
P18	F	25	Learning	Dyslexia and ADHD	Final	Psychology
P19	M	45	Mental	Bipolar disorder	First year	Multimedia
P20	M	40	Mental	Psychotic disorder	First year	Psychology
P21	F	39	Mental	Depressive disorder	Intermediate	Humanities
P22	M	42	Mental	Psychotic and behavioural disorder	Intermediate	Computer engineering
P23	M	45	Mental	Psychotic disorder	Final	Computer engineering
P24	F	41	Mental	Depressive disorder	Final	Art and humanities

The participants were 13 women and 11 men aged from 22 to 55 years. Nearly all students were older than 30 (n=21) and three aged between 22 and 28 years. They all had previous experience in higher education either in on-campus universities, distance universities, or vocational education (non-degree programs). According to the selection criteria, the types of disabilities among participants were varied and included physical (mobility, chronic fatigue, fibromyalgia, and electro-sensitivity); sensory (vision, speech, and hearing impairments); learning difficulties (dyslexia and ADHD); and mental (bipolar, psychopathic, and depressive disorders).

Data collection

Data were collected during November and December 2020 through semi-structured interviews (protocol is available upon request) by videoconferencing or email, depending on the participants' situation and preferences. The interviews conducted by videoconferencing were recorded upon participant consent and then transcribed verbatim. Email interviews were conducted through five blocks of questions delivered throughout the whole process in five

different emails, in addition to follow-up questions. All the interviews were saved and encrypted to ensure participants' data protection and privacy.

Data coding and analysis

Data were inductively coded with Atlas.ti and analyzed following the six-phase approach of Thematic Analysis (Braun et al., 2015; Braun & Clarke, 2006). This approach makes it possible to codify and analyze interview-based data flexibly and systematically, as well as ensure analysis trustworthiness by following an iterative process. Thus, after multiple readings of the entire corpus of data, the first author systematically and iteratively produced a trial coding, subsequently discussed it with the other authors, and then together defined the final themes that better describe the participants' consensus. Table 2 displays richer details about the coding and analysis process.

Table 2. Coding hierarchy

Group of codes	Theme	Codes	Frequency
Online learning	Accessibility	Expectations	**5**
		Experiences	**116**
		- LMS	11
		- Assessment	28
		- Learning resources	28
		- Contents	27
		- Teaching and feedback	22
	Flexibility	Expectations	**51**
		- Time of study	10
		- Location of study	11
		- Pace of study	20
		- Family, home, or job duties	9
		Experiences	**128**
		- Time of study	36
		- Location of study	22
		- Pace of study	45
		- Flexible access	11
		- Deadlines	14
	Psycho-emotional well-being	Expectations	**6**
		- Managing mental effects	6
		Experiences	**94**
		- Motivation	35
		- Self-confidence/efficacy	38
		- Self-esteem	7
		- Anxiety and frustration	10

		- Cognitive functions	4
University educational model	Accommodations	Expectations	**1**
		Experiences	**92**
		- Teaching	11
		- Assessment	59
		- Challenges	22
	Interactivity	Expectations	**15**
		- Synchronous	10
		- Asynchronous	5
		Experiences	**348**
		- SWDs-Academic advisors	47
		- SWDs-Instructors	108
		- SWDs-Peers	117
		- SWDs-Student services	17
		- Challenges	59
	Collaborative learning	Experiences	**153**
		- Teamwork activities	64
		- Discussion spaces	19
		- Continuous assessment	46
		- Challenges	24

Results

We have organized our findings around five themes: flexibility, accessibility, interactivity, collaboration for learning, and psycho-emotional wellbeing in the context of a fully online university following the research questions.

RQ1: How suitable is online learning for SWDs overall?

Online learning enables SWDs' to study flexibly, thus balancing their studies with work and home commitments alongside the issues resulting from their disability. Our participants also looked for a learning environment in which they can access the classroom, the learning materials, and activities effortlessly. Both flexibility and accessibility triggered extra benefits for SWDs such as enhancing their interactivity and emotional wellbeing. However, these students also experienced challenges specially to access learning resources and administrative procedures. Next, we display participants' overall experiences.

Flexible time, location, and pace of study

Although SWDs comprise a diverse population, all participants agreed that online learning enables them to study at a convenient time either due to their job or home responsibilities, but also because of the issues resulting from their disability, such as P6 who stated that OHE allows her "to study even if I had insomnia at 3:00 in the morning or if I feel like it at 9:00 a.m. or if I want to at 4:00 p.m." These students usually struggle with severe issues such as pain and mental or emotional crises, as well as the effects of medication that often prevent them from attending lessons that are based on synchronous sessions or with rigorous schedules. Therefore, students with severe disabilities find OHE highly flexible in terms of time because it represents a great opportunity to carry out their studies in a way that would be not possible in person.

Studying wherever they can or want is one of the most significant aspects of online learning, especially for students with physical, mental, and sensory disabilities. But most importantly, some students stated that studying in campus-based universities might be challenging because of their disability. There were other participants for whom online education was the only option for completing their studies. P3, for example, expressed that his "personal health circumstances are not compatible with campus-based studies." P19 also spoke out about his decision to study online:

> These benefits offered [by this university] for studying online, in my own way, from home… Of course, all social interaction was gone… travelling, the journeys… I thought the online university would make it easier for me and it does, eh.

Furthermore, some students lived in villages where there are no universities and, due to their circumstances, it was unfeasible to move to another location to carry out their studies: "Not having to commute to the city works very well for me" (P22). Other participants lived

in cities where the local universities did not offer the programs of study in which they were interested, so the best available option was to study online.

SWDs find online learning very suitable because they usually need more time for preparing their assignments due to their disability. The flexibility of online learning together with the university's open enrolment policy enables them to study at their own pace, more conveniently. "There are days I cannot do anything due to my pathologies, so I tend to study from Monday to Sunday" (P10). Studying online is beneficial in terms of work pace for nearly all respondents. For instance, one student with learning disabilities stated: "For people with dyslexia, [studying online] is okay because you can work at your own pace; I mean, a topic scheduled for 1 hour takes you 3 hours" (P18).

Accessible LMS

Students hoped the LMS had high usability and accessibility in accordance with their needs and possibilities. In an environment in which most activities can be conducted offline or with a minimal online connection, LMS design should consider technical issues such as the inclusion of navigation tools for all users and the highest possible level of usability. So, our participants recognized that the university's LMS meets several accessibility requirements. These requirements are essential in encouraging students' progress. "The [university's] LMS is what has helped me most" (P15). Even though no student expressed dissatisfaction with the university's LMS for accessing teaching and learning resources, some students perceive specific challenges to completing bureaucratic procedures because even when "that [information] is available in the personal online profile [LMS], it is hard to find" (P19).

Curricular Design

Even though our participants appreciated some positive aspects about course design such as well-designed assessment activities, updated learning resources, and flexible learning

strategies, they also suggested improvements in critical areas, such as accessibility, flexibility, scheduling, and organization. For instance, participants criticized how the assessment activities are scheduled: "For a simple continuous assessment activity they have now given me a month [to do it] and I have done it in three days; by contrast, for a complicated one they gave me 14 days" (P14). Others perceived that they needed curricular accommodations to cover the special needs that were not previously designed: "I really thought they already had an accommodation designed for people like me [with hearing impairments], but they didn't… my instructor suggested that I do what I could" (P2).

Accessible learning resources. One of the preferred characteristics of the university's educational model for SWDs was the possibility of having the learning resources in multiple formats. Some students found it helpful in the sense that they could access the content easily so, "the student has more possibilities to access all the contents" (P17). However, students also agreed that some learning resources were hard to follow. In this context, "there are instructors who share videos in English or other languages with subtitles that are inaccessible" and it is even harder "when they share resources as photocopies or reading with images" (P5).

Accessibility for assessment activities: One of the reasons why SWDs chose to study at the online university being researched is because of its continuous assessment model. The participants highlighted the advantage of working at their own pace throughout the entire course instead of cramming all the study load at the end of the course and its final exams. Consequently, nearly all respondents managed the issues resulting from their disability thanks to this methodology and, obviously, it reduced most psychological issues caused by final exams, as conveyed by P14: "Continuous assessment allows me to study more conveniently." However, students still perceive accessibility issues, as some of them stated: "There have been continuous assessment activities that are humanly impossible to understand" (P1) and

"Oftentimes, I find very entangled the structure through which the exercises are formulated" (P17).

Accommodations

SWDs received reasonable accommodations for their needs in teaching and assessment processes, as well as personalized support when they requested it. These accommodations included the availability of the course planning from the beginning so that they could prepare their learning activities at their own pace and extra time to prepare the continuous assessment activities. Instructors do not take into consideration grammar and spelling mistakes for students with learning disabilities neither in their writing activities nor for final exams. All SWDs also have more time to complete online exams if they need it.

Students who receive these accommodations perceived them as essential to their results. For instance, these students noted that they were achieving better academic performance: "The accommodations have been crucial" (P3). And they also experienced better psycho-emotional balance: "It calms you down because you know you are going to have that accommodation" (P16). Most importantly, accommodations have been crucial for some of these students to accomplish their academic goals. Such is the case with P19, "I have passed courses these semesters thanks to the extra time." However, students described various issues with getting accommodations, such as P20, who did not know that the university offers them. Furthermore, this student (P20) along with P4, P11, and P24 just prefer to keep their disability private. Likewise, there were students unsatisfied with the accommodations received, either because they did not fit their needs or because the ones given were not what requested. One common challenge experienced by nearly all participants was the procedure to request this kind of support, which should be done at the beginning of every semester and for every enrolled course. Managing this procedure becomes problematic for them because it requires extra effort and reduces their autonomy. Additionally, they feel

exposed when they had to disclose their disability. In this regard, P5 reflected, "The university should offer accommodations for SWDs – they [staff] already know who we are – through an own-initiative procedure."

Online interaction

Interaction is still a challenge in online learning environments. Some SWDs expected more synchronous interactivity both with their instructors and peers. However, nearly all participants were aware of the university's asynchronous model of interaction before their first enrolment, a relevant factor to them because it is aligned with flexibility and accessibility in most cases. Many students highlighted the benefits of asynchronous online interaction on their learning: "I can spend much more time preparing an assignment; I do not have to listen to someone else and memorize contents" (P15). Furthermore, synchronous interaction can even affect them negatively, as some participants commented, "What affects me negatively are the online exercises and video calls" (P10); and "All those activities that require sight and hearing at the same time are difficult for me" (P3).

SWDs expected closer contact with their instructor, especially at the beginning of the courses. Early contact would increase the confidence of students so they can contact their instructor later to consult any questions related to the contents, continuous assessment, or to talk about their disability, as P19 recognized: "If I know the instructors, I lose that fear to ask them about something because they are closer." Direct interaction with the instructors also motivates students to participate in the discussion spaces: "When instructors encourage interaction and you see that they do interact, it encourages you to interact more" (P6).

Psycho-emotional wellbeing

A small number of participants sought to avoid some disability issues by studying online. Those who chose online learning for that purpose agreed that online studies helped them keep their mind occupied while learning, which also helped to mitigate mental or

physical effects resulting from their disability. For example, P10 stated that "Everything was due to [my] mental health. It is really hard going from 'normal' life to staying at home most days." According to some students' testimonies, studying online not only helped them to improve their psycho-emotional wellbeing in terms of reducing stress and anxiety but also to enhance their motivation, self-efficacy, self-esteem, and self-confidence. P13 recognized: "I had already given up, [I thought] 'I would never go to university, I would not get a degree'." In some specific cases, online studies even improve SWDs' overall well-being, like as P4: "I try to be active so as not to get depressed thinking about my physical problems." Furthermore, one of the well-known advantages of online learning for SWDs is the possibility of concealing their disability. These students preferred to remain unnoticed, finding in OHE the perfect scenario in which to do so. P20 stated, "I haven't told the instructors about my disability." P24 also conveyed something similar: "If you have something like that [mental issues], you try to remain unnoticed."

RQ2: How do SWDs perceive online learning according to their type of disability?

Students' experiences and perceptions are influenced by disability type and severity. Participants conveyed their experiences while accessing learning resources, learning strategies, instructors' feedback, and assessment activities. Sometimes, such experiences differed according to their type of disability. So, we have observed some variability in the participants' narratives, especially when it concerns to those with learning and sensory disabilities, as well as to those with severe chronic illnesses.

Access to learning resources

The students access and use offline learning resources, which enables them to study more comfortably, especially to those with sensory and physical disabilities. Some participants valued the possibility to access learning resources at any time, whether online or

offline. For instance, students with fibromyalgia and electro-sensitivity disorders expressed that, thanks to downloading and printing the learning contents, they can manage some disability issues. "My children help me download and print the learning resources so I can read them offline" (P10). Students with learning disabilities also recognized that online resources enable them "to access the modules as many times as one wants" (P12; P15), while others prefer to download and print their readings to study offline, which increases their "focus" (P16) and "reading comprehension" (P14; P15). However, these students also conveyed their difficulties with text-based content that cause them psycho-emotional issues, such as anxiety and frustration: "For example, a text that is 50 pages long, you see it and give up because you only see letters and they all get mixed up" (P14).

Assessment processes and pedagogical support

The availability of the syllabus and continuous assessment activities from the beginning of the course also enables SWDs, especially those with learning disabilities, to organize themselves, as explained by P14: "I have been able to see from the beginning how it [the course] is organized, so for me, it has also been easier to see how I can guide myself throughout the semester." Having the course plan available from the beginning of the course seems to be beneficial for all the students regardless of the type of disability they live with, especially for their psycho-emotional and cognitive performance. Therefore, students perceive a decrease in anxiety and stress if they know how and when to prepare all assignments in advance, which also helps them better manage their executive and cognitive functions.

However, there are still some troubling aspects for SWDs concerning flexibility, especially regarding continuous assessment. For instance, some students with mental or physical disabilities experienced crises resulting from their disability which prevented them from submitting continuous assessment activities, so they perceived the assessment schedule

was inflexible for them. In this sense, P7 shared, "I have spent two weeks in bed without being able to do anything. So, why should I be penalized for that?" Some students with mental illnesses also expressed their dissatisfaction with "the instructors' assessment criteria" (P20), which, according to this student, "are exactly the same used for a person who has no other issues." In these cases, the issue is that most students with mental illnesses usually take medications that impair their cognitive functions, so they expect more awareness of their disability from instructors.

Students with learning disabilities also expected more understanding of their situation. On the one hand, these students find it challenging to read textual contents or instructions and sometimes they do not receive a suitable response from instructors: "Some teachers don't comprehend it, they don't understand what it [dyslexia] entails, they don't comprehend why I ask them questions 1000 times" (P15). On the other hand, even if they have enough time, some students make inadvertent errors in grammar and spelling due to the neurological effects of their disability: "Just because they give me more time doesn't mean I will make fewer mistakes, because I cannot see them" (P18). Although the university policies suggest that their mistakes should be disregarded when assessing their learning activities, some students with learning difficulties think it is advisable to get personalized support during the examination or to employ more accessible types of exams. P13 reflected, "The accommodation I would like to get would be that someone else read the exams to me."

Accessible learning strategies

Various students found learning strategies accessible: "One of the instructors I have in one of the courses is an 'angel', he posts short videos during the continuous assessment activities, and he just reads the question wording" (P14). Nevertheless, there are still some aspects to improve to make those processes fully accessible to all students, especially to those with sensory and learning disabilities for whom it is still difficult to follow continuous

assessment, learning strategies, and communication. For instance, students with sensory

disabilities found it challenging to participate in activities that require speaking or listening.

"Oral practice (in English, for example) is an impassable wall for me" (P4). Furthermore,

some students with learning disabilities consider that, even though instructors' written

feedback is useful, sometimes it is hard to comprehend: "This Math instructor is wonderful in

this regard, but his feedback is, sometimes, very long or highly technical because he is not

aware that sometimes I do not understand it" (P13). These students also referred to an

increase in their anxiety and stress while interacting asynchronously, which was greater with

text-based interaction, as P14 expressed, "This [text-based interaction] makes me a little

anxious because it takes me a lot of time to understand, to read." Some students with chronic

illnesses also experienced issues in performing learning activities in which they had to

interact face-to-face or follow inflexible schedules.

Online collaboration for learning

Collaboration is a controversial topic for SWDs in OHE. Nearly all the interviewees

considered collaboration very essential to their learning when it came from an informal

interaction, or when it followed an asynchronous form of collaboration. For instance, P14

stated that "some classmates, in particular, are the people who help me most when I have

questions." Furthermore, various participants highlighted the importance of online

collaborative methodologies in their acquisition of knowledge and competence, given that

collaborative activities enable them to "share questions and concerns even if one does not

know the person behind the screen" (P5).

However, when SWDs have to work with peers in compulsory group assignments,

collaboration can prove hard to manage for them because it affects flexibility, accessibility,

and even their psycho-emotional wellbeing. For example, P12 thinks that "people have a

specific way of working", so students with learning difficulties or ADHD "find it hard

because they think differently" or at least they "appreciate things differently." Moreover, compulsory collaborative activities may arouse negative feelings such as frustration, anxiety, or fear of social contact. P18 asserted, "I do not like it because I am afraid, and I am ashamed to show what happens to me." Some students with sensory disabilities also experienced discriminatory attitudes against them from their peers. As one participant commented: "I had to perform a compulsory group activity in a course and one of the members discredited my contributions arguing that I had no experience with these activities because of my disability" (P3).

Discussion

This research focused on exploring SWDs' expectations about OHE and how their experience in a fully online university changed their beliefs. Twenty-four semi-structured interviews with students with physical, sensory, learning, and mental disabilities gave us a better understanding of why they prefer online studies and how this learning environment fits their educational needs.

The type and severity of the disability determine how convenient OHE is for SWDs

Considering the reasons why these students chose OHE to complete their higher studies, we identified two patterns. Firstly, for students with several physical, sensory, and mental disabilities, studying online was the best option, and in some cases the only one. These students choose online learning over campus-based universities because of the issues resulting from their disabilities either attending classes in person, commuting from home to university, moving from their villages to the city, or avoiding social pressure. Secondly, students with learning difficulties and those with moderate disabilities choose OHE either to balance their studies with home and work responsibilities, because the campus-based

universities near them did not offer the studies in which they were interested, or because of self-esteem issues.

These findings are consistent with previous research showing an explanation of which factors affect those students' online learning experience in terms of flexibility (Kotera et al., 2019; Verdinelli & Kutner, 2016), accessibility (Reyes et al., 2022), interaction (Alamri & Tyler-Wood, 2017; Oh & Lee, 2016), collaboration (Gehret et al., 2017), and psycho-emotional wellbeing (McManus et al., 2017; Murphy et al., 2019). SWDs find a great opportunity in OHE to complete their undergraduate or even graduate studies, as it enables them to overcome physical, social, and emotional barriers, coupled with getting more flexibility to manage the issues resulting from their disability, as well as balancing work or home responsibilities. According to our participants, they look for a flexible and accessible environment in which they can learn at their own pace, anywhere, anytime. These students also expect more interactive learning processes in which the presence of instructors and the interaction with peers are more frequent. Students with mental and chronic illnesses also choose OHE to avoid some physical and psycho-emotional effects caused by their disability, such as pain or negative thoughts, so they look for an environment in which they would feel more comfortable coping with these issues.

Flexibility is key for SWDs to succeed in OHE

Beyond some issues that online universities should continue working on, SWDs feel comfortable with online learning because of the various possibilities it offers. These students find OHE highly flexible in terms of time, location, and pace of study. The results of this study offer a wider insight and complement what Verdinelli and Kutner (2016), Kotera et al. (2019), and Murphy et al. (2019) found concerning online learning flexibility. For these students, having the freedom to study when they feel better is crucial to persist, especially for those with physical, sensory, and mental disabilities who struggle with extra difficulties

resulting from their disability. Studying at home or other preferred locations is also essential in following their higher studies because some of them cannot attend campus-based or synchronous lectures due to their situation. Most importantly, studying at their own pace is perceived as a key element for SWDs regardless of the type of disability. Apart from some exceptional cases, these students usually need more time to complete their assignments because they are constantly struggling, firstly with the issues resulting from their disability, and secondly with the effects of medications.

Designing accessible courses is essential for promoting inclusion in OHE

This research suggests that SWDs find most of the pedagogical practices and technological tools available in the online university examined to be highly accessible. Contrary to what Kent (2015b), Kent et al. (2018) and McManus et al. (2017) observed, most participants in this study found accessing learning resources and the LMS to be rather straightforward. However, students with any disability showed a generalized concern about the accessibility of assessment activities. Students reported issues such as the length and readability of continuous assessment activities and insufficient accommodations in final exams, which makes them difficult to access for nearly all. These issues have an even greater effect on those with learning and sensory disabilities for whom it is also hard to access fundamental processes such as teaching, interaction, and collaboration in an asynchronous online educational model that mainly relies on text-based learning resources.

Designing fully accessible online courses is the next step toward making OHE inclusive for everyone, considering that accessibility entails–apart from designing accessible LMS, websites, and technological tools–designing accessible learning resources and processes in which all students can engage effortlessly (Lee, 2017; Rodrigo & Tabuenca, 2020). Adopting the UDL principles by enabling multiple means of action, expression, representation, and engagement come across to be a great opportunity for online universities

to improve course accessibility and flexibility, thus facilitating all learners' inclusion. The UID-OL also outlines useful guidelines either to design courses or LMS suitable to all students in terms of accessibility, flexibility, collaboration, and interactivity. Even though SWDs' needs are diverse, by combining UDL and UID-OL guidelines when designing learning resources, learning strategies, and assessment activities, their chances to succeed greatly increase (Catalano, 2014; Rao et al., 2021; Singleton et al., 2019).

SWDs find interacting with someone else at the university very beneficial

The findings emphasize online interaction as one of the key aspects to promote the inclusion of SWDs, as suggested by Rao et al. (2021). This study highlighted the importance of interaction between these students and instructors, peers, and support services in improving their learning experience (Alamri and Tyler-Wood, 2017) and overcoming emotional issues (Kotera et al., 2019). SWDs considered both formal interaction with instructors and informal interaction with their peers as useful resources for improving their academic achievements. Furthermore, direct contact with their academic advisor, instructors, and close peers also triggered a positive emotional response because it helped them to overcome issues such as frustration and loneliness, which in the end also contributed to improving their academic results.

Online interaction enhances academic support and collaborative learning among all students. Even though the participants stressed the importance of the support provided by instructors in improving their learning, they recognize that such support would improve if communication between students and academic staff were closer, more frequent, and constant (Alamri and Tyler-Wood, 2017; Gehret et al., 2017). Likewise, informal interaction with peers seems to be more effective on SWDs' learning than formal and compulsory collaborative methodologies, bearing in mind some issues they experience with flexibility, accessibility, stigmatization, or psycho-emotional challenges.

Our results suggest that asynchronous interaction is highly convenient for SWDs irrespective of their disability. However, there is still a necessity to expand the instructors' and advisors' presence by using formats other than text-based messages when interacting with students in a fully online university. Consequently, professionals in charge of working directly with students should use some strategies such as interacting through subtitled videos and webinars that all learners can access asynchronously, as well as encouraging them to participate in the (accessible) discussion spaces so that learners can engage and support mutually.

OHE enables SWDs to improve their psycho-emotional wellbeing

This study shows how some SWDs find OHE very suitable for improving their psycho-emotional and physical wellbeing. Some students with mental and chronic illnesses and sensory disabilities admitted that one reason to choose online studies was to avoid its hardships, such as pain and mental issues and, most importantly, that OHE is helping them manage their situation. Furthermore, for students who experienced academic failure either in K12 education or at campus-based universities, such as those with learning disabilities, studying online has enabled them to gain self-confidence and increase their self-esteem.

The results suggest that OHE enables SWDs not only to reduce negative psycho-emotional issues such as anxiety, as pointed out by Kotera et al. (2019) and Murphy et al. (2019), but also to increase positive psycho-emotional processes such as motivation, self-confidence, and self-efficacy. For instance, once students were accommodated within OHE they felt an increase in their motivation to study. These students' motivation encourages them to overcome all the difficulties related to their studies. Additionally, their motivation and self-efficacy are likely to increase when they perceive they are progressing successfully on their degrees or when they find a pleasant learning climate. Furthermore, this study reflects that OHE enables SWDs to conceal their disability, thus preventing stigmatization. The

participants highlighted that in OHE they can decide to disclose their condition only when it is strictly necessary, such as when they request additional support from their instructors or the university services, as previously reported in the literature (Kent et al., 2018; Murphy et al., 2019). Therefore, students with any type of disability perceive online learning as a suitable scenario for studying on an equal footing with other students because they can remain unnoticed.

Study limitations

The purpose of this study was to include the experiences and perceptions of SWDs as widely as possible, so that it enabled us to develop an analysis based on addressing most learners' needs by using an inclusive approach. However, our sample did not include students with very specific disabilities (i.e., autism, paraplegia, etc.), so there needs to analyze their perspective to have an insight on how suitable online learning may be for them. A second matter to consider is that our research design enabled us focusing on a particular context, so our results can be useful for other institutions with similar characteristics. But considering that online universities may use diverse educational and organizational philosophies, some of our specific recommendations may not fit all the online learning spectrum in higher education.

Futures lines of work

Implications and recommendations for research

This research was conducted at a single online university. However, it is advisable to conduct empirical research at other institutions to be able to compare students' experiences in more diverse online learning environments. Furthermore, there is a need to deepen the understanding of the influence of some significant variables such as age, gender, and severity of disability on the adaptability of online learning for SWDs. Thus, more research is needed

to establish the extent of personalized support and accommodation that these students might need when both the UID-OL and the UDL are being applied considering the heterogeneity among these students. Finally, it would also be relevant to examine the suitability of these approaches to successfully include students with multiple or severe disabilities in OHE, as well as students with specific sensory or physical disabilities for whom interacting with digital technologies may turn out challenging.

Implications and recommendations for practice

Various experts have concluded that improvements in educational environments should be made considering learners' needs. Hence, we should listen to SWDs' voices to promote improvements in OHE. The results of this study suggest the importance of taking measures regarding, at least, four areas to guarantee the inclusion of all students in online learning: accessibility, support, collaboration, and social interaction. The UID-OL emphasizes the design of pedagogical environments in which every student should be able to access, participate, and learn. The application of these principles in course design, teaching, and assessment seems particularly suitable for making OHE more inclusive and, based on students' perceptions and needs, incorporating improvements in interaction, support, and accommodations would also be useful as follows.

1. Have a team of experts conduct a thorough review of all learning resources and assessment before they are delivered to students. This will ensure that the learning resources and the assessment process itself are accessible to them. The teaching staff should also work collaboratively to design additional teaching strategies aimed at seeing students' special needs. Furthermore, it is highly advisable to establish a balance between the difficulty of the assignments and the time available to prepare the assessment activities.

2. *Apart* from designing accessible assessment processes, instructors should offer final exams in different formats to ensure that all students understand what the instructors are asking for. Furthermore, as much as possible, instructors should be flexible in allowing students to demonstrate their learning through diverse means of expression.

3. Asynchronous interaction has a high level of acceptance among SWDs. It is advisable to keep this as the primary form of communication during the learning process. However, applying accessible communication strategies in which students can interact directly with their instructors using audio-visual formats is highly recommended. This strategy would help students gain confidence, especially at the beginning of the courses, so they can feel motivated to interact and collaborate with their peers.

4. Provide instructors with the appropriate tools and resources so that they can communicate and give feedback to students using different media and formats. Additionally, it is necessary to foster the application of personalized academic support for those students experiencing special difficulties to follow the courses at the same pace as their peers. Online universities should also work on enhancing disability awareness among the teaching staff in such a way that they have a better understanding of SWDs' needs to support them properly.

5. An inclusive learning environment should address all learners' needs. In this sense, planning, promoting, and applying reasonable accommodation for those students with exceptional (uncommon) needs, such as those with electro-sensitivity, as well as for those with multiple or severe disabilities, should be considered by online universities.

Conclusions

This study highlights the main reasons why SWDs find OHE suitable for completing their undergraduate studies. The benefits these students perceive while studying online encompass managing the issues resulting from their disability, having accessible learning

resources and environments, getting sufficient flexibility to study at their own pace, doing so in convenient locations, and at any time, as well as combining their studies with other responsibilities. Furthermore, SWDs usually overcome some accessibility issues through digital technology, which is not always possible in traditional learning environments. OHE seems to be the best, and perhaps the only, option for students with severe disabilities because it increases accessibility, flexibility, and convenience for them. For instance, they find it helpful to study from home without having to commute to campus-based universities.

Our findings also suggest the priorities on which online universities should work in the future. SWDs encompass a heterogeneous population, so the strategies to support them on the path to academic success should be diverse to fit all their particular needs. In this regard, adopting and combining the UID-OL with the UDL principles offer a great opportunity to improve students' academic experience thanks to their plurality, either in course design, teaching strategies, academic support, assessment, or interaction and collaboration processes. By considering the SWDs' experiences, online universities will be able to design courses in such a way that every student has an ample array of alternatives aimed at enabling all students to participate under the same conditions.

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Bibliography

Alamri, A., & Tyler-Wood, T. (2017). Factors affecting learners with disabilities–instructor interaction in online learning. *Journal of Special Education Technology*, *32*(2), 59-69. https://doi.org/10.1177/0162643416681497

Batanero, C., de-Marcos, L., Holvikivi, J., Hilera, J. R., & Otón, S. (2019). Effects of new supportive technologies for blind and deaf engineering students in online learning. *IEEE Transactions on Education*, *62*(4), 270-277. https://doi.org/10.1109/TE.2019.2899545

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., Clarke, V., & Rance, N. (2015). How to use thematic analysis with interview data. En A. Vossler & N. Moller (Eds.), *The Counselling and Psychotherapy Research Handbook* (pp. 183-197). SAGE Publications. http://dx.doi.org/10.4135/9781473909847.n13

Burgstahler, S. (2015). Opening doors or slamming them shut? Online learning practices and students with disabilities. *Social Inclusion*, *3*(6), 69-79. https://doi.org/10.17645/si.v3i6.420

Burgstahler, S. (2016). The development of accessibility indicators for distance learning programs. *ALT-J: Research in Learning Technology*, *14*(1), 79-102. https://doi.org/10.1080/09687760500479753

Capdeferro, N., & Romero, M. (2012). are online learners frustrated with collaborative learning experiences? *International Review of Research in Open and Distance Learning*, *13*(2), 26-44. https://doi.org/10.19173/irrodl.v13i2.1127

Reyes, J. I., Meneses, J., & Xavier, M. (2023). Suitability of Online Higher Education for Learners with Disabilities: The Students' Voices. *Journal of Special Education Technology, 38*(3), 370-383. https://doi.org/10.1177/01626434221131772

Catalano, A. (2014). improving distance education for students with special needs: A qualitative study of students' experiences with an online library research course. *Journal of Library and Information Services in Distance Learning*, 8(1-2), 17-31. https://doi.org/10.1080/1533290X.2014.902416

Edwards, M. (2019). Inclusive learning and teaching for Australian online university students with disability: A literature review. *International Journal of Inclusive Education*. https://doi.org/10.1080/13603116.2019.1698066

Elias, T. (2010). Universal instructional design principles for Moodle. *The International Review of Research in Open and Distributed Learning*, *11*(2), 110. https://doi.org/10.19173/irrodl.v11i2.869

Fichten, C., Olenik-Shemesh, D., Asuncion, J., Jorgensen, M., & Colwell, C. (2020). Higher education, information and communication technologies and students with disabilities: An overview of the current situation. En J. Seale (Ed.), *Improving Accessible Digital Practices in Higher Education: Challenges and New Practices for Inclusion* (pp. 21-44). Springer International Publishing. https://doi.org/10.1007/978-3-030-37125-8_2

Gehret, A. U., Elliot, L. B., & MacDonald, J. H. C. (2017). Active collaborative learning through remote tutoring: A case study with students who are deaf or hard of hearing. *Journal of Special Education Technology*, *32*(1), 36-46. https://doi.org/10.1177/0162643416681162

Keane, K., & Russell, M. (2014). Using cloud collaboration for writing assignments by students with disabilities: A case study using action research. *Open Praxis*, *6*(1), 55-63. https://www.informit.org/doi/abs/10.3316/informit.935999861353365

Reyes, J. I., Meneses, J., & Xavier, M. (2023). Suitability of Online Higher Education for Learners with Disabilities: The Students' Voices. *Journal of Special Education Technology, 38*(3), 370-383. https://doi.org/10.1177/01626434221131772

Kember, D., Trimble, A., & Fan, S. (2022). An investigation of the forms of support needed to promote the retention and success of online students. *American Journal of Distance Education*, 1-16. https://doi.org/10.1080/08923647.2022.2061235

Kent, M. (2015). Disability and elearning: Opportunities and barriers. *Disability Studies Quarterly*, *35*(1), Article 1. http://dx.doi.org/10.18061/dsq.v35i1.3815

Kent, M. (2016). *Access and barriers to online education for people with disabilities* (pp. 1-168) [Report]. National Centre for Student Equity in Higher Education. https://espace.curtin.edu.au/handle/20.500.11937/55588

Kent, M., Ellis, K., & Giles, M. (2018). Students with disabilities and elearning in Australia: Experiences of accessibility and disclosure at Curtin University. *TechTrends*, *62*(6), 654-663. https://doi.org/10.1007/s11528-018-0337-y

Kirkpatrick, A., Connor, J., Campbell, A., & Cooper, M. (2018). *Web Content Accessibility Guidelines (WCAG) 2.1*. World Wide Web Consortium (W3C). https://www.w3.org/TR/WCAG21/

Kocdar, S., & Bozkurt, A. (2022). Supporting learners with special needs in open, distance, and digital education. En O. Zawacky-Richter & I. Jung (Eds.), *Handbook of Open, Distance and Digital Education* (pp. 1-16). Springer. https://doi.org/10.1007/978-981-19-0351-9_49-1

Kotera, Y., Cockerill, V., Green, P., Hutchinson, L., Shaw, P., & Bowskill, N. (2019). Towards another kind of borderlessness: Online students with disabilities. *Distance Education*, *40*(2), 170-186. https://doi.org/10.1080/01587919.2019.1600369

Lee, K. (2017). Rethinking the accessibility of online higher education: A historical review. *The Internet and Higher Education*, *33*(2017), 15-23. https://doi.org/10.1016/j.iheduc.2017.01.001

Reyes, J. I., Meneses, J., & Xavier, M. (2023). Suitability of Online Higher Education for Learners with Disabilities: The Students' Voices. *Journal of Special Education Technology, 38*(3), 370-383. https://doi.org/10.1177/01626434221131772

Ley General de derechos de las personas con discapacidad y de su inclusión social [General Law on the Rights of Persons with Disabilities and their Social Inclusion], Pub. L. No. Real Decreto Legislativo 1/2013, 289 BOE-A-2013-12632 (2013). https://www.boe.es/buscar/act.php?id=BOE-A-2013-12632#ddunica

Lowenthal, P. R., Humphrey, M., Conley, Q., Dunlap, J. C., Greear, K., Lowenthal, A., & Giacumo, L. A. (2020). Creating accessible and inclusive online learning: Moving beyond compliance and broadening the discussion. *Quarterly Review of Distance Education*, *21*(2), 1-21. https://eric.ed.gov/?id=EJ1288511

McManus, D., Dryer, R., & Henning, M. (2017). Barriers to learning online experienced by students with a mental health disability. *Distance Education*, *38*(3), 336-352. https://doi.org/10.1080/01587919.2017.1369348

Murphy, A., Malenczak, D., & Ghajar, M. (2019). Identifying challenges and benefits of online education for students with a psychiatric disability. *Journal of Postsecondary Education and Disability*, *32*(4), 395-409. https://eric.ed.gov/?id=EJ1247112

Oh, Y., & Lee, S. M. (2016). The effects of online interactions on the relationship between learning-related anxiety and intention to persist among e-learning students with visual impairment. *International Review of Research in Open and Distributed Learning*, *17*(6), 89-107. https://doi.org/10.19173/irrodl.v17i6.2581

Rao, K., Torres, C., & Smith, S. J. (2021). Digital tools and UDL-based instructional strategies to support students with disabilities online. *Journal of Special Education Technology*. https://doi.org/10.1177/0162643421998327

Reyes, J. I., & Meneses, J. (in press). Advising college students with dis/abilities in online learning. Distance Education. https://doi.org/10.1080/01587919.2022.2121264

Reyes, J. I., Meneses, J., & Melián, E. (2022). A systematic review of academic interventions for students with disabilities in Online Higher Education. *European Journal of*

Reyes, J. I., Meneses, J., & Xavier, M. (2023). Suitability of Online Higher Education for Learners with Disabilities: The Students' Voices. *Journal of Special Education Technology, 38*(3), 370-383. https://doi.org/10.1177/01626434221131772

Special Needs Education, *37*(4), 569-586.

https://doi.org/10.1080/08856257.2021.1911525

Richardson, J. T. E. (2016). Face-to-face versus online tutorial support in distance education: Preference, performance, and pass rates in students with disabilities. *Journal of Postsecondary Education and Disability*, *29*(1), 83-90.

https://eric.ed.gov/?id=EJ1107475

Roberts, J. B., Crittenden, L. A., & Crittenden, J. C. (2011). Students with disabilities and online learning: A cross-institutional study of perceived satisfaction with accessibility compliance and services. *Internet and Higher Education*, *14*(4), 242-250.

https://doi.org/10.1016/j.iheduc.2011.05.004

Rodrigo, C., & Tabuenca, B. (2020). Learning ecologies in online students with disabilities. *Comunicar*, *28*(62), 53-65. https://doi.org/10.3916/C62-2020-05

She, L., & Martin, F. (2022). Systematic review (2000 to 2021) of online accessibility research in higher education. *American Journal of Distance Education*, *0*(0), 1-20.

https://doi.org/10.1080/08923647.2022.2081438

Singleton, K., Evmenova, A., Jerome, M. K., & Clark, K. (2019). Integrating UDL strategies into the online course development process: Instructional designers' perspectives. *Online Learning*, *23*(1), 206-235. https://doi.org/10.24059/olj.v23i1.1407

Verdinelli, S., & Kutner, D. (2016). Persistence factors among online graduate students with disabilities. *Journal of Diversity in Higher Education*, *9*(4), 353-368.

https://doi.org/10.1037/a0039791

Westbrook, C. (2012). Online collaborative learning in health care education. *European Journal of Open, Distance and E-Learning, 1*(2012), 1-6

https://eric.ed.gov/?id=EJ979596

Reyes, J. I., Meneses, J., & Xavier, M. (2023). Suitability of Online Higher Education for Learners with Disabilities: The Students' Voices. *Journal of Special Education Technology, 38*(3), 370-383. https://doi.org/10.1177/01626434221131772

Yin, R. K. (2009). *Case Study Research: Design and methods* (4th ed., Número 1, p. 219).

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