



# HEDforALL: Holistic Approach to Accessible Higher Education

D1.1

Needs and requirements of Students with Disabilities

ERASMUS+

Project No: 2021-1-EL01-KA220-HED-000032260



This work is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-sa/4.0/).

Co-funded by the Erasmus+ Programme of the European Union



*This project (2021-1-EL01-KA220-HED-000032260) has been co-funded by the Erasmus+ Programme of the European Commission. This publication reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.*

## DOCUMENT DESCRIPTION

<b>Funding:</b>	ERASMUS+ Programme
<b>Project website:</b>	www.hedforall.eu
<b>Project Result:</b>	RES1 Needs and requirements of Students with Disabilities
<b>Task No:</b>	Tasks R1.1, R1.2, R1.3, R1.4, R1.5
<b>Deliverable No:</b>	D1.1
<b>Partner responsible:</b>	University of Macedonia (UOM)
<b>Editor:</b>	- Konstantinos Papadopoulos (UOM)
<b>Authors</b>	- Konstantinos Papadopoulos (UOM) - Eleni Koustriava (UOM) - Konstantinos Charitakis (UOM) - Lisander Isaraj (UOM)
<b>Contributors:</b>	- José María Fernández Gil, Josefa Parreño Selva, Cristina Palomares Crespo (UA) - Matthias Grünke, Susanne Hoff, Carsten Klöpfer, Merle Schoppmann (UOC) - Flavio Manganello, Lucia Ferlino (ITD-CNR)
<b>Date of publication:</b>	28/08/2023
<b>Status:</b>	Final
<b>Language:</b>	English
<b>Dissemination level:</b>	P = Public
<b>DOI:</b>	10.17471/54022
<b>How to cite:</b>	Papadopoulos, K, Koustriava, E., Charitakis, K., Isarai, L., Manganello, F., Urton, K., Grünke, M., Carmona, R.M., Selva, J.P., Fernández Gil, J.M., Ferlino, L., Crespo, C.P., Hoff, S., Klöpfer, C., & Schoppmann, M. (2023). <i>Needs and requirements of Students with Disabilities</i> . Report of HEDforALL Erasmus+ project. Thessaloniki, Greece: University of Macedonia.

## THE HEDFORALL CONSORTIUM

No.	Partner Name	Logo
1	University of Macedonia (UOM) Project Coordinator	
2	University of Cologne (UOC)	
3	University of Alicante (UA)	
4	National Research Council of Italy - Institute for Educational Technology (CNR-ITD)	

## ABBREVIATIONS

Term	Explanation
SwD	Students with Disabilities
HEI	Higher Education Institute
RES	Project Result

## Contents

Abstract.....	6
Introduction.....	6
SECTION-A: Qualitative research - Interviews.....	8
1. Methodology .....	8
2. Research Instruments .....	8
3. Participants .....	9
4. Results.....	11
4.1 Interview question 1.....	12
4.1.1 Answers of Students with Visual Impairment.....	12
4.1.2 Answers of Students with Hearing Impairment.....	15
4.1.3 Answers of Students with Physical/Mobility Impairment .....	18
4.1.4 Answers of Students with Learning Difficulties.....	21
4.2 Interview question 2.....	24
4.2.1 Answers of Students with Visual Impairments .....	24
4.2.2 Answers of Students with Hearing Impairments .....	26
4.2.3 Answers of Students with Physical/Mobility Impairments.....	28
4.2.4 Answers of Students with Learning Difficulties.....	29
4.3 Interview question 3.....	30
4.3.1 Answers of Students with Visual Impairments .....	31
4.3.2 Answers of Students with Hearing Impairments .....	31
4.3.3 Answers of Students with Physical/Mobility Impairments.....	32
4.3.4 Answers of Students with Learning Difficulties.....	33
4.4 Interview question 4.....	34
4.4.1 Answers of Students with Visual Impairments .....	34
4.4.2 Answers of Students with Hearing Impairments .....	35
4.4.3 Answers of Students with Physical/Mobility Impairments.....	36
4.4.4 Answers of Students with Learning Difficulties.....	36
4.5 Interview question 5.....	37
4.5.1 Answers of Students with Visual Impairments .....	37
4.5.2 Answers of Students with Hearing Impairments .....	38
4.5.3 Answers of Students with Physical/Mobility Impairments.....	40

4.5.4 Answers of Students with Learning Difficulties.....	41
SECTION-B: Quantitative research - Questionnaires .....	43
1. Participants.....	43
2. Research Instruments.....	43
3. Results .....	43
APPENDIX I: instructions for Interview Moderators.....	75
APPENDIX II: INTERVIEW - Demographic questions.....	77
APPENDIX III: INTERVIEW QUESTIONS.....	84
APPENDIX IV: QUESTIONNAIRES (Authors: Papadopoulos, K., Koustriava, E., & Lisander, I.)	
87	
1. Questionnaire for Students with Visual Impairments.....	87
2. Questionnaire for Students with Hearing Impairments .....	96
3. Questionnaire for Students with Mobility Impairments .....	103
4. Questionnaire for Students with Learning Difficulties .....	109

## ABSTRACT

The HEDforALL project aims at improving the inclusion of Students with Disabilities (SwD) (visual, hearing, physical/mobility/ impairments and learning difficulties) in Higher Education Institutes (HEI) and support academic personnel to develop digital competences in order to cope with the SwD's needs on accessible resources and the shift to digital education and e-Learning. The ultimate aim of HEDforALL is the development of a set of educational material, development practices and distance education/e-Learning methodologies for the implementation of digital education in higher education.

In this framework HEDforALL needs to identify the needs and requirements of SwD for accessible materials regarding different subjects/courses taught in higher education and the needs revealed by distance education to SwD themselves.

## INTRODUCTION

This report presents the activities and results of the work package "Project Result 1 (RES1)" titled "Needs and requirements of Students with Disabilities" which aims to identify:

- a) the types/forms of adapted educational materials that end-users need in different courses (e.g. students with blindness need accessible videos, verbal descriptions of pictures or tactile and audio-tactile pictures, maps, charts and mathematical or chemical equations in accessible digital format etc.),
- b) the equipment (software and hardware) that they need to have at university and home,
- c) what types of different formats of accessible material SwD are aware of, which ones they have used or they are using, and
- d) the needs revealed by distance education (DE) for SwD.

Initially, interviews were conducted for each group of SwD (learning difficulties, visual impairments, hearing impairments, physical/mobility impairments) in order to identify a) the types/forms of adapted educational materials that SwD need for different courses taught in higher education b) the equipment (software and hardware) that they need to have at university and home, c) what types/formats of accessible material SwD are aware that exist, they have used or they are using, and b) the needs revealed by distance education to SwD themselves. The findings from the qualitative analysis (applying content analysis) of the interviews was used for the design of questionnaires (**see APPENDIX IV: Questionnaires**) that were answered by the students with disabilities in the next phase of the same study. For

the design of the questionnaires apart from the qualitative data of the interviews, the extensive previous experience of the authors in the production of accessible educational materials for SwD was used. The questionnaires that were applied to each group of SwD to obtain quantitative data consisted of closed-type questions. Actually, each questionnaire consists of a list of items concerning the used types/forms of adapted educational materials, the needs of SwD for equipment (devices and applications/software), the needs for different types/forms of adapted educational materials and the needs of SwD in order to be able to participate in DE. The answers of the participants will be recorded by using a five-point Likert Scale.

The present report consists of two sections. The first section (**Section-A**) concerns the first study (qualitative research - interviews) and the second section (**Section-B**) concerns the second study (quantitative research - questionnaires)

## SECTION-A: QUALITATIVE RESEARCH - INTERVIEWS

### 1. Methodology

The aim of *Task R1.2 Implementation of interviews with SwD* was the research base identification of qualitative data of

- What types/forms of accessible material participants are aware that exist.
- Which ones of these types/forms of accessible material they have used.
- What types/forms of adapted educational materials they need for different courses.
- What equipment (software and hardware) they need at university and home.
- What needs were revealed to them by distance education.

The results of this task of RES1 would then be used as input for the following tasks of the particular Project Result RES1.

Based on the above semi-structured interviews were conducted with Students with Disabilities (SwD). The interviews were conducted on groups of SwD based on the type of their disability (i.e. visual impairments, hearing impairments, physical/mobility impairments, learning difficulties). The interviews were conducted either online or in person.

The researchers were given specific instructions on how to conduct the interview procedure together with an introductory text to be read aloud to participants before the interview. The introductory text provided to the participants information on the purpose of the study and on the procedure to be followed. The researchers recorded (Audio recording) the whole interview. Apart from the questions of the actual interview, each participant was asked to answer some questions on demographics characteristics that needed to be answered at the beginning of the interview. The demographic questions differ according to the respective disability of the group of participants (APPENDIX II).

### 2. Research Instruments

The researchers developed instruments consisting of different questions based on the type of disability of each group of participants (i.e. visual impairments, hearing impairments, physical/mobility impairments, learning difficulties).

The instruments were developed as an accessible text document (.docx file) in order for the participants with visual impairments to be able to use screen reading software of their preference in order to read it. The text in the document was structured using plain text, 1st level Headings, numbered lists and bullet lists.

The first part of the instruments included the instructions in a separate text document (.docx file) (APPENDIX I). The instructions document had the following sections.

- **Purpose of the study** explaining what the purpose of the study is.
- **Instructions to moderators of Tests** on how the researchers should conduct the interview.
- **Introductory text** that the interviewers should read before the interview begins.

The second part of the instruments included the demographic data questions to be filled in for each participant SwD (APPENDIX II).

The third part of the instruments included the interview questions to be answered by the participants (APPENDIX III).

### 3. Participants

The number of participating, students with disabilities from each different group of disability, that each partner interviewed is depicted in the following table.

Table 1

*Number of Students with Disabilities participated in the interviews*

Partner	Visual impairments	Hearing impairments	Physical/mobility Impairments	Learning Difficulties
UOM - Greece	5	4	4	1
CNR - Italy	2	2	2	6
UOC - Germany	2	3	3	2
UA - Spain	1	2	2	1
<b>Total</b>	<b>10</b>	<b>11</b>	<b>11</b>	<b>10</b>

#### VISUAL IMPAIRMENT

Ten adults with visual impairments (from low vision to total blindness) took part in the research. The sample comprised 5 men and 5 women. The age ranged from 18 years to 46

years. The visual impairment was congenital for 8 participants and acquired for the rest 2 participants. For the 2 participants the age at onset of vision impairment was 8 and 10 years respectively. The type of the disabilities and the cause that were mentioned:

- Stargardt disease (juvenile macular dystrophy)
- Peter's anomaly (congenital)
- Detached retina (congenital)
- Bilateral microphthalmia and iris and retinal stumps (congenital)
- Total Blindness (congenital)
- Oculocutaneous albinism resulting in optic nerve impairment (congenital)
- Septo-optic dysplasia (congenital)
- Behcet's disease
- Partial blindness (congenital)
- Iris coloboma (congenital)

### **HEARING IMPAIRMENT**

Eleven adults with hearing impairments took part in the research. The sample comprised 7 men and 4 women. The age ranged from 18 years to 38 years. The hearing impairment was congenital for 3 participants and acquired for the rest 8 participants. The age at onset of hearing loss of the participants was 1 year, 2 years, 3 years for two participants, 4 years, 10 years, 12 years and 16 years. The type of the disabilities and the cause that were mentioned:

- Total ruptures of auditory neurons
- Sensory nerve bilateral hearing loss
- Genetic Hearing Loss (congenital)
- Hearing loss/ Unknown degenerative
- Hearing loss close to deafness, progressive hearing loss
- Bilateral profound hearing loss , Genetic
- Profound hearing loss
- Degenerative mixed hearing loss
- Genetic mixed hearing loss
- mild related phonologopathy
- Profound bilateral hearing loss

### **MOBILITY IMPAIRMENT**

Eleven adults with Mobility impairments participated in the research, of whom 5 were men and six were women. The age ranged from 19 years to 47 years. The age at onset of Mobility impairment was congenital for three participants, at the early life for three participants at 2, 4 and 6 years old respectively. For 4 participants were their teens, 12, 15, 16 and 18 years old and for one participant was 42 years old.

The type of the disabilities and the cause that were mentioned:

- Neuromuscular myopathy
- Sensorimotor type polyneuropathy of upper and lower extremities. Paraplegia
- Paraplegia
- Passive paraplegia, perigenetic encephalopathy and cystic disorders
- Gait disorder with residual ability to stand
- Friedreich's ataxia
- Paraplegia due to a car accident
- Infantile cerebral palsy
- Surgical intervention due to a tumor in the L3 vertebra
- SMA 3 neuromuscular motor disability muscular atrophy type 3
- Neuromuscular

### **LEARNING DIFFICULTIES**

Ten adults with learning difficulties took part in the research. The sample consisted of 3 men and 7 women aged from 21 to 49 years. Nine out of 10 mentioned that they had Dyslexia. Three participants have ADHD. Five identified as having Dyscalculia and 6 as having Dysorthography. The age of diagnosis ranged from 7 to 29 years.

## **4. Results**

After the implementation of the interviews the answers were gathered and assorted into tables, with frequency of occurrence of each answer enumerated, for each interview question and impairment. The students' responses led to an identification of their knowledge and needs in different types of accessible educational material and assistive technology. Moreover, many

needs regarding distance education were discovered from the answers of the fifth interview questions.

#### 4.1 Interview question 1

The following tables depict the frequency of occurrence of answers of students with visual impairments (VI), hearing impairments (HI), physical/mobility impairments (MI) or learning difficulties (LD) in the first interview question (objectives 1 & 2 of the study).(i.e., reference to the types/forms of accessible material and assistive technology they are aware that exists)

##### 4.1.1 Answers of Students with Visual Impairment

Table 2

*Frequency of occurrence of answers of students with Visual Impairments in the first interview question*

Educational material		
	Accessible printed material	Frequency
1	Large prints (included enlarged books) /Enlarged text	6
2	Braille prints (including Braille books)	7
3	Piaf prints (i.e., using microcapsule paper)	3
4	Large-format notebooks with gridded paper	1
5	Text in readable / desirable font (e.g., Arial)	1
6	Plastic paper prints/thermoform	1
7	Tactile books	1
8	Tactile maps	1
9	Tactile graphics /pictures	3
10	Special transparent paper	1
11	Adapted manuals, practices, and notes	1

	<b>Accessible Digital material</b>	<b>Frequency</b>
1	Accessible word	4
2	Accessible pdf	5
3	Accessible PowerPoint	2
4	Daisy	3
5	Accessible epub	2
6	Digital books /ebooks / digital literature	5
7	Audio recorded lecture note / Dictated audio lessons	1
8	Audio books	5
9	Digital texts and digital manuals	1
10	Pictures with description	1
11	Audio material / audio recordings	1
12	Digital material	3
13	Digital lecture notes / course documents	2
14	Digital slides	1
	<b>Tactile material</b>	<b>Frequency</b>
1	Plastic shapes	1
2	3D printed material	1
3	Tactile globes	2
4	Tactile dolls	1
5	Tactile Improvised material (i.e., constructs with different materials)	1
	<b>Audio tactile material</b>	<b>Frequency</b>
1	Audio tactile material	1

<b>Assistive Technology</b>		
	<b>Assistive technology devices</b>	<b>Frequency</b>
1	Magnifier / Magnifying glass / reading stone	3
2	Monocular	1
3	Victor reader (i.e., Handheld media player)	1
4	Braille typewriter	1
5	Touch tablet	1
6	Video enlargers / zoomer	1
7	Magnilink Magnifier (i.e., Closed Circuits TV devices)	1
8	Physical surface that works as a magnifier (connected to the computer)	1
9	Portable video magnifier	1
10	Video enlargers/Zoomer	1
11	Refreshable Braille display	1
12	Braille printer	1
13	OCR scanner (i.e., optical character recognition)	1
	<b>Assistive technology software apps</b>	<b>Frequency</b>
1	Screen reader	3
2	Voice over (i.e., ios screen reader)	1
3	Text to speech software	1
4	Teleo (i.e., Braille to speech software)	1
5	Braille speak (i.e., notetaker)	1
6	Microsoft windows magnifier	2
7	NVDA (i.e., screen reader)	3

8	Talkback (i.e., android screen reader)	1
9	Voiceover (i.e., ios screen reader)	1
10	Voice dream software (i.e., conversion of files into audiobooks)	1
11	Finereader OCR (i.e., optical character recognition)	1
12	Text to braille software	1
13	Biblos - (i.e., Braille Translation Software)	1
14	Odt2braille (i.e.,OpenOffice plugin for braille translation)	1
15	Speech synthesizers	1
16	Software that modify screen brightness (opaque, reflection)	1
17	Color inversion and magnification software	1
	<b>Mainstream technology</b>	<b>Frequency</b>
1	Microsoft windows software	1
2	Laptop / Personal computer	5
3	Scanner	1
4	Smartphone / cell phone	1
5	Tablet	1
6	Additional light sources (e.g., Table lamp for strong additional light)	1

#### 4.1.2 Answers of Students with Hearing Impairment

Table 3

*Frequency of occurrence of answers of students with Hearing Impairments in the first interview question*

	<b>Educational material</b>	
	<b>Accessible Digital material</b>	<b>Frequency</b>

1	Accessible word	4
2	Accessible pdf	4
3	Accessible PowerPoint	4
4	Audio recorded lecture note / Dictated audio lessons	1
5	Audio material / audio recordings	2
6	Videos with sign language	2
7	Videos with transcriptions	2
8	Sign language lectures	1
9	Youtube videos with automatic transcription	1
10	Youtube with captions	1
11	Videos with subtitles	4
12	Videos with captions	2
13	Multimedia content	1
14	Accessible google docs	1
15	Video lessons with slow rhythm	1
16	Transcriptions of lectures	1
17	Audio files with transcripts	1
18	Moodle lectures	1
19	Material with images, graphics and visual elements	1
	<b>Accessible printed material</b>	<b>Frequency</b>
1	Written texts on paper/hand writer notes	2
	<b>Assistive Technology</b>	

	<b>Assistive technology devices</b>	<b>Frequency</b>
1	Fm systems (i.e., wireless assistive hearing devices that enhance the use of hearing aids)	4
2	Cochlear Implant	2
3	Hearing aid	1
4	Light signaling devices with light and vibration signals	1
	<b>Assistive Technology apps</b>	<b>Frequency</b>
1	Text to speech software	1
2	Text transcription systems	4
3	Voice dictation/ recognition systems	1
4	Automatic subtitles functions	1
5	Sign language interpreters/translators	3
6	Text translators/written language interpreters	3
7	Connectclip (i.e., hardware that enables hands-free phone calls and music streaming from smartphone)	1
8	Tess services (i.e., Telecommunication relay services (a communication assistant serves as a bridge between two callers))	1
9	Communication assistants (i.e., personal support)	1
10	ListenAll app (i.e., voice recognition software)	2
11	TAL application (i.e., text transcript software)	1
12	lyricsFind (i.e., software for lyrics location and display)	1
	<b>Mainstream Technology</b>	<b>Frequency</b>
1	Laptop / Personal computer	10
2	Smartphone / cell phone	5

3	Tablet	2
4	Sound recorders / note taking audio recorders	2
5	Microphone	3
6	Soundproof rooms	1
7	Microsoft Teams	1
8	Online lessons with virtual board	1
9	Headphones	4
10	OBS (i.e., Video recording software/app)	1
11	Monitor	1
12	Pad and pen / Paper and pen	3
13	Media players for videos with subtitles	1
14	VLC media player for videos with subtitles	1
15	Facetime	1
16	Zoom software	1

#### 4.1.3 Answers of Students with Physical/Mobility Impairment

Table 4

*Frequency of occurrence of answers of students with Physical/Mobility impairments in the first interview question*

	Educational material	
	Accessible Digital material	Frequency
1	Accessible word	5
2	Accessible pdf	4
3	Accessible PowerPoint	4

4	Accessible excel	2
5	Digital books /ebooks / digital literature	4
6	Audio recorded lecture note / Dictated audio lessons	1
7	Audio books	1
8	Digital texts and digital manuals	3
9	Digital material	1
10	Digital lecture notes / course documents	3
11	Video lessons	1
12	Accessible documents with elements with enough spaces	1
<b>Accessible Printed material</b>		
1	Written texts on paper/hand writer notes	1
2	Printed slides	1
3	Printed books	1
<b>Assistive Technology</b>		
<b>Assistive technology devices</b>		<b>Frequency</b>
1	Adapted Keyboard	2
2	Adapted Mouse	1
3	Head stylus	1
<b>Assistive Technology apps</b>		<b>Frequency</b>
1	Text to speech software	2
2	Speech synthesizers	1
3	Voice dictation/ recognition systems	1
4	Voice control applications	1

5	Alexa (i.e., microsoft windows assistant)	1
6	Dragon naturally speaking (i.e., speech to text software)	1
	<b>Mainstream technology</b>	<b>Frequency</b>
1	Laptop / Personal computer	8
2	Tablet	3
3	Sound recorders / note taking audio recorders	3
4	Microphone	1
5	Ramps	1
6	Stair lifts	1
7	Stools (e.g., shower)	1
8	Bathtub lift	1
9	Modified counter top (e.g., lowered and clear underneath)	1
10	Furnitures at certain height	1
11	Automatic door opening	1
12	Lifts	1
13	Equipped bathrooms	1
14	Wheelchair	4
15	Electric mobility vehicle	1
16	Writing extensions	1
17	Video recorders	1
18	Scanner pen (e.g., irispen)	2
19	Online lessons (synchronous and asynchronous)	2
20	Cortana on windows (i.e., virtual assistant)	1

21	Email Apps	2
----	------------	---

#### 4.1.4 Answers of Students with Learning Difficulties

Table 5

*Frequency of occurrence of answers of students with Learning Difficulties in the first interview question.*

Learning Difficulties		
Educational material		
	Accessible Printed material	Frequency
1	Large prints (included enlarged books) /Enlarged text	4
2	Text in readable / desirable font (e.g., Arial)	2
3	Self-prepared formulas and sheets	1
4	Self-prepared schemes (diagrams-maps)	1
5	Printed books	1
6	Printed material	2
7	Simplified/Plain language text	4
8	Index cards	1
9	Paper conceptual and mental maps	1
10	Underlined / highlighted slides or hangouts	1
Accessible Digital material		
		Frequency
1	Accessible word	2
2	Accessible pdf	2
3	Accessible PowerPoint	2

4	Digital books /ebooks / digital literature	2
5	Audio books	1
6	Digital texts and digital manuals	1
7	Digital lecture notes / course documents	1
8	Youtube videos	1
9	Videos with subtitles	1
10	Videos with captions	2
11	Accessible google docs	1
12	Material with images, graphics and visual elements	4
13	Accessible documents with elements with enough spaces	1
14	Pictograms (i.e., graphic symbol that conveys its meaning through its pictorial resemblance to a physical object)	1
15	Poems and rules	1
16	Digital concept map/mind map	1
17	Documentaries	1
18	Accessible Mathematical formulas	1
19	Symbol languages	2
20	Divided text with shorter intervals	1
21	Highlighted texts	1
22	Podcast	1
23	Online lectures	1
	<b>Tactile educational material</b>	<b>Frequency</b>
1	Physically adapted books (added tactile pieces)	1

<b>Assistive Technology</b>		
	<b>Assistive technology apps</b>	<b>Frequency</b>
1	Speech synthesizers	2
2	Text transcription systems	1
3	Dragon naturally speaking (i.e., speech to text software)	2
4	Read aloud software	3
5	Digital text enlarger	1
6	Compensatory tools	1
7	Cmap (i.e., concept map creation software)	1
8	Klips (i.e., university's campus managements program)	1
9	Duden online spellchecker (i.e., German dictionary software)	1
10	Mind map creation software	1
11	ePico (i.e., automatic content summary software)	1
12	ANASTASI superMappe (i.e., software for creating conceptual maps)	1
<b>Mainstream technology</b>		<b>Frequency</b>
1	Laptop / Personal computer	9
2	Tablet	3
3	Sound recorders / note taking audio recorders	1
4	Microsoft Teams	1
5	Pad and pen / Paper and pen	1
6	Email Apps	1
7	Analogue Clocks with Number (not lines or symbols)	1
8	Calculator	2

9	Digital reading software	1
10	Text editors	2
11	Apps for repeated reminders	1
12	Calendar with notifications	1
13	Spelling software	4
14	Folder for each lecture	1
15	Highlighting programs	1

## 4.2 Interview question 2

Frequency of occurrence of answers of students with visual impairments (VI), hearing impairments (HI), mobility impairments (MI) or learning difficulties (LD) in the second interview question (objective 3 of the study). (i.e., The types/forms of accessible material and assistive technology they have used in the past or they are currently using.)

### 4.2.1 Answers of Students with Visual Impairments

Table 6

*Frequency of occurrence of answers of students with Visual Impairments in the second interview question*

	Educational material	
	Accessible printed material	Frequency
1	Large prints (included enlarged books) /Enlarged text	5
2	Braille prints (including Braille books)	2
3	Piaf prints (i.e., using microcapsule paper)	2
4	Large-format notebooks with gridded paper	1
5	Plastic paper prints (e.g., thermoform prints)	1

6	Tactile maps	1
7	Tactile graphics /pictures	1
8	Special transparent paper	1
<b>Accessible Digital material</b>		<b>Frequency</b>
1	Accessible word	4
2	Accessible pdf	5
3	Daisy	3
4	Accessible epub	2
5	Digital books /ebooks / digital literature	2
6	Audio recorded lecture note / Dictated audio lessons	1
7	Audio books	3
8	Digital texts and digital manuals	1
9	Audio material / audio recordings	1
<b>Tactile material</b>		<b>Frequency</b>
1	3D printed material	1
2	Tactile globe (i.e., manipulatives)	1
3	Tactile Improvised material (i.e., constructs with different materials)	2
<b>Audio tactile material</b>		<b>Frequency</b>
1	Audio tactile material	1
<b>Assistive Technology</b>		
<b>Assistive technology devices</b>		<b>Frequency</b>
1	Magnifier / Magnifying glass / reading stone	3
2	Monocular	1

3	Victor reader (i.e., Handheld media player)	1
4	Touch tablet	1
5	Video enlargers / zoomer	1
<b>Assistive technology software apps</b>		<b>Frequency</b>
1	Screen reader	1
4	Teleo (i.e., Braille to speech software)	1
5	Braille speak (i.e., notetaker)	1

#### 4.2.2 Answers of Students with Hearing Impairments

Table 7

*Frequency of occurrence of answers of students with hearing impairments in the second interview question*

<b>Educational material</b>		
<b>Accessible Digital material</b>		<b>Frequency</b>
1	Accessible word	4
2	Accessible pdf	3
3	Accessible PowerPoint	4
4	Audio recorded lecture note / Dictated audio lessons	1
5	Audio material / audio recordings	2
6	Videos with transcriptions	2
7	Youtube videos with automatic transcription	1
8	Videos with subtitles	2
9	Videos with captions	2
10	Video lessons with slow rhythm	1

	<b>Accessible printed material</b>	<b>Frequency</b>
1	Written texts on paper/hand writer notes	1
	<b>Assistive Technology</b>	
	<b>Assistive technology devices</b>	<b>Frequency</b>
1	Fm systems (i.e., wireless assistive hearing devices that enhance the use of hearing aids)	3
2	Hearing aid	1
3	Light signaling devices with light and vibration signals	1
	<b>Assistive Technology apps</b>	<b>Frequency</b>
1	Text transcription systems	1
2	Voice dictation/ recognition systems	1
3	Sign language interpreters/translators	2
4	Text translators/written language interpreters	2
5	Tess services (i.e., Telecommunication relay services (a communication assistant serves as a bridge between two callers))	1
6	ListenAll app (i.e., voice recognition software)	2
	<b>Mainstream Technology</b>	<b>Frequency</b>
1	Smartphone / cell phone	1
2	Tablet	1
3	Sound recorders / note taking audio recorders	2
4	Microphone	2
5	Online lessons with virtual board	1
6	Headphones	1

7	OBS (i.e., Video recording software/app)	1
---	--	---

#### 4.2.3 Answers of Students with Physical/Mobility Impairments

Table 8

*Frequency of occurrence of answers of students with Physical/Mobility impairments in the second interview question.*

	<b>Educational material</b>	
	<b>Accessible Digital material</b>	<b>Frequency</b>
1	Accessible word	5
2	Accessible pdf	4
3	Accessible PowerPoint	4
4	Digital books /ebooks / digital literature	1
5	Audio books	1
6	Digital texts and digital manuals	3
7	Digital material	1
8	Digital lecture notes / course documents	1
9	Video lessons with slow rhythm	1
10	Digital Slides	1
	<b>Assistive Technology</b>	
	<b>Assistive technology devices</b>	<b>Frequency</b>
1	Adapted Keyboard	2
2	Adapted Mouse	1
	<b>Assistive Technology apps</b>	<b>Frequency</b>

1	Voice dictation/ recognition systems	1
2	Voice control applications	1
3	Online synchronous lessons	1
<b>Mainstream technology</b>		<b>Frequency</b>
1	Tablet	2
2	Sound recorders / note taking audio recorders	1
3	Automatic door opening	1
4	Lifts	1
5	Writing extensions	1
6	Video recorders	1

#### 4.2.4 Answers of Students with Learning Difficulties

Table 9

*Frequency of occurrence of answers of students with Learning Difficulties in the second interview question*

<b>Educational material</b>		
<b>Accessible Printed material</b>		<b>Frequency</b>
1	Self-prepared formulas and sheets	1
2	Self-prepared schemes (diagrams-maps)	1
3	Index cards	1
<b>Accessible Digital material</b>		<b>Frequency</b>
1	Accessible word	1
2	Audio books	1
3	Digital texts and digital manuals	1

4	Youtube videos	1
5	Accessible google docs	1
6	Material with images, graphics and visual elements	1
7	Digital concept map/mind map	1
8	Documentaries	1
9	Divided text with shorter intervals	1
<b>Assistive Technology</b>		
<b>Assistive technology apps</b>		<b>Frequency</b>
1	Speech synthesizers	2
2	Digital text enlarger	1
3	Cmap (i.e., concept map creation software)	1
<b>Mainstream technology</b>		<b>Frequency</b>
1	Laptop / Personal computer	1
2	Analogue Clocks with Number (not lines or symbols)	1
3	Calculator	2
4	Digital reading software	1
5	Text editors	1

### 4.3 Interview question 3

Frequency of occurrence of answers of students with visual impairments (VI), hearing impairments (HI), mobility impairments (MI) or learning difficulties (LD) in the third interview question (objective 4 of the study) (i.e., the adapted educational material they need for different courses taught in higher education)

### 4.3.1 Answers of Students with Visual Impairments

Table 10

*Frequency of occurrence of answers of students with Visual Impairments in the third interview question*

Educational material		
Accessible printed material		Frequency
1	Large prints (included enlarged books) /Enlarged text	3
2	Braille prints (including Braille books)	1
3	Adapted manuals, practices, and notes	1
Accessible Digital material		Frequency
1	Accessible word	4
2	Accessible pdf	5
3	Accessible PowerPoint	2
4	Daisy	1
5	Accessible epub	1
6	Digital books /ebooks / digital literature	2
7	Digital material	3
8	Digital lecture notes / course documents	2

### 4.3.2 Answers of Students with Hearing Impairments

Table 11

*Frequency of occurrence of answers of students with Hearing Impairments in the third interview question*

Educational material		
Accessible Digital material		Frequency

1	Accessible word	4
2	Accessible pdf	4
3	Accessible PowerPoint	3
4	Videos with sign language	1
5	Sign language lectures	1
6	Youtube with captions	1
7	Videos with subtitles	4
8	Videos with captions	2
9	Accessible google docs	1
10	Transcriptions of lectures	1
11	Audio files with transcripts	1
12	Moodle lectures	1
13	Material with images, graphics and visual elements	1

#### 4.3.3 Answers of Students with Physical/Mobility Impairments

Table 12

*Frequency of occurrence of answers of students with Physical/Mobility impairments in the third interview question*

	Educational material	
	Accessible Digital material	Frequency
1	Accessible word	3
2	Accessible pdf	2
3	Accessible PowerPoint	2
4	Accessible excel	2

5	Digital books /ebooks / digital literature	3
6	Digital lecture notes / course documents	3
7	Accessible documents with elements with enough spaces	1
<b>Accessible Printed material</b>		<b>Frequency</b>
1	Written texts on paper/hand writer notes	1
2	Printed books	1

#### 4.3.4 Answers of Students with Learning Difficulties

Table 13

*Frequency of occurrence of answers of students with Learning Difficulties in the third interview question*

<b>Educational material</b>		
<b>Accessible Printed material</b>		<b>Frequency</b>
1	Self-prepared formulas and sheets	1
2	Printed books	1
3	Printed material	2
4	Index cards	1
5	Underlined/ highlighted slides or handouts	1
<b>Accessible Digital material</b>		<b>Frequency</b>
1	Accessible word	2
2	Accessible pdf	2
3	Accessible PowerPoint	2
4	Digital books /ebooks / digital literature	2
5	Audio books	1

6	Digital texts and digital manuals	1
7	Digital concept map/mind map	1
8	Highlighted texts	2
9	Podcast	1
10	Online lectures	1

#### 4.4 Interview question 4

Frequency of occurrence of answers of students with visual impairments (VI), hearing impairments (HI), mobility impairments (MI) or learning difficulties (LD) in the fourth interview question (objective 5 of the study)(i.e., the equipment, software and hardware, the need at university and home).

##### 4.4.1 Answers of Students with Visual Impairments

Table 14

*Frequency of occurrence of answers of students with Visual Impairments in the fourth interview question*

Assistive Technology		
Assistive technology devices		Frequency
1	Magnifier / Magnifying glass / reading stone	1
2	Braille typewriter	1
3	Magnilink Magnifier (i.e., Closed Circuits TV devices)	1
4	Physical surface that works as a magnifier (connected to the computer)	1
5	Portable video magnifier	1
6	Refreshable Braille display	1
7	Braille printer	1
8	OCR scanner (i.e., optical character recognition)	1
Assistive technology software apps		Frequency

1	Microsoft windows magnifier	2
2	NVDA (i.e., screen reader)	3
3	Talkback (i.e., android screen reader)	1
4	Voiceover (i.e., ios screen reader)	1
5	Voice dream software (i.e., conversion of files into audiobooks)	1
6	Finereader OCR (i.e., optical character recognition)	1
7	Text to braille software	1
8	Biblos - (i.e., Braille Translation Software)	1
9	Odt2braille (i.e.,OpenOffice plugin for braille translation)	1
10	Speech synthesizers	1
11	Software that modify screen brightness (opaque, reflection)	1

#### 4.4.2 Answers of Students with Hearing Impairments

Table 15

*Frequency of occurrence of answers of students with Hearing Impairments in the fourth interview question*

Assistive Technology		
Assistive technology devices		Frequency
1	Fm systems (i.e., wireless assistive hearing devices that enhance the use of hearing aids)	1
2	Cochlear Implant	2
Assistive Technology apps		Frequency
1	Text to speech software	1
2	Sign language interpreters/translators	2

3	Text translators/written language interpreters	2
4	ListenAll app (i.e., voice recognition software)	2
5	lyricsFind (i.e., software for lyrics location and display)	1
6	OBS (i.e., Video recording software/app)	1

#### 4.4.3 Answers of Students with Physical/Mobility Impairments

Table 16

*Frequency of occurrence of answers of students with Physical/Mobility impairments in the fourth interview question.*

Assistive Technology		
Assistive technology devices		Frequency
1	Adapted Keyboard	1
2	Adapted Mouse	1
Assistive Technology apps		Frequency
1	Voice dictation/ recognition systems	1
2	Dragon naturally speaking (i.e., speech to text software)	1
3	Online lessons (synchronous and asynchronous)	2

#### 4.4.4 Answers of Students with Learning Difficulties

Table 17

*Frequency of occurrence of answers of students with Learning Difficulties in the fourth interview question*

Assistive Technology		
Assistive technology apps		Frequency
1	Speech synthesizers	1

2	Highlighting programs	1
3	Text transcription systems	1
4	Dragon naturally speaking (i.e., speech to text software)	2
5	Read aloud software	3
6	Cmap (i.e., concept map creation software)	1
7	Klips (i.e., university's campus managements program)	1
8	Duden online spellchecker (i.e., German dictionary software)	1
9	Mind map creation software	1
10	ePico (i.e., automatic content summary software)	1
11	ANASTASI superMappe (i.e., software for creating conceptual maps)	1
12	Digital reading software	1
13	Spelling software	4

#### 4.5 Interview question 5

Frequency of occurrence of answers of students with visual impairments (VI), hearing impairments (HI), mobility impairments (MI) or learning difficulties (LD) in the fifth interview question (objective 4 of the study)(i.e., the needs revealed to them by distance education).

##### 4.5.1 Answers of Students with Visual Impairments

Table 18

*Frequency of occurrence of answers of students with Visual Impairments in the fifth interview question*

Needs	Frequency
Have channels for facilitation of communication with the professors beyond the class time	3
Have accessible educational material (e.g., pdf, presentations, videos)	3
Have the flexibility to decide the pace of the educational program's progress on my own	2

Have technical/accessibility support available	2
Have channels for facilitation of communication with the professors in real time (e.g., accessible text box)	2
Have breaks and flexibility for the realization of courses and exams to avoid fatigue	2
Have an accessible platform (compatible with the screen reader - e.g., NVDA - I use)	2
Have accessible educational material (e.g., pdf, presentations, videos) early-before the course at hand	2
Take feedback from and be in contact with the professors systematically	1
Participate from wherever I decide	1
Have various platforms available for communication and educational purposes (e.g., Moodle, Skype)	1
Have the lecture recorded	1
Have the ability to participate orally in the class	1
Have plenty of time when I have to fill in documents and all kind of forms	1
Have plenty of time during the examinations and other activities	1
Have administrative support available	1
Have accessible documents and all kind of forms that should be filled in	1
Have access to accessible tools/information (e.g., accessible sites, databases)	1
Have a smooth/organized use of the necessary tools during the course to be able to follow	1
Follow a hybrid model (from distance and physically) to have the ability to meet students and teachers in person	1
Can choose the form of examination (e.g., oral examination, paper composition, written exams)	1
Be able to understand when my camera or the others' camera in on/off	1
Be able to participate in the lecture (for instance, "raise the hand" through the relative digital feature of a DE platform)	1
Avoid using symbols or special fonts for the need to emphasize something, since this is not recognizable by screen reading programs	1
See the presentation online through magnification	1

#### 4.5.2 Answers of Students with Hearing Impairments

Table 19

*Frequency of occurrence of answers of students with Hearing Impairment in the fifth interview question.*

Needs	Frequency
Recorded lectures with captions	3
Have an accessible platform (compatible with speech-to-text software and good sound transmitter & receiver)	3
Have accessible educational material (e.g. videos with captions and content in sign language)	3
Autocaption feature in the language I speak integrated in the platform for lectures	3
Online/distant communication with a SL interpreter	2
Educational platform that allows the interpreter and the professor's presentation appear simultaneously	2
Can choose the form of examination (e.g. oral examination, paper composition, written exams)	2
Have the professor speak clearly so automatic captions work	1
The professor should speak close to the camera so I can lip-read easily	1
Telecommunication relay services (a communication assistant serves as a bridge between two callers) (e.g. Tess)	1
Take feedback from and be in contact with the professors systematically	1
Participate from wherever I decide	1
Have the flexibility to decide the pace of the educational program's progress on my own	1
Have technical/accessibility support available	1
Have plenty of time during the examinations and other activities	1
Have educational material (e.g. pdf, presentations, videos) early-before the course at hand so I can pay attention to the lecturers	1
Have detailed scripts of the lecture to complete the missing information delivered orally	1
Have channels for facilitation of communication with the students in real time (e.g. text box)	1
Have channels for facilitation of communication with the students beyond the class time	1
Have breaks and flexibility for the realization of courses and exams to avoid fatigue	1
Have administrative support available	1
Have access to accessible tools/information (e.g. accessible sites with captioned	1

video)	
Have a smooth/organized use of the necessary tools during the course to be able to follow	1
Change of person who speaks needs to be announced	1

#### 4.5.3 Answers of Students with Physical/Mobility Impairments

Table 20

*Frequency of occurrence of answers of students with Physical/Mobility impairments in the fifth interview question*

Needs	Frequency
Have accessible educational material (e.g. pdf, presentations, videos)	3
Have channels for facilitation of communication with the students in real time (e.g. accessible text box)	2
Have channels for facilitation of communication with the professors in real time (e.g. accessible text box)	2
Have channels for facilitation of communication with the professors beyond the class time	2
Follow a hybrid model (from distance and physically) to have the ability to meet students and teachers in person	2
Take feedback from and be in contact with the professors systematically	1
Participate from wherever I decide	1
Have the lecture recorded	1
Have the flexibility to decide the pace of the educational program's progress on my own	1
Have the ability to participate orally in the class	1
Have technical/accessibility support available	1
Have plenty of time during the examinations and other activities	1
Have channels for facilitation of communication with the students beyond the class time	1
Have breaks and flexibility for the realization of courses and exams to avoid fatigue	1
Have an accessible platform for the lectures	1
Have all the information I need online (for instance, announcements, program)	1
Have administrative support available	1

Have accessible educational material (e.g. pdf, presentations, videos) early-before the course at hand	1
Have access to accessible tools/information (e.g. accessible sites, databases)	1
Have a smooth/organized use of the necessary tools during the course to be able to follow	1
Be able to participate in the lecture (for instance, "raise the hand" through the relative digital feature of a DE platform)	1

#### 4.5.4 Answers of Students with Learning Difficulties

Table 21

*Frequency of occurrence of answers of students with Learning Difficulties in the fifth interview question*

Needs	Frequency
Have the lecture recorded	5
Take feedback from and be in contact with the professors systematically	1
Participate from wherever I decide	1
Have the flexibility to decide the pace of the educational program's progress on my own	1
Have the ability to participate orally in the class	1
Have technical/accessibility support available	1
Have projects to hand in (as a motivating factor)	1
Have plenty of time during the examinations and other activities	1
Have channels for facilitation of communication with the students in real time (e.g. oral communication)	1
Have channels for facilitation of communication with the students beyond the class time	1
Have breaks and flexibility for the realization of courses and exams to avoid fatigue	1
Have an accessible platform (compatible with text-to-speech apps or a screen reader)	1
Have administrative support available	1
Have accessible educational material (e.g. pdf, presentations, notes) early-before the course at hand	1
Have accessible educational material (e.g. pdf, presentations, notes)	1
Have a smooth/organized use of the necessary tools during the course to be able	1

to follow	
Follow a hybrid model (from distance and physically) to have the ability to meet students and teachers in person	1
Develop familiarity with digital tools beforehand	1
Can choose the form of examination (e.g. oral examination, paper composition, written exams)	1
Have an outline of the topics to be covered before the course and a summary of the main subjects after the course	1

## SECTION-B: QUANTITATIVE RESEARCH - QUESTIONNAIRES

### 1. Participants

The questionnaires were answered by **19 students with visual impairments** (3 from Italy, 1 from Germany, 4 from Spain, and 11 from Greece), **31 students with hearing impairments** (2 from Italy, 16 from Germany, 10 from Spain: 10 and 3 from Greece), **35 students with mobility impairments** (9 from Italy, 8 from Germany, 6 from Spain, and 12 from Greece), and **86 students with learning difficulties** (44 from Italy, 15 from Germany, 7 from Spain, and 20 from Greece).

### 2. Research Instruments

The findings from the qualitative analysis (applying content analysis) of the interviews was used for the design of questionnaires (see **APPENDIX IV: Questionnaires**) that were answered by the students with disabilities. The questionnaires were translated into five languages, English, Greek, Italian, Spanish and German. The questionnaires were also developed as accessible text documents (.docx file) but also google forms, a free survey administration software, was used in order to collect the students' answers.

### 3. Results

In this chapter, the results of the descriptive statistical analysis of the participants' responses to the questionnaire items are presented in tables. The analysis was applied for each group of students with disabilities separately.

#### Students with Visual Impairments

Table 22

*Minimum, maximum, mean, standard deviation (SD), number of "not appropriate for me" answers and number of "I don't know" answers of students with visual impairments.*

<b>Accessible Printed Material:</b> How often do you use it (or you have used it)	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>
Large prints (included enlarged books)	2.462	1.664	0	4	5
Tactile maps	1.500	1.698	0	4	
3D printed material (by 3D printer)	1.462	1.941	0	4	

Tactile graphics	1.273	1.555	0	4	2
Braille prints (included braille books)	1.083	1.505	0	4	3
Pictures with Braille description	1.000	1.549	0	4	3
Tactile books (Text and graphics)	0.923	1.320	0	4	1
Verbal descriptions in braille	0.778	1.302	0	4	3
Microcapsule paper prints (e.g., Piaf prints)	0.750	1.488	0	4	
Plastic paper prints/ thermoform	0.333	1.000	0	3	1
Raised-line paper for writing or graphing	0.250	0.463	0	1	2

<b>Accessible Printed Material:</b> How useful is their use	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Large prints (included enlarged books)	2.667	1.723	0	4	4	2
Tactile graphics	2.444	1.424	0	4	3	6
3D printed material (by 3D printer)	2.231	1.878	0	4		4
Tactile maps	2.167	1.586	0	4	1	4
Braille prints (included braille books)	2.100	1.729	0	4	4	4
Pictures with Braille description	2.000	1.633	0	4	4	3
Tactile books (Text and graphics)	1.900	1.524	0	4	3	5
Verbal descriptions in braille	1.889	1.691	0	4	3	5
Microcapsule paper prints (e.g., Piaf prints)	1.714	1.704	0	4	2	9
Plastic paper prints/ thermoform	1.625	1.768	0	4	1	8
Raised-line paper for writing or graphing	1.625	1.685	0	4	2	7

<b>Accessible Digital Material:</b> How often do you use it (or you have used it)	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>D N</b>
Accessible presentations (Powerpoint)	3.438	1.153	0	4	1	5
Accessible word	3.222	1.263	0	4		2
Accessible pdf	3.000	1.369	0	4	1	6
Digital books with legible texts (e.g., arial fonts, tahoma, san serif, helvetica)	2.900	1.287	0	4	4	8
ebooks	2.400	1.352	0	4	1	4
Accessible videos	2.375	1.544	0	4	1	7
Audio recorded material (e.g., lecture notes, books)	2.278	1.526	0	4		3
Pictures with verbal-audio description	1.875	1.821	0	4		5

Verbal description in audio file	1.467	1.685	0	4		9
Accessible epub	1.364	1.567	0	4	1	4
Accessible daisy	1.154	1.573	0	4	1	4

<b>Accessible Digital Material:</b> How useful is their use	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Accessible word	3.857	0.363	3	4	1	
Accessible presentations (Powerpoint)	3.786	0.579	2	4		1
Accessible pdf	3.615	0.870	1	4	2	
Digital books with legible texts (e.g., arial fonts, tahoma, san serif, helvetica)	3.417	1.240	0	4	3	
ebooks	3.143	0.864	2	4		1
Accessible videos	3.067	1.100	1	4		
Audio recorded material (e.g., lecture notes, books)	3.000	1.301	1	4		1
Verbal description in audio file	3.000	1.354	1	4		1
Pictures with verbal-audio description	2.750	1.603	0	4		3
Accessible daisy	2.364	1.567	0	4	1	1
Accessible epub	2.111	1.453	0	4	2	4

<b>Tactile Material:</b> How often do you use it (or you have used it)	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>
Manipulatives (Plastic shapes/objects, Tactile globes, Tactile dolls)	1.154	1.463	0	4	
Haptic models (haptic pictures, graphs, maps etc, manufactured from everyday material attached onto a surface)	1.077	1.441	0	4	

<b>Tactile Material:</b> How useful is their use	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Manipulatives (Plastic shapes/objects, Tactile globes, Tactile dolls)	2.167	1.697	0	4	1	4
Haptic models (haptic pictures, graphs, maps etc, manufactured from everyday material attached onto a surface)	2.091	1.640	0	4	1	5

<b>Audio-tactile material:</b> How often do you use it (or you have used it)	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>
Audio-tactile pictures for IVEO/TTT (Systems with audio-tactile feedback)	1.182	1.662	0	4	

<b>Audio-tactile material:</b> How useful is their use	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Audio-tactile pictures for IVEO/TTT (Systems with audio-tactile feedback)	2.600	1.647	0	4	1	6

<b>Assistive-Technology Devices:</b> How often do you use it (or you have used it)	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Text to speech devices (e.g., reading devices)	2.278	1.602	0	4		1
Adapted notebooks (e.g., enlarged pages, grid paper, colored pages)	1.583	1.782	0	4	3	
Computer monitor magnifier	1.545	1.864	0	4	4	
Scan & text-to-speech devices (e.g., Portable scan translation pen)	1.533	1.767	0	4		
Hand held magnifiers (e.g., reading stone, monocular, magnifying glass)	1.500	1.508	0	4	5	
Traditional Braille typewriter (e.g., Perkins, Tatrapoint)	1.357	1.646	0	4	2	
Refreshable Braille display	1.154	1.573	0	4	2	3
Daisy-player device (talking book machine)	0.933	1.438	0	4	1	
Slate and Stylus (can be equated to paper and pencil for individuals with visual impairment)	0.917	1.505	0	4	3	
Braille printer/ Embosser (Index Everest, Viewplus Tiger)	0.857	1.562	0	4	2	1
Portable CCTV/ Portable video magnifier	0.818	1.401	0	4	4	
Adjusted keyboards (enlarged keys, braille keys)	0.786	1.424	0	4	2	
Touch tablet (e.g., IVEO or TTT)	0.600	1.265	0	4		1
Tactile-image enhancer (e.g., Piaf, Thermoform)	0.583	1.165	0	4	1	
Electronic Braille typewriter (e.g., Mountbatten)	0.538	1.198	0	4	2	1
Notetakers (e.g., Braille N' Speak, Braille Lite)	0.538	1.127	0	4	2	
Handheld media player (e.g., Victor Reader Stream)	0.444	1.333	0	4		1

CCTV (e.g., MagniLink magnifier, Onyx, Topaz, Optelec ClearView)	0.400	0.699	0	4	4	4
Personal digital assistant (PDA, small handheld computers)	0.308	0.630	0	2		

<b>Assistive-Technology Devices:</b> How useful is their use	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Text to speech devices (e.g., reading devices)	3.385	1.044	1	4	1	1
Scan & text-to-speech devices (e.g., Portable scan translation pen)	3.000	1.279	0	4	1	2
Hand held magnifiers (e.g., reading stone, monocular, magnifying glass)	2.667	1.225	1	4	4	2
Adapted notebooks (e.g., enlarged pages, grid paper, colored pages)	2.667	1.323	0	4	3	2
Handheld media player (e.g., Victor Reader Stream)	2.375	1.685	0	4	1	5
Touch tablet (e.g., IVEO or TTT)	2.125	1.642	0	4	1	5
Computer monitor magnifier	2.000	1.414	0	4	4	2
Refreshable Braille display	1.778	1.641	0	4	3	2
Daisy-player device (talking book machine)	1.750	1.658	0	4	1	1
Slate and Stylus (can be equated to paper and pencil for individuals with visual impairment)	1.750	1.753	0	4	4	3
Personal digital assistant (PDA, small handheld computers)	1.750	1.815	0	4		3
Braille printer/ Embosser (Index Everest, Viewplus Tiger)	1.700	1.567	0	4	3	1
Tactile-image enhancer (e.g., Piaf, Thermoform)	1.667	1.658	0	4	2	3
CCTV (e.g., MagniLink magnifier, Onyx, Topaz, Optelec ClearView)	1.625	1.188	0	4	5	1
Adjusted keyboards (enlarged keys, braille keys)	1.600	1.430	0	4	3	1
Notetakers (e.g., Braille N' Speak, Braille Lite)	1.500	1.269	0	4	2	1
Traditional Braille typewriter (e.g., Perkins, Tatrapoint)	1.400	1.578	0	4	3	2
Electronic Braille typewriter (e.g., Mountbatten)	1.400	1.430	0	4	3	3
Portable CCTV/ Portable video magnifier	1.400	1.430	0	4	3	1

<b>Assistive-Technology Software/Apps:</b> How often do you use it (or you have used it)	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>

Screen reader (e.g., Jaws, VoiceOver, NVDA, TalkBack)	2.353	1.801	0	4		1
Digital voice recorder	2.063	1.652	0	4		2
Speech-to-text software/apps (e.g., Dragon by Nuance, Apple dictation, Gboard)	2.000	1.826	0	4		3
Screen magnification software (e.g., Supernova)	1.900	1.663	0	4	3	2
Screen magnification apps (e.g., Microsoft windows magnifier)	1.900	1.912	0	4	4	2
Scan & speech apps (e.g., Voice Dream Scanner)	1.857	1.791	0	4		1
Text-to-speech applications/programs (e.g., Natural Reader, ReadAloud)	1.800	1.699	0	4		2
Document and Word Processing software with text-to-speech conversion (e.g., Speak with MS Office)	1.786	2.007	0	4		1
Word completion software/app	1.643	1.823	0	4		1
Word prediction software/app	1.538	1.808	0	4		1
Talking calculator	1.533	1.642	0	4		3
Object identification apps	1.308	1.548	0	4		
Color identification apps	1.231	1.691	0	4		
Light identification apps	1.231	1.801	0	4		
Multifunctional text-to-speech software (e.g., Voice Dream Reader, Voice Dream Writer)	1.214	1.718	0	4		5
Specialized Math Software (digitally allows the use of supports such as screen magnification, text-to-speech support, audio representation of graphics, and translation into Nemeth code)	1.000	1.595	0	4	1	1
Document and Word Processing software with braille translator (e.g., Biblos, Odt2braille with OpenOffice Writer)	0.889	1.764	0	4	2	3
Braille translator/ text-to-braille software	0.818	1.601	0	4	2	3
Braille to speech software (e.g., TELEO)	0.800	1.687	0	4	2	1
Math-ML player (enables assistive technology such as screen readers and screen magnifiers to speak, navigate math expressions and convert to braille)	0.727	1.421	0	4		2
Daisy-player software (e.g., Dolphin easy reader, AMIS)	0.692	1.182	0	3		2

Ebook readers (e.g., Dolphin EasyReader, Read2go, Thorium)	0.615	1.044	0	3		5
--	-------	-------	---	---	--	---

<b>Assistive-Technology Software/Apps:</b> How useful is their use	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Speech-to-text software/apps (e.g., Dragon by Nuance, Apple dictation, Gboard)	3.182	1.250	1	4	1	2
Screen reader (e.g., Jaws, VoiceOver, NVDA, TalkBack)	3.167	1.403	0	4	1	1
Text-to-speech applications/programs (e.g., Natural Reader, ReadAloud)	2.917	1.240	0	4	1	1
Digital voice recorder	2.917	1.240	0	4	1	1
Document and Word Processing software with text-to-speech conversion (e.g., Speak with MS Office)	2.818	1.722	0	4	1	2
Scan & speech apps (e.g., Voice Dream Scanner)	2.818	1.250	1	4	1	2
Word prediction software/app	2.778	1.716	0	4	1	3
Word completion software/app	2.600	1.647	0	4	1	3
Math-ML player (enables assistive technology such as screen readers and screen magnifiers to speak, navigate math expressions and convert to braille)	2.500	1.309	0	4	1	5
Object identification apps	2.500	1.179	1	4	2	2
Talking calculator	2.417	1.443	0	4	1	1
Screen magnification software (e.g., Supernova)	2.375	1.188	1	4	5	1
Color identification apps	2.300	1.567	0	4	2	2
Screen magnification apps (e.g., Microsoft windows magnifier)	2.250	1.581	0	4	5	1
Specialized Math Software (digitally allows the use of supports such as screen magnification, text-to-speech support, audio representation of graphics, and translation into Nemeth code)	2.200	1.476	0	4	2	2
Ebook readers (e.g., Dolphin EasyReader, Read2go, Thorium)	2.091	1.221	0	4	1	2
Document and Word Processing software with braille translator (e.g., Biblos, Odt2braille with OpenOffice Writer)	2.000	1.528	0	4	3	4

Multifunctional text-to-speech software (e.g., Voice Dream Reader, Voice Dream Writer)	1.909	1.221	0	4	1	2
Braille translator/ text-to-braille software	1.750	1.581	0	4	3	3
Light identification apps	1.700	1.567	0	4	2	2
Braille to speech software (e.g., TELEO)	1.375	1.506	0	4	3	3
Daisy-player software (e.g., Dolphin easy reader, AMIS)	1.300	1.160	0	3	2	2

<b>Mainstream Technology:</b> How often do you use it (or you have used it)	Mean	SD	Min	Max	NA
Laptop	3.588	0.795	1	4	
Smart phone	3.529	1.007	1	4	
MS Windows software	3.063	1.482	0	4	
Cell phone	2.800	1.424	0	4	
Personal Computer (PC)	2.750	1.612	0	4	
OCR (optical character recognition e.g., Abbyy Finereader)	2.000	1.826	0	4	2
Scanner	1.933	1.831	0	4	1
Color adjustment on screens	1.692	1.750	0	4	
Tablet	1.647	1.693	0	4	
Additional light sources	1.333	1.497	0	4	4

<b>Mainstream Technology:</b> How useful is their use	Mean	SD	Min	Max	NA	DN
Laptop	3.80	0.561	2	4		
Smart phone	3.80	0.775	1	4		
MS Windows software	3.36	1.336	0	4		1
Personal Computer (PC)	3.00	1.569	0	4		1
Cell phone	2.85	1.463	0	4		2
OCR (optical character recognition e.g., Abbyy Finereader)	2.77	1.691	0	4	1	1
Scanner	2.64	1.598	0	4		1
Color adjustment on screens	2.44	1.878	0	4	5	1
Additional light sources	2.11	1.691	0	4	4	2
Tablet	1.93	1.730	0	4		

<b>Needs revealed for Distance Education (DE):</b>	Mean	SD	Min	Max	NA	DN
How significant is the need?						

Have all the information I need online (for instance, announcements, program)	3.33	1.085	0	4		
Have the ability to participate orally in the class	3.22	1.060	0	4		
Can choose the form of examination (e.g., oral examination, paper composition, written exams)	3.06	1.434	0	4		
Have an accessible platform (compatible with the screen reader - e.g., NVDA - I use)	3.00	1.414	0	4	1	2
Participate from wherever I decide	3.00	1.237	0	4		
Have channels for facilitation of communication with the professors beyond the class time	2.94	1.144	0	4		
Have accessible educational material (e.g., pdf, presentations, videos)	2.89	1.451	0	4		
Take feedback from and be in contact with the professors systematically	2.89	1.323	0	4		
Have plenty of time when I have to fill in documents and all kind of forms	2.82	1.286	0	4		1
Have accessible documents and all kind of forms that should be filled in	2.81	1.471	0	4		1
Have access to accessible tools/information (e.g., accessible sites, databases)	2.78	1.215	0	4		
Have plenty of time during the examinations and other activities	2.75	1.342	0	4	1	1
Have a smooth/organized use of the necessary tools during the course to be able to follow	2.72	1.227	0	4		
Have various platforms available for communication and educational purposes (e.g., Moodle, Skype)	2.72	1.406	0	4		
Have channels for facilitation of communication with the students in real time (e.g., accessible text box)	2.71	1.160	0	4		1
Be able to participate in the lecture (for instance, "raise the hand" through the relative digital feature of a DE platform)	2.69	1.448	0	4		
Have the lecture recorded	2.67	1.372	0	4		
Have channels for facilitation of communication with the students beyond the class time	2.65	1.367	0	4		
See the presentation online through magnification	2.62	1.758	0	4	4	

Have accessible educational material (e.g., pdf, presentations, videos) early-before the course at hand	2.61	1.335	0	4		
Be able to understand when my camera or the others' camera in on/off	2.56	1.548	0	4	1	
Have administrative support available	2.44	1.542	0	4		
Have technical/accessibility support available	2.41	1.417	0	4		1
Have channels for facilitation of communication with the professors in real time (e.g., accessible text box)	2.33	1.455	0	4		
Have the flexibility to decide the pace of the educational program's progress on my own	2.33	1.283	0	4		
Have breaks and flexibility for the realization of courses and exams to avoid fatigue	2.29	1.490	0	4		1
Avoid using symbols or special fonts for the need to emphasize something, since this is not recognizable by screen reading programs	2.25	1.545	0	4	3	2
Follow a hybrid model (from distance and physically) to have the ability to meet students and teachers in person	2.00	1.581	0	4	1	

## Students with Hearing Impairments

Table 23

*Minimum, maximum, mean, standard deviation (SD), number of "not appropriate for me" answers and number of "I don't know" answers of students with hearing impairments.*

<b>Accessible Printed Material:</b> How often do you use it (or you have used it)?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>
Printed material (e.g. lecture notes)	1.483	1.326	0	4	
Printed material with images, graphics, and visual elements	1.387	1.230	0	4	

<b>Accessible Printed Material:</b> How useful is their use?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>

Printed material (e.g. lecture notes)	2.480	1.194	0	4	2	
Printed material with images, graphics, and visual elements	2.333	1.240	0	4	2	

<b>Accessible Digital Material:</b> How often do you use it (or you have used it)?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>
Audio recorded material transcribed (notes, dictated lessons)	1.935	1.365	0	4	
Videos with sign language	0.250	0.683	0	2	13
Videos with transcriptions (including YouTube, lectures)	2.065	1.340	0	4	
Videos with captions (including YouTube)	2.806	0.910	2	4	
Accessible pdf	1.923	1.412	0	4	3
Accessible word	1.840	1.313	0	4	3
Accessible powerpoint	1.808	1.201	0	4	3
Google docs	1.690	1.417	0	4	
Video lessons with slow rhythm	0.690	1.004	0	4	
Live streaming with captions (e.g. lectures given synchronously online)	1.581	1.259	0	4	
Digital material with images, graphics, and visual elements	2.767	0.935	1	4	

<b>Accessible Digital Material:</b> How useful is their use?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Audio recorded material transcribed (notes, dictated lessons)	2.900	1.155	0	4		
Videos with sign language	1.889	1.900	0	4		15

Videos with transcriptions (including YouTube, lectures)	3.167	1.020	1	4		
Videos with captions (including YouTube)	3.633	0.615	2	4		
Accessible pdf	3.053	0.848	2	4		5
Accessible word	3.053	0.848	2	4		5
Accessible powerpoint	3.158	0.765	2	4		5
Google docs	2.429	1.260	0	4		
Video lessons with slow rhythm	2.536	1.170	0	4		
Live streaming with captions (e.g. lectures given synchronously online)	3.567	0.568	2	4		
Digital material with images, graphics, and visual elements	3.200	0.997	1	4		

<b>Accessibility Services:</b> How often do you use it (or you have used it)?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>
Sign language interpretation (e.g. in lectures)	0.786	1.188	0	3	16

<b>Accessibility Services:</b> How useful is their use?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Sign language interpretation (e.g. in lectures)	2.500	1.401	0	4	15	1

<b>Assistive-Technology:</b> How often do you use it (or you have used it)?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>
Speech-to-Text software/audio transcription apps (e.g. Dragon anywhere, Google Gboard, Apple dictation)	1.258	1.390	0	4	
Text-to-speech apps (e.g. Voice Dream reader)	0.520	0.714	0	2	6
Voice recognition systems (e.g. ListenAll)	1.630	1.621	0	4	
Automatic captioning software/app (Communication Access Realtime Translation (CART))	1.481	1.528	0	4	

Connectclip (Enables hands-free phone calls and music streaming from smartphone)	1.417	1.792	0	4	2
Video processing software for captioning	0.654	0.797	0	2	
FM systems (wireless assistive hearing devices that enhance the use of hearing aids)	2.000	1.658	0	4	3
Loop systems (or induction loop, systems use electromagnetic energy to transmit sound)	0.696	0.876	0	2	3
Speech amplification devices (e.g. ChatterVOX)	0.435	0.788	0	2	3
Hearing aids (e.g. behind-the-ear (BTE), in-the-ear (ITE), receiver-in-the-ear (RITE), in-the-canal (ITC) and CROS (Contralateral Routing of Signals)/BiCROS(Bilateral Contralateral Routing of Signals))	2.462	1.772	0	4	5
Soundproof equipment for indoors environment	1.600	1.581	0	4	3
Telecoils (or t-coil, a coil of wire that is installed inside many hearing aids and cochlear implants to act as a miniature wireless receiver)	1.652	1.584	0	4	5

<b>Assistive-Technology:</b> How useful is their use?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Speech-to-Text software/audio transcription apps (e.g. Dragon anywhere, Google Gboard, Apple dictation)	2.857	0.970	1	4		
Text-to-speech apps (e.g. Voice Dream reader)	1.625	1.310	0	4	8	
Voice recognition systems (e.g. ListenAll)	3.100	1.021	1	4		
Automatic captioning software/app (Communication Access Realtime Translation (CART))	3.333	0.816	2	4		
Connectclip (Enables hands-free phone calls and music streaming from smartphone)	3.000	1.372	0	4	2	
Video processing software for captioning	2.100	1.294	0	4		

FM systems (wireless assistive hearing devices that enhance the use of hearing aids)	2.957	1.551	0	4	3	
Loop systems (or induction loop, systems use electromagnetic energy to transmit sound)	2.632	1.257	0	4	3	
Speech amplification devices (e.g. ChatterVOX)	2.250	1.065	0	4	2	4
Hearing aids (e.g. behind-the-ear (BTE), in-the-ear (ITE), receiver-in-the-ear (RITE), in-the-canal (ITC) and CROS(Contralateral Routing of Signals)/BiCROS (Bilateral Contralateral Routing of Signals))	3.130	1.325	0	4	7	
Soundproof equipment for indoors environment	3.300	0.733	2	4	4	
Telecoils (or t-coil, a coil of wire that is installed inside many hearing aids and cochlear implants to act as a miniature wireless receiver)	2.952	0.921	2	4	5	

<b>Mainstream Technology:</b> How often do you use it (or you have used it)?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>
Audio recorder	1.276	1.222	0	4	
Smartphone	3.207	1.082	0	4	
Tablet	2.000	1.491	0	4	3
Computers	3.194	1.167	0	4	
Microphones	1.600	1.555	0	4	2
Accessible online (synchronous and asynchronous) communication (e.g. MS Teams, Zoom)	3.032	1.110	0	4	
Virtual board	1.414	1.150	0	4	1
Headset/Headphones	3.138	1.246	0	4	2
Video recording software/apps (e.g. OBS)	0.700	0.988	0	4	
Media players for video with subtitles (e.g. VLC)	1.964	1.575	0	4	

<b>Mainstream Technology: How useful is their use?</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Audio recorder	2.208	1.503	0	4		
Smartphone	3.200	1.157	0	4		
Tablet	2.571	1.345	0	4	2	
Computers	3.200	1.157	0	4		
Microphones	2.300	1.559	0	4	2	2
Accessible online (synchronous and asynchronous) communication (e.g. MS Teams, Zoom)	2.966	1.149	0	4	1	
Virtual board	2.360	1.186	1	4	1	
Headset/Headphones	3.630	0.629	2	4	3	
Video recording software/apps (e.g. OBS)	1.826	1.527	0	4	1	
Media players for video with subtitles (e.g. VLC)	3.143	0.793	2	4	1	

<b>Needs revealed for Distance Education (DE):</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
How significant is the need?						
The professor should speak close to the camera so I can lip-read easily	2.483	1.243	0	4	2	
Have detailed scripts of the lecture to complete the missing information delivered orally	3.065	1.124	1	4		
Recorded lectures with captions	3.226	1.117	1	4		
Change of person who speaks needs to be announced	1.677	1.301	0	4		
Educational platform that allows the interpreter and the professor's presentation appear simultaneously	2.688	1.621	0	4	13	
Can choose the form of examination (e.g. oral examination, paper composition, written exams)	2.258	1.032	1	4		

Online/distant communication with a SL interpreter	1.214	1.672	0	4	15	
Telecommunication relay services (a communication assistant serves as a bridge between two callers) (e.g. Tess)	0.786	1.188	0	4	5	6
Autocaption feature in the language I speak integrated in the platform for lectures	2.935	1.209	0	4		
Be able to participate in the lecture (for instance, "raise the hand" through the relative digital feature of a DE platform, write in the text box)	2.742	1.154	0	4		
Have an accessible platform (compatible with speech-to-text software and good sound transmitter & receiver)	2.963	1.018	0	4		
Have channels for facilitation of communication with the professors in real time (e.g. text box)	2.552	1.152	0	4		
Have channels for facilitation of communication with the professors beyond the class time	2.276	1.066	0	4		
Have channels for facilitation of communication with the students in real time (e.g. text box)	2.483	1.090	0	4		
Have channels for facilitation of communication with the students beyond the class time	2.621	1.083	0	4		
Have accessible educational material (e.g. videos with captions and content in sign language)	3.724	0.591	2	4		
Have educational material (e.g. pdf, presentations, videos) early-before the course at hand so I can pay attention to the lecturers	3.533	0.819	2	4	1	
Have plenty of time when I have to fill in documents and all kind of forms	2.484	1.525	0	4		
Have plenty of time during the examinations and other activities	3.034	1.017	1	4		

Have breaks and flexibility for the realization of courses and exams to avoid fatigue	2.483	1.271	0	4		
Have a smooth/organized use of the necessary tools during the course to be able to follow	3.000	1.065	0	4		
Have access to accessible tools/information (e.g. accessible sites with captioned video)	3.414	1.086	0	4		
Have various platforms available for communication and educational purposes (e.g. Moodle, Skype)	2.310	1.072	1	4		
Have the flexibility to decide the pace of the educational program's progress on my own	2.724	1.162	0	4		
Participate from wherever I decide	2.828	1.071	1	4		
Have the ability to participate orally in the class	2.290	1.160	0	4		
Have administrative support available	2.440	1.356	0	4		
Have technical/accessibility support available	2.931	1.307	0	4		
Take feedback from and be in contact with the professors systematically	2.774	1.023	1	4		
Follow a hybrid model (from distance and physically) to have the ability to meet students and teachers in person	2.774	1.175	0	4		
Have all the information I need online (for instance, announcements, program)	3.484	0.811	1	4		

## Students with Mobility Impairments

Table 24

*Minimum, maximum, mean, standard deviation (SD), number of "not appropriate for me" answers and number of "I don't know" answers of students with mobility impairments.*

<b>Accessible Printed Material:</b> How often do you use it (or you have used it)?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>

Accessible text (books, notes etc.)	2.167	1.510	0	4	3
Accessible presentations	2.333	1.561	0	4	2

<b>Accessible Printed Material: How useful is their use?</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Accessible text (books, notes etc.)	2.692	1.436	0	4	3	2
Accessible presentations	2.846	1.405	0	4	2	2

<b>Accessible Digital Material: How often do you use it (or you have used it)?</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>
Accessible word	2.828	1.391	0	4	3
Accessible pdf	3.000	1.309	0	4	2
Accessible daisy	0.263	0.806	0	4	
Accessible epub	0.955	1.046	0	4	2
Accessible presentations (Powerpoint)	2.800	1.472	0	4	2
Accessible excel files	1.929	1.464	0	4	3
ebook	2.172	1.490	0	4	2
Audio recorded material (e.g. lecture notes, books)	2.516	1.546	0	4	2
Video recorded material (e.g. lectures)	2.781	1.518	0	4	1

<b>Accessible Digital Material: How useful is their use?</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Accessible word	3.280	0.980	0	4	3	2
Accessible pdf	3.520	0.714	2	4	2	2
Accessible daisy	0.929	1.542	0	4		11
Accessible epub	1.882	1.364	0	4	2	9

Accessible presentations (Powerpoint)	3.400	0.866	1	4	2	2
Accessible excel files	2.458	1.179	1	4	3	2
ebook	2.893	1.066	1	4	1	3
Audio recorded material (e.g. lecture notes, books)	2.966	1.322	0	4	1	2
Video recorded material (e.g. lectures)	3.290	1.189	0	4	1	1

<b>Access to computer &amp; mobile devices:</b> How often do you use it (or you have used it)?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>
Text-to-speech programs/applications (e.g. Voice Dream reader)	0.714	1.117	0	4	2
Speech-to-text programs/applications (e.g. Dragon anywhere, Google Gboard, Apple dictation)	1.032	1.402	0	4	
Head stylus	0.407	1.010	0	4	1
Voice control apps (e.g. Dragon naturally speaking)	0.655	1.111	0	4	
Word prediction software/app	0.933	1.363	0	4	1
Word completion software/app	1.097	1.491	0	4	
Adapted keyboards (e.g. small keyboards, ergonomic)	1.333	1.583	0	4	2
Virtual keyboards/mouse	0.933	1.337	0	4	1
Adapted mouses (e.g. ergonomic)	1.448	1.549	0	4	2
Alternative mouses (e.g. jelly-bean switches, trackball, joystick, leg switch)	0.857	1.557	0	4	3
Sip and Puff system	0.435	1.199	0	4	2
Remote control of computer (e.g. eye tracking system, head mouse)	0.433	1.223	0	4	1
Scanning input (screen scanning software/application)	0.800	1.500	0	4	

Augmentative and alternative communication devices/software	0.741	1.130	0	4	2
Personal Emergency response system	1.069	1.646	0	4	2
Personal digital assistant (PDA, small handheld computers)	0.586	1.268	0	4	

<b>Access to computer &amp; mobile devices:</b> How useful is their use?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Text-to-speech programs/applications (e.g. Voice Dream reader)	1.680	1.547	0	4	2	3
Speech-to-text programs/applications (e.g. Dragon anywhere, Google Gboard, Apple dictation)	2.259	1.509	0	4		2
Head stylus	1.278	1.708	0	4	1	8
Voice control apps (e.g. Dragon naturally speaking)	2.100	1.619	0	4		7
Word prediction software/app	2.217	1.622	0	4		4
Word completion software/app	2.522	1.534	0	4		4
Adapted keyboards (e.g. small keyboards, ergonomic)	2.792	1.615	0	4	2	2
Virtual keyboards/mouse	2.125	1.541	0	4	1	2
Adapted mouses (e.g. ergonomic)	2.870	1.546	0	4	2	3
Alternative mouses (e.g. jelly-bean switches, trackball, joystick, leg switch)	2.706	1.490	0	4	3	5
Sip and Puff system	1.615	1.850	0	4	2	10
Remote control of computer (e.g. eye tracking system, head mouse)	2.048	1.687	0	4	1	5
Scanning input (screen scanning software/application)	1.938	1.731	0	4		9
Augmentative and alternative communication devices/software	1.938	1.526	0	4	3	6
Personal Emergency response system	2.600	1.635	0	4	2	4

Personal digital assistant (PDA, small handheld computers)	1.700	1.809	0	4		5
--	-------	-------	---	---	--	---

<b>Mainstream Technology:</b> How often do you use it (or you have used it)?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>
Microphones	2.192	1.600	0	4	2
Note-taking audio recorders	1.613	1.667	0	4	
Video recorders	1.613	1.667	0	4	
Tablets	2.100	1.709	0	4	1
Computers	3.667	0.844	0	4	1
Book scanner desktop or portable (e.g. Irispen scan)	1.172	1.560	0	4	
Cortana on windows (virtual assistant for setting reminders, searching and answering questions for the user)	1.207	1.567	0	4	1
Email apps	3.357	1.129	0	4	2
Touch devices(interaction through touch)	2.321	1.827	0	4	1
Smart watches	1.417	1.717	0	4	1

<b>Mainstream Technology:</b> How useful is their use?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Microphones	3.042	1.334	0	4	2	
Note-taking audio recorders	3.111	1.219	0	4		1
Video recorders	2.786	1.449	0	4		
Tablets	2.714	1.607	0	4	1	1
Computers	3.778	0.506	2	4	2	
Book scanner desktop or portable (e.g. Irispen scan)	2.480	1.610	0	4	1	1

Cortana on windows (virtual assistant for setting reminders, searching and answering questions for the user)	2.522	1.563	0	4	1	1
Email apps	3.654	0.562	2	4	1	
Touch devices(interaction through touch)	2.920	1.382	0	4		1
Smart watches	2.304	1.663	0	4	1	

<b>Needs revealed for Distance Education (DE):</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
How significant is the need?						
Be able to participate in the lecture (for instance, "raise the hand" through the relative digital feature of a DE platform)	2.938	1.318	0	4	1	
Have an accessible platform for the lectures	2.938	1.501	0	4	1	
Have channels for facilitation of communication with the professors in real time (e.g. accessible text box)	2.700	1.418	0	4	1	1
Have channels for facilitation of communication with the professors beyond the class time	3.097	1.193	0	4	1	1
Have channels for facilitation of communication with the students in real time (e.g. accessible text box)	2.964	1.290	0	4	3	1
Have channels for facilitation of communication with the students beyond the class time	3.000	1.414	0	4	3	1
Have accessible educational material (e.g. pdf, presentations, videos)	3.313	1.230	0	4	2	
Have accessible educational material (e.g. pdf, presentations, videos) early-before the course at hand	3.156	1.370	0	4	1	
Have accessible documents and all kind of forms that should be filled in	3.000	1.366	0	4		1
Have plenty of time when I have to fill in documents and all kind of forms	2.742	1.548	0	4	1	1

Have plenty of time during the examinations and other activities	2.688	1.554	0	4	2	
Have breaks and flexibility for the realization of courses and exams to avoid fatigue	2.800	1.324	0	4	2	2
Have a smooth/organized use of the necessary tools during the course to be able to follow	2.839	1.440	0	4	1	1
Have access to accessible tools/information (e.g. accessible sites, databases)	3.000	1.155	0	4	1	1
Have various platforms available for communication and educational purposes (e.g. Moodle, Skype)	2.774	1.407	0	4	2	
Have the flexibility to decide the pace of the educational program's progress on my own	2.909	1.508	0	4		1
Participate from wherever I decide	3.031	1.356	0	4	1	1
Have the lecture recorded	2.833	1.341	0	4	2	1
Have the ability to participate orally in the class	3.000	1.164	0	4	1	
Have administrative support available	2.844	1.273	0	4	1	1
Have technical/accessibility support available	2.400	1.499	0	4		
Take feedback from and be in contact with the professors systematically	2.438	1.480	0	4	1	
Follow a hybrid model (from distance and physically) to have the ability to meet students and teachers in person	2.667	1.575	0	4	1	
Have all the information I need online (for instance, announcements, program)	3.273	0.944	1	4	1	
Can choose the form of examination (e.g. oral examination, paper composition, written exams)	3.032	1.278	0	4	2	1

## Students with Learning Difficulties

Table 25

*Minimum, maximum, mean, standard deviation (SD), number of "not appropriate for me" answers and number of "I don't know" answers of students with learning difficulties.*

<b>Accessible Printed Material:</b> How often do you use it (or you have used it)?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>
Large prints	1.261	1.244	0	4	12
Adapted books (added tactile pieces and images/picture annotation)	1.468	1.533	0	4	14
Accessible printed texts (fonts, spaces etc.)	1.973	1.488	0	4	7
Educational images/graphics	2.289	1.403	0	4	4
Printed conceptual/mental map	2.475	1.441	0	4	1
Texts with simplified language	1.662	1.529	0	4	7
Flash cards	1.576	1.540	0	4	4

<b>Accessible Printed Material:</b> How useful is their use?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Large prints	1.938	1.489	0	4	9	2
Adapted books (added tactile pieces and images/picture annotation)	2.525	1.331	0	4	11	5
Accessible printed texts (fonts, spaces etc.)	2.767	1.264	0	4	5	
Educational images/graphics	3.000	1.110	0	4	2	
Printed conceptual/mental map	3.373	1.024	0	4	3	
Texts with simplified language	2.803	1.499	0	4	4	1
Flash cards	2.452	1.456	0	4	3	14

<b>Accessible Digital Material:</b> How often do you use it (or you have used it)?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>
E-books	1.684	1.345	0	4	5
Accessible docs (fonts, spaces etc.)	2.120	1.365	0	4	4

Accessible pdf	2.474	1.393	0	4	4
Accessible powerpoint	2.507	1.474	0	4	4
Accessible daisy	0.976	1.352	0	4	7
Accessible epub	1.102	1.311	0	4	8
Digital images	2.385	1.331	0	4	2
Pictograms in digital texts	1.787	1.582	0	4	8
Digital texts with simplified language	1.693	1.488	0	4	4
Paper conceptual and mental maps	2.638	1.389	0	4	2
Digital conceptual/mental maps	2.563	1.439	0	4	2
Color correction of texts	1.826	1.553	0	4	5
Videos with captions	2.027	1.552	0	4	5
Videos (including YouTube, Documentaries)	2.638	1.407	0	4	2
Accessible Mathematical formulas	2.188	1.647	0	4	7
Symbolic languages	1.905	1.583	0	4	10
Audiobooks	1.818	1.644	0	4	4
Recorded lectures (audio, video)	2.642	1.399	0	4	2
Highlighted texts	2.203	1.505	0	4	2
Lecture summaries	2.525	1.475	0	4	1

<b>Accessible Digital Material:</b> How useful is their use?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
E-books	2.554	1.315	0	4	3	2
Accessible docs (fonts, spaces etc.)	2.896	1.182	0	4	4	4
Accessible pdf	3.191	1.110	0	4	5	4
Accessible powerpoint	3.188	1.097	0	4	5	4

Accessible daisy	2.286	1.506	0	4	8	28
Accessible epub	2.167	1.395	0	4	9	20
Digital images	2.971	1.137	0	4	2	4
Pictograms in digital texts	2.824	1.244	0	4	7	13
Digital texts with simplified language	2.913	1.303	0	4	4	2
Paper conceptual and mental maps	3.431	0.962	0	4	4	1
Digital conceptual/mental maps	3.347	1.023	0	4	4	1
Color correction of texts	2.938	1.355	0	4	5	6
Videos with captions	2.848	1.327	0	4	6	4
Videos (including YouTube, Documentaries)	3.280	1.021	0	4	2	2
Accessible Mathematical formulas	3.017	1.295	0	4	5	7
Symbolic languages	2.583	1.381	0	4	6	6
Audiobooks	3.014	1.356	0	4	3	3
Recorded lectures (audio, video)	3.434	0.884	1	4		1
Highlighted texts	2.863	1.337	0	4	2	2
Lecture summaries	3.286	1.099	0	4	1	

<b>Assistive-Technology Devices:</b> How often do you use it (or you have used it)?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>
Text to speech devices (e.g. reading devices)	1.459	1.464	0	4	6
Daisy-player device (players that are used to play DAISY audio books and are designed to be used by people with print impairments)	0.733	1.260	0	4	11
Personal digital assistant (PDA, small handheld computers)	0.875	1.363	0	4	10

<b>Assistive-Technology Devices:</b> How useful is their use?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>

Text to speech devices (e.g. reading devices)	2.571	1.357	0	4	4	5
Daisy-player device (players that are used to play DAISY audio books and are designed to be used by people with print impairments)	2.060	1.557	0	4	11	14
Personal digital assistant (PDA, small handheld computers)	2.216	1.501	0	4	8	17

<b>Assistive-Technology Software/Apps: How often do you use it (or you have used it)?</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>
Highlighting text application	1.923	1.602	0	4	3
Text-to-Speech software/apps (e.g Voice Dream reader)	1.324	1.453	0	4	5
Accessible calculators	2.030	1.633	0	4	9
Screen/Text magnification	2.013	1.483	0	4	6
Concept map program (e.g. Cmap)	1.757	1.670	0	4	2
Reminder app/calendar with notifications	2.716	1.381	0	4	1
Speech-to-text software (e.g. Dragon anywhere, Google Gboard, Apple dictation)/Transcription apps	1.514	1.581	0	4	3
Spell checker/word correction programs	2.793	1.463	0	4	2
Word prediction software/app	1.766	1.597	0	4	4
Word completion software/app	1.838	1.681	0	4	1
Time management apps	1.734	1.662	0	4	2

<b>Assistive-Technology Software/Apps: How useful is their use?</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
Highlighting text application	2.926	1.353	0	4	3	5
Text-to-Speech software/apps (e.g Voice Dream reader)	2.848	1.268	0	4	4	7
Accessible calculators	3.140	1.217	0	4	10	7

Screen/Text magnification	2.696	1.458	0	4	4	2
Concept map program (e.g. Cmap)	3.266	1.158	0	4	4	4
Reminder app/calendar with notifications	3.211	1.099	0	4	1	1
Speech-to-text software (e.g. Dragon anywhere, Google Gboard, Apple dictation)/Transcription apps	2.957	1.333	0	4	3	4
Spell checker/word correction programs	3.316	1.048	0	4	1	1
Word prediction software/app	2.924	1.305	0	4	2	4
Word completion software/app	2.966	1.402	0	4		6
Time management apps	2.971	1.307	0	4	1	4

<b>Mainstream Technology:</b> How often do you use it (or you have used it)?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>
Audio-recorder	1.825	1.682	0	4	2
Computer	3.753	0.615	1	4	
Clocks	2.619	1.488	0	4	
Word processing software	2.438	1.606	0	4	2
Tablet	1.974	1.759	0	4	4
Pad and pen	2.788	1.415	0	4	
Accessible online (synchronous and asynchronous) communication (e.g. MS Teams, Zoom)	2.408	1.397	0	4	4
Summarizing programs (e.g. ePico!)	1.143	1.544	0	4	4
Learning management systems (platform for all education processes - lessons, notes, exams etc.)	1.870	1.609	0	4	2
Digital dictionaries	2.114	1.493	0	4	1

<b>Mainstream Technology:</b> How useful is their use?	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
--	-------------	-----------	------------	------------	-----------	-----------

Audio-recorder	2.658	1.419	0	4	2	
Computer	3.829	0.540	1	4		
Clocks	3.051	1.329	0	4	1	1
Word processing software	3.267	1.107	0	4	1	2
Tablet	2.785	1.505	0	4	2	10
Pad and pen	3.025	1.368	0	4	1	1
Accessible online (synchronous and asynchronous) communication (e.g. MS Teams, Zoom)	3.141	1.150	0	4	2	1
Summarizing programs (e.g. ePico!)	2.892	1.427	0	4	5	6
Learning management systems (platform for all education processes - lessons, notes, exams etc.)	3.075	1.172	0	4	4	4
Digital dictionaries	2.959	1.263	0	4	2	2

<b>Needs revealed for Distance Education (DE):</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>NA</b>	<b>DN</b>
How significant is the need?						
Have an outline of the topics to be covered before the course and a summary of the main subjects after the course	3.337	1.018	0	4	1	1
Be able to participate in the lecture (for instance, "raise the hand" through the relative digital feature of a DE platform)	3.139	1.095	0	4	2	1
Have an accessible platform (compatible with text-to-speech apps or a screen reader)	2.853	1.307	0	4	8	4
Have channels for facilitation of communication with the professors in real time (e.g. oral communication)	2.973	1.260	0	4	3	3
Have channels for facilitation of communication with the professors beyond the class time	2.882	1.265	0	4	3	3
Have channels for facilitation of communication with the students in real time (e.g. oral communication)	2.831	1.322	0	4	1	3

Have channels for facilitation of communication with the students beyond the class time	2.840	1.305	0	4	1	4
Have accessible educational material (e.g. pdf, presentations, notes)	3.526	0.840	0	4	4	1
Have accessible educational material (e.g. pdf, presentations, notes) early-before the course at hand	3.329	1.136	0	4	4	1
Have accessible documents and all kind of forms that should be filled in	3.276	1.001	0	4	4	3
Have plenty of time when I have to fill in documents and all kind of forms	3.346	1.091	0	4	3	2
Have plenty of time during the examinations and other activities	3.369	1.128	0	4		
Have breaks and flexibility for the realization of courses and exams to avoid fatigue	3.156	1.257	0	4	2	3
Have a smooth/organized use of the necessary tools during the course to be able to follow	3.247	1.090	0	4	5	
Have access to accessible tools/information (e.g. accessible sites, databases)	3.214	1.062	0	4	7	
Avoid using symbols or special fonts for the need to emphasize something, since this is not recognizable by screen reading programs or text-to-speech apps	2.582	1.539	0	4	6	5
Have various platforms available for communication and educational purposes (e.g. Moodle, Skype)	2.909	1.289	0	4	2	3
Have the flexibility to decide the pace of the educational program's progress on my own	3.243	1.120	0	4	3	4
Participate from wherever I decide	2.920	1.343	0	4	2	4
Have the lecture recorded	3.195	1.148	0	4	2	1
Have the ability to participate orally in the class	2.892	1.320	0	4	4	1
Have administrative support available	2.786	1.361	0	4	8	2

Have technical/accessibility support available	2.800	1.314	0	4	7	1
Take feedback from and be in contact with the professors systematically	2.760	1.334	0	4	4	2
Follow a hybrid model (from distance and physically) to have the ability to meet students and teachers in person	3.234	1.202	0	4		3
Have all the information I need online (for instance, announcements, program)	3.600	0.739	0	4		
Can choose the form of examination (e.g. oral examination, paper composition, written exams)	3.461	1.101	0	4	3	1

## REFERENCES

- [1] Guidance Notes on Project Reporting, European Commission, Community Research, Version 07/03/2008.
- [2] Guide to Financial Issues relating to FP7 Indirect Actions, Community Research, Version 24/07/2008.

## **APPENDIX I: INSTRUCTIONS FOR INTERVIEW MODERATORS**

### **Purpose of the study**

In the current study, we are conducting a survey in order to identify:

- a) the types/forms of adapted educational materials that Students with Disabilities (SwD) end-users need in different courses,
- b) the equipment (software and hardware) that they need to have at university and home,
- c) what types of different formats of accessible material SwD are aware of, which ones they have used or they are using, and
- d) the needs revealed by Distance Education (DE) to SwD.

### **Instructions to moderators of Tests**

Semi-structured interviews will be conducted with Students with Disabilities

The interviews will be conducted on groups of SwD based on the type of their disability (learning difficulties, visual impairments, hearing impairments, physical/mobility impairments).

The interviews could be conducted either online or in person.

The researcher needs to record (Video/Audio recording) the whole interview.

Apart from the questions of the actual interview, each participant shall answer some questions on demographics/personal characteristics that need to be answered at the beginning of the interview.

These questions will not be the same for each group of participants (please see attached files).

Approximately ten (10) individuals from each disability group of students with disabilities (40 total) will participate in the interviews.

We explain to participants that we record everything and we will discuss everything at the end.

Please read the instructions carefully, fill in the demographic data of participants, conduct the interview and select the correct option or fill in the answers to the respective question field.

### **Introductory text**

Before the test begins, researchers should read aloud the following introductory text to the participants.

*“The purpose of the study is to identify the real needs and requirements of Students with Disabilities (SwD) on accessible education and derive research results that will help towards the production of accessible educational materials that meet the real needs of SwD in traditional Higher Education but also in Distance Education (DE).”*

*The procedure will be the following:*

*First you will be asked to answer some questions on demographics/personal characteristics and then you will be asked to answer some questions on your needs and requirements on accessible educational material during your studies.*

*During that time the interview will be recorded by the interviewers.”*

## **APPENDIX II: INTERVIEW - DEMOGRAPHIC QUESTIONS**

### **Visual Impairments**

#### **Demographic data of participants**

**1. Gender**

- a. Male
- b. Female

**2. The place of residence (and the University you attend).**

**3. The type of your disability and the cause of it** (official clinical diagnosis).

**4. The age at onset of visual impairments.**

**5. The date of birth.**

**6. Educational level** (e.g. Undergraduate, Postgraduate/ Master's, PhD).

**7. Severity of disability**

- a. Blindness
- b. Severe visual impairments
- c. Moderate visual impairments
- d. Low vision

**8. What means do you use to read?**

- a. Braille or screen reader
- b. Large prints or magnifiers

**9. Visual acuity of the left eye**

- a. Total blindness, loss of light perception
- b. Only light perception
- c. Less than 1/20
- d. Better than 1/20 and worse than 1/10
- e. Better than 1/10

**10. Visual acuity of the right eye**

- a. Total blindness, loss of light perception
- b. Only light perception
- c. Less than 1/20
- d. Better than 1/20 and worse than 1/10
- e. Better than 1/10

**11. Visual field**

- a. Full visual field
- b. Central vision loss
- c. Peripheral vision loss

**12. You move alone or with the help of an attendant?**

- a. Alone
- b. Sometimes alone and sometimes with help of an attendant
- c. With help of an attendant

**13. How often do you move alone?**

- a. Never
- b. Few times
- c. Some times
- d. Most of the time
- e. Always

## Hearing Impairments

### Demographic data of participants

1. **Gender**

- c. Male
- d. Female

2. **The place of residence (and the University) you attend.**

3. **The type of your hearing loss and the cause of it** (official clinical diagnosis).

4. **The age at onset of hearing loss.**

5. **The date of birth.**

6. **Educational level** (e.g. Undergraduate, Postgraduate/ Master's, PhD).

7. **Do you have bilateral hearing loss?**

- a. Yes
- b. No

8. **Do you have deaf/hard of hearing parents?**

- a. Yes
- b. No

9. **Degrees of hearing loss in left ear**

- a. Slight hearing loss (25-40 dB)
- b. Mild hearing loss (41-55 dB)
- c. Moderate hearing loss (56-70 dB)
- d. Severe hearing loss (71-90 dB)
- e. Profound hearing loss (91+ dB)

10. **Degrees of hearing loss in right ear**

- a. Slight hearing loss (25-40 dB)
- b. Mild hearing loss (41-55 dB)
- c. Moderate hearing loss (56-70 dB)
- d. Severe hearing loss (71-90 dB)
- e. Profound hearing loss (91+ dB)

11. **Are you a lip-reader?**

- a. Yes
- b. No

12. **Level of difficulty in understanding the oral language (through lip reading)**

- b. Very easy

- c. Easy
- d. Neutral
- e. Difficult
- f. Very difficult

**13. Do you understand the written form of language?**

- a. Yes
- b. No

**14. Level of difficulty in understanding the written language**

- a. Very easy
- b. Easy
- c. Neutral
- d. Difficult
- e. Very difficult

**15. Do you know sign language?**

- a. Yes
- b. No

## Mobility Impairments

### Demographic data of participants

#### 1. Gender

- e. Male
- f. Female

#### 2. The place of residence (and the University you attend).

#### 3. The type of your disability and the cause of it (official clinical diagnosis).

#### 4. The age at onset of mobility impairments.

#### 5. The date of birth.

#### 6. Educational level (e.g. Undergraduate, Postgraduate/ Master's, PhD).

#### 7. Your disability occurs

- a. In your lower extremities
- b. In your upper extremities
- c. In your lower and upper extremities
- d. On one side of your body
- e. Only in one of your extremities
- f. Other: \_\_\_\_\_

#### 8. How would you most accurately describe the functionality of your hands?

(Select only one of the following answers)

- a. I handle all objects easily and successfully. I may have some difficulties in activities that require great speed or/and accuracy. However, these difficulties do not restrict my independence in my daily activities at all.
- b. I handle all objects with somewhat reduced quality (accuracy) or/and speed. Certain activities need to be done in alternative ways. Usually, these difficulties do not restrict my independence in my daily activities.
- c. I handle objects with difficulty, I need help to prepare or modify the activities. My performance is slow and can be achieved with limited success as regards the quantity and quality of activity. I can be independent, only if the activities have been adapted for me.
- d. I can only handle selected (very specific) objects that are easy and only in adapted activities. Usually, I only perform parts of an entire activity with a lot of effort and with limited success. I need continuous support, assistance and/or adapted equipment.

- e. Basically, I cannot handle objects as I have severely limited ability to perform even simple actions. I need total assistance.

**9. You move alone or with the help of an attendant?**

- a. Alone  
b. Sometimes alone and sometime with help of an attendant  
c. With help of an attendant

**10. How often do you move alone?**

- a. Never  
b. Few times  
c. Some times  
d. Most of the times  
e. Always

**11. How would you describe your commute?**

(Select only one of the following answers)

- a. I walk on any place without restrictions and assistance. I may have balance, speed or motor-coordination difficulties.
- b. In most places, I walk without any assistance. However, outside my home, I may use either walking aids – walkers, crutches, cane – for walking or climbing up the stairs or a wheelchair for long distances.
- c. Most of the time, I need walking aids to be able to walk anywhere. Usually, I need the assistance of another person or I need specialized equipment to get up from the floor, from the bed, or from the chair. When climbing stairs, I usually need assistance or at least supervision from someone else. I need a wheelchair for outdoor environments.
- d. Almost everywhere, I use a wheelchair on my own (either electric or manual wheelchair). However, almost always, I need the assistance of another person. Usually, I need special support on my torso (e.g., waist) and/or my head. I can walk at home for a while but only with the assistance of another person.
- e. In all cases and in all places, I use a wheelchair. At best, I can use an electric wheelchair. I always need special support in my waist, torso and head. I use many types of assistive devices for mobility impairments, but I still need the assistance of another person.

## **Learning Difficulties**

### **Demographic data of participants**

#### **1. Gender**

g. Male

h. Female

#### **2. The place of residence and the University you attend.**

#### **3. The type of learning difficulties** (official clinical diagnosis).

#### **4. The age of diagnosis of learning difficulties.**

#### **5. The date of birth.**

#### **6. Educational level** (e.g. Undergraduate, Postgraduate/ Master's, PhD).

## **APPENDIX III: INTERVIEW QUESTIONS**

### **Visual Impairments**

#### **Interview Questions**

1. Please mention what types/forms of assistive technologies (software/apps and devices) and what types/forms of accessible material you are aware that exist (e.g. tactile pictures, DAISY books, etc.). In your answer please also include any alternative types/forms of accessible material that you are aware of existing, by mentioning separately each alternative form of material (e.g. tactile pictures printed on microcapsule paper, tactile pictures printed on a plastic sheet with thermoform, tactile pictures printed on plain 160gr weight paper with a Tiger Printer, etc.).
2. Please mention which ones of these types/forms of accessible material have you used in the past or you are currently using?
3. Please mention the types/forms of adapted educational materials that you need for different courses taught in higher education.
4. Please mention the equipment (software and hardware) that you need at university and home.
5. Please mention the needs revealed by distance education for you (what more apart from the above mentioned do you need).

### **Hearing Impairments**

#### **Interview Questions**

1. Please mention what types/forms of assistive technologies (software/apps and devices) and what types/forms of accessible material you are aware that exist (e.g., video and audio content with transcripts and captions, video content with sign language interpretation). In your answer please also include any alternative types/forms of accessible material that you are aware of existing, by mentioning separately each alternative form of material (media players that display captions and provide options to control the text size and color, options to pause, stop, start and adjust the volume of audio content).
2. Please mention which ones of these types/forms of accessible material have you used in the past or you are currently using?
3. Please mention the types/forms of adapted educational materials that you need for different courses taught in higher education.

4. Please mention the equipment (software and hardware) that you need at university and home.
5. Please mention the needs revealed by distance education for you (what more apart from the above mentioned do you need).

## **Mobility Impairments**

### **Interview Questions**

1. Please mention what types/forms of assistive technologies (software/apps and devices) and what types/forms of accessible material you are aware that exist (e.g. audio and video content, content in file format with full keyboard support). In your answer please also include any alternative types/forms of accessible material that you are aware of existing, by mentioning separately each alternative form of material (images and graphics that can be enlarged).
2. Please mention which ones of these types/forms of accessible material have you used in the past or you are currently using?
3. Please mention the types/forms of adapted educational materials that you need for different courses taught in higher education.
4. Please mention the equipment (software and hardware) that you need at university and home.
5. Please mention the needs revealed by distance education for you (what more apart from the above mentioned do you need).

## **Learning Difficulties**

### **Interview Questions**

1. Please mention what types/forms of assistive technologies (software/apps and devices) and what types/forms of accessible material you are aware that exist (e.g., adapted and simplified reading material with decreased reading level and plain language, digital texts with extra spaces, enlarged text and read aloud options, graphics, pictures and symbols). In your answer please also include any alternative types/forms of accessible material that you are aware of existing, by mentioning separately each alternative form of material (audio and video content with captions, symbol languages, cards or personal pictures, physically adapted books (added tactile pieces)).

2. Please mention which ones of these types/forms of accessible material have you used in the past or you are currently using?
3. Please mention the types/forms of adapted educational materials that you need for different courses taught in higher education.
4. Please mention the equipment (software and hardware) that you need at university and home.
5. Please mention the needs revealed by distance education for you (what more apart from the above mentioned do you need).

## **APPENDIX IV: QUESTIONNAIRES (AUTHORS: PAPADOPOULOS, K., KOUSTRIAVA, E., & LISANDER, I.)**

### **1. Questionnaire for Students with Visual Impairments**

Below you may find: 1) a list with the different kinds of Accessible Educational Material, and 2) a list of Assistive Technology Devices and software, 3) a list including mainstream technology. Please, answer: a) in what degree (how often) you use (or you have used) each item of these lists, and b) how significant or necessary you consider their use in educational settings.

In order to answer, please, use one of the following options:

0 = not at all

1 = a few

2 = medium

3 = much

4 = very much

X = not appropriate for you (e.g., large prints are not appropriate for individuals with blindness)

DN = you do not know how significant or necessary is their use

In addition, below you may find a list with the Needs revealed for Distance Education. Please, answer how significant you consider each one of the needs enlisted. In order to answer, please, use one of the following options:

0 = not at all

1 = a few

2 = medium

3 = much

4 = very much

X = not appropriate for you (e.g., large prints are not appropriate for individuals with blindness)

DN = you do not know how significant or necessary is their use

**Educational material**

<b>Accessible Printed Material</b>	How often you use it (or you have used it)	How significant is their use
Large prints (included enlarged books)		
Braille prints (included braille books)		
Tactile books (Text and graphics)		
Tactile graphics		
Microcapsule paper prints (e.g., PIAF prints)		
Plastic paper prints/ thermoform		
Pictures with Braille description		
Tactile maps		
Verbal descriptions in braille		
Raised-line paper for writing or graphing		
3D printed material (by 3D printer)		

<b>Accessible Digital Material</b>	How often you use it (or you have used it)	How significant is their use
Accessible word		
Accessible pdf		
Accessible daisy		
Accessible epub		
ebooks		
Audio recorded material (e.g., lecture notes, books)		

<b>Accessible Digital Material</b>	How often you use it (or you have used it)	How significant is their use
Accessible presentations (Powerpoint)		
Pictures with verbal-audio description		
Verbal description in audio file		
Digital books with legible texts (e.g., arial fonts,tahoma,san serif, helvetica)		
Accessible videos		

<b>Tactile Material</b>	How often you use it (or you have used it)	How significant is their use
Haptic models (haptic pictures, graphs, maps etc, manufactured from everyday material attached onto a surface)		
Manipulatives (Plastic shapes/objects, Tactile globes, Tactile dolls)		

<b>Audio-tactile material</b>	How often you use it (or you have used it)	How significant is their use
Audio-tactile pictures for IVEO/TTT (Systems with audio-tactile feedback)		

### **Assistive-Technology Devices**

<b>Assistive-Technology Devices</b>	How often you use it (or you have used it)	How significant is their use
Hand held magnifiers (e.g., reading stone, monocular, magnifying glass)		
Text to speech devices (e.g., reading devices)		
Daisy-player device (talking book machine)		
Traditional Braille typewriter (e.g., Perkins, Tatrapoint)		
Electronic Braille typewriter (e.g., Mountbatten)		
Notetakers (e.g., Braille N' Speak, Braille Lite)		
Handheld media player (e.g., Victor Reader Stream)		
Touch tablet (e.g., IVEO or TTT)		
Refreshable Braille display		
Braille printer/ Embosser (Index Everest, Viewplus Tiger)		
CCTV (e.g., MagniLink magnifier, Onyx, Topaz, Optelec ClearView)		
Computer monitor magnifier		
Portable CCTV/ Portable video magnifier		
Adjusted keyboards (enlarged keys, braille keys)		
Adapted notebooks (e.g., enlarged pages, grid paper, colored pages)		
Tactile-image enhancer (e.g., Piaf, Thermoform)		

<b>Assistive-Technology Devices</b>	How often you use it (or you have used it)	How significant is their use
Scan & text-to-speech devices (e.g., Portable scan translation pen)		
Slate and Stylus (can be equated to paper and pencil for individuals with visual impairment)		
Personal digital assistant (PDA, small handheld computers)		

### **Assistive-Technology Software**

<b>Assistive-Technology Software/Apps</b>	How often you use it (or you have used it)	How significant is their use
Screen reader (e.g., Jaws, VoiceOver, NVDA, TalkBack)		
Text-to-speech applications/programs (e.g., Natural Reader, ReadAloud)		
Daisy-player software (e.g., Dolphin easy reader, AMIS)		
Math-ML player (enables assistive technology such as screen readers and screen magnifiers to speak, navigate math expressions and convert to braille)		
Ebook readers (e.g., Dolphin EasyReader, Read2go, Thorium)		
Multifunctional text-to-speech software (e.g., Voice Dream Reader, Voice Dream Writer)		
Screen magnification software (e.g., Supernova)		

<b>Assistive-Technology Software/Apps</b>	How often you use it (or you have used it)	How significant is their use
Screen magnification apps (e.g., Microsoft windows magnifier)		
Braille to speech software (e.g., TELEO)		
Braille translator/ text-to-braille software		
Document and Word Processing software with braille translator (e.g., Biblos, Odt2braille with OpenOffice Writer)		
Document and Word Processing software with text-to-speech conversion (e.g., Speak with MS Office)		
Speech-to-text software/apps (e.g., Dragon by Nuance, Apple dictation, Gboard)		
Word prediction software/app		
Word completion software/app		
Scan & speech apps (e.g., Voice Dream Scanner)		
Digital voice recorder		
Talking calculator		
Specialized Math Software (digitally allows the use of supports such as screen magnification, text-to-speech support, audio representation of graphics, and translation into Nemeth code)		
Object identification apps		
Color identification apps		

<b>Assistive-Technology Software/Apps</b>	How often you use it (or you have used it)	How significant is their use
Light identification apps		

### Mainstream Technology

<b>Mainstream Technology</b>	How often you use it (or you have used it)	How significant is their use
Tablet		
Laptop		
Personal Computer (PC)		
MS Windows software		
Scanner		
OCR (optical character recognition e.g., Abbyy Finereader)		
Cell phone		
Smart phone		
Additional light sources		
Color adjustment on screens		

### Needs revealed for Distance Education (DE)

<b>Needs revealed for Distance Education (DE)</b>	How significant is the need
See the presentation online through magnification	

<b>Needs revealed for Distance Education (DE)</b>	How significant is the need
Be able to participate in the lecture (for instance, "raise the hand" through the relative digital feature of a DE platform)	
Have an accessible platform (compatible with the screen reader - e.g., NVDA - I use)	
Be able to understand when my camera or the others' camera in on/off	
Have channels for facilitation of communication with the professors in real time (e.g., accessible text box)	
Have channels for facilitation of communication with the professors beyond the class time	
Have channels for facilitation of communication with the students in real time (e.g., accessible text box)	
Have channels for facilitation of communication with the students beyond the class time	
Have accessible educational material (e.g., pdf, presentations, videos)	
Have accessible educational material (e.g., pdf, presentations, videos) early-before the course at hand	
Have accessible documents and all kind of forms that should be filled in	
Have plenty of time when I have to fill in documents and all kind of forms	
Have plenty of time during the examinations and other activities	
Have breaks and flexibility for the realization of courses and exams to avoid fatigue	
Have a smooth/organized use of the necessary tools during the course to be able to follow	

<b>Needs revealed for Distance Education (DE)</b>	How significant is the need
Have access to accessible tools/information (e.g., accessible sites, databases)	
Avoid using symbols or special fonts for the need to emphasize something, since this is not recognizable by screen reading programs	
Have various platforms available for communication and educational purposes (e.g., Moodle, Skype)	
Have the flexibility to decide the pace of the educational program's progress on my own	
Participate from wherever I decide	
Have the lecture recorded	
Have the ability to participate orally in the class	
Have administrative support available	
Have technical/accessibility support available	
Take feedback from and be in contact with the professors systematically	
Follow a hybrid model (from distance and physically) to have the ability to meet students and teachers in person	
Have all the information I need online (for instance, announcements, program)	
Can choose the form of examination (e.g., oral examination, paper composition, written exams)	

## 2. Questionnaire for Students with Hearing Impairments

Below you may find: 1) a list with the different kinds of Accessible Educational Material, and 2) a list of Assistive Technology, 3) a list including mainstream technology. Please, answer: a) in what degree (how often) you use (or you have used) each item of these lists, and b) how significant or necessary you consider their use in educational settings.

In order to answer, please, use one of the following options:

0 = not at all

1 = a few

2 = medium

3 = much

4 = very much

X = not appropriate for you (e.g. Sign language interpretation is not appropriate for individuals who do not know sign language)

DN = you do not know how significant or necessary is their use

In addition, below you may find a list with the Needs revealed for Distance Education. Please, answer how significant you consider each one of the needs enlisted. In order to answer, please, use one of the following options:

0 = not at all

1 = a few

2 = medium

3 = much

4 = very much

X = not appropriate for you (e.g. Sign language interpretation is not appropriate for individuals who do not know sign language)

DN = you do not know how significant or necessary is their use

**Educational material**

<b>Accessible Digital Material</b>	How often you use it (or you have used it)	How significant is their use
Audio recorded material transcribed (notes, dictated lessons)		
Videos with sign language		
Videos with transcriptions (including YouTube, lectures)		
Videos with captions (including YouTube)		
Accessible pdf		
Accessible word		
Accessible powerpoint		
Google docs		
Video lessons with slow rhythm		
Live streaming with captions (e.g. lectures given synchronously online)		
Digital material with images, graphics, and visual elements		

<b>Accessible Printed Material</b>	How often you use it (or you have used it)	How significant is their use
Printed material (e.g. lecture notes)		
Printed material with images, graphics, and visual elements		

<b>Accessibility Services</b>	How often you use it (or you have used it)	How significant is their use
Sign language interpretation (e.g. in lectures)		

### **Assistive-Technology**

<b>Assistive-Technology</b>	How often you use it (or you have used it)	How significant is their use
Speech-to-Text software/audio transcription apps (e.g. Dragon anywhere, Google Gboard, Apple dictation)		
Text-to-speech apps (e.g. Voice Dream reader)		
Voice recognition systems (e.g. ListenAll)		
Automatic captioning software/app (Communication Access Realtime Translation (CART))		
Connectclip (Enables hands-free phone calls and music streaming from smartphone)		
Video processing software for captioning		
FM systems (wireless assistive hearing devices that enhance the use of hearing aids)		
Loop systems (or induction loop, systems use electromagnetic energy to transmit sound)		
Speech amplification devices (e.g. ChatterVOX)		
Hearing aids (e.g. behind-the-ear (BTE), in-the-ear (ITE), receiver-in-the-ear (RITE), in-the-canal (ITC) and CROS (Contralateral Routing of Signals)/BiCROS (Bilateral Contralateral Routing of Signals))		

<b>Assistive-Technology</b>	How often you use it (or you have used it)	How significant is their use
Soundproof equipment for indoors environment		
Telecoils (or t-coil, a coil of wire that is installed inside many hearing aids and cochlear implants to act as a miniature wireless receiver)		

### **Mainstream Technology**

<b>Mainstream Technology</b>	How often you use it (or you have used it)	How significant is their use
Audio recorder		
Smartphone		
Tablet		
Computers		
Microphones		
Accessible online (synchronous and asynchronous) communication (e.g. MS Teams, Zoom)		
Virtual board		
Headset/Headphones		
Video recording software/apps (e.g. OBS)		
Media players for video with subtitles(e.g. VLC)		

### **Needs revealed for Distance Education (DE)**

<b>Needs revealed for Distance Education (DE)</b>	How significant is the need
The professor should speak close to the camera so I can lip-read easily	
Have detailed scripts of the lecture to complete the missing information delivered orally	
Recorded lectures with captions	
Change of person who speaks needs to be announced	
Educational platform that allows the interpreter and the professor's presentation appear simultaneously	
Can choose the form of examination (e.g. oral examination, paper composition, written exams)	
Online/distant communication with a SL interpreter	
Telecommunication relay services (a communication assistant serves as a bridge between two callers) (e.g. Tess)	
Autocaption feature in the language I speak integrated in the platform for lectures	
Be able to participate in the lecture (for instance, "raise the hand" through the relative digital feature of a DE platform, write in the text box)	
Have an accessible platform (compatible with speech-to-text software and good sound transmitter & receiver)	
Have channels for facilitation of communication with the professors in real time (e.g. text box)	
Have channels for facilitation of communication with the professors beyond the class time	

<b>Needs revealed for Distance Education (DE)</b>	How significant is the need
Have channels for facilitation of communication with the students in real time (e.g. text box)	
Have channels for facilitation of communication with the students beyond the class time	
Have accessible educational material (e.g. videos with captions and content in sign language)	
Have educational material (e.g. pdf, presentations, videos) early-before the course at hand so I can pay attention to the lecturers	
Have plenty of time when I have to fill in documents and all kind of forms	
Have plenty of time during the examinations and other activities	
Have breaks and flexibility for the realization of courses and exams to avoid fatigue	
Have a smooth/organized use of the necessary tools during the course to be able to follow	
Have access to accessible tools/information (e.g. accessible sites with captioned video)	
Have various platforms available for communication and educational purposes (e.g. Moodle, Skype)	
Have the flexibility to decide the pace of the educational program's progress on my own	
Participate from wherever I decide	
Have the ability to participate orally in the class	
Have administrative support available	

<b>Needs revealed for Distance Education (DE)</b>	How significant is the need
Have technical/accessibility support available	
Take feedback from and be in contact with the professors systematically	
Follow a hybrid model (from distance and physically) to have the ability to meet students and teachers in person	
Have all the information I need online (for instance, announcements, program)	

### 3. Questionnaire for Students with Mobility Impairments

Below you may find: 1) a list with the different kinds of Accessible Educational Material, and 2) a list of Assistive Technology (access to computer & mobility devices), 3) a list including mainstream technology. Please, answer: a) in what degree (how often) you use (or you have used) each item of these lists, and b) how significant or necessary you consider their use in educational settings.

In order to answer, please, use one of the following options:

0 = not at all

1 = a few

2 = medium

3 = much

4 = very much

X = not appropriate for you (e.g. adapted keyboards are not appropriate for individuals who can not physically activate the keyboard)

DN = you do not know how significant or necessary is their use

In addition, below you may find a list with the Needs revealed for Distance Education. Please, answer how significant you consider each one of the needs enlisted. In order to answer, please, use one of the following options:

0 = not at all

1 = a few

2 = medium

3 = much

4 = very much

X = not appropriate for you (e.g. adapted keyboards are not appropriate for individuals who can not physically activate the keyboard)

DN = you do not know how significant or necessary is their use

### Educational material

<b>Accessible Digital Material</b>	How often you use it (or you have used it)	How significant is their use
Accessible word		
Accessible pdf		
Accessible daisy		
Accessible epub		
Accessible presentations (Powerpoint)		
Accessible excel files		
ebook		
Audio recorded material (e.g. lecture notes, books)		
Video recorded material (e.g. lectures)		

<b>Accessible Printed Material</b>	How often you use it (or you have used it)	How significant is their use
Accessible text (books, notes etc.)		
Accessible presentations		

### Assistive-Technology

<b>Access to computer &amp; mobile devices</b>	How often you use it (or you have used it)	How significant is their use
Text-to-speech programs/applications (e.g. Voice Dream reader)		

<b>Access to computer &amp; mobile devices</b>	How often you use it (or you have used it)	How significant is their use
Speech-to-text programs/applications (e.g. Dragon anywhere, Google Gboard, Apple dictation)		
Head stylus		
Voice control apps (e.g. Dragon naturally speaking)		
Word prediction software/app		
Word completion software/app		
Adapted keyboards (e.g. small keyboards, ergonomic)		
Virtual keyboards/mouse		
Adapted mouses (e.g. ergonomic)		
Alternative mouses (e.g. jelly-bean switches, trackball, joystick, leg switch)		
Sip and Puff system		
Remote control of computer (e.g. eye tracking system, head mouse)		
Scanning input (screen scanning software/application)		
Augmentative and alternative communication devices/software		
Personal Emergency response system		
Personal digital assistant (PDA, small handheld computers)		

## Mainstream Technology

<b>Mainstream Technology</b>	How often you use it (or you have used it)	How significant is their use
Microphones		
Note-taking audio recorders		
Video recorders		
Tablets		
Computers		
Book scanner desktop or portable (e.g. Irispen scan)		
Cortana on windows (virtual assistant for setting reminders, searching and answering questions for the user)		
Email apps		
Touch devices(interaction through touch)		
Smart watches		

### **Needs revealed for Distance Education (DE)**

<b>Needs revealed for Distance Education (DE)</b>	How significant is the need
Be able to participate in the lecture (for instance, "raise the hand" through the relative digital feature of a DE platform)	
Have an accessible platform for the lectures	
Have channels for facilitation of communication with the professors in real time (e.g. accessible text box)	

<b>Needs revealed for Distance Education (DE)</b>	How significant is the need
Have channels for facilitation of communication with the professors beyond the class time	
Have channels for facilitation of communication with the students in real time (e.g. accessible text box)	
Have channels for facilitation of communication with the students beyond the class time	
Have accessible educational material (e.g. pdf, presentations, videos)	
Have accessible educational material (e.g. pdf, presentations, videos) early-before the course at hand	
Have accessible documents and all kind of forms that should be filled in	
Have plenty of time when I have to fill in documents and all kind of forms	
Have plenty of time during the examinations and other activities	
Have breaks and flexibility for the realization of courses and exams to avoid fatigue	
Have a smooth/organized use of the necessary tools during the course to be able to follow	
Have access to accessible tools/information (e.g. accessible sites, databases)	
Have various platforms available for communication and educational purposes (e.g. Moodle, Skype)	
Have the flexibility to decide the pace of the educational program's progress on my own	
Participate from wherever I decide	

<b>Needs revealed for Distance Education (DE)</b>	How significant is the need
Have the lecture recorded	
Have the ability to participate orally in the class	
Have administrative support available	
Have technical/accessibility support available	
Take feedback from and be in contact with the professors systematically	
Follow a hybrid model (from distance and physically) to have the ability to meet students and teachers in person	
Have all the information I need online (for instance, announcements, program)	
Can choose the form of examination (e.g. oral examination, paper composition, written exams)	

#### 4. Questionnaire for Students with Learning Difficulties

Below you may find: 1) a list with the different kinds of Accessible Educational Material, and 2) a list of Assistive Technology Devices and software, 3) a list including mainstream technology. Please, answer: a) in what degree (how often) you use (or you have used) each item of these lists, and b) how significant or necessary you consider their use in educational settings.

In order to answer, please, use one of the following options:

0 = not at all

1 = a few

2 = medium

3 = much

4 = very much

X = not appropriate for you (e.g. large prints are not appropriate for individuals with blindness)

DN = you do not know how significant or necessary is their use

In addition, below you may find a list with the Needs revealed for Distance Education. Please, answer how significant you consider each one of the needs enlisted. In order to answer, please, use one of the following options:

0 = not at all

1 = a few

2 = medium

3 = much

4 = very much

X = not appropriate for you (e.g. large prints are not appropriate for individuals with blindness)

DN = you do not know how significant or necessary is their use

**Educational material**

<b>Accessible Printed Material</b>	How often you use it (or you have used it)	How significant is their use
Large prints		
Adapted books (added tactile pieces and images/picture annotation)		
Accessible printed texts (fonts, spaces etc.)		
Educational images/graphics		
Printed conceptual/mental map		
Texts with simplified language		
Flash cards		

<b>Accessible Digital Material</b>	How often you use it (or you have used it)	How significant is their use
E-books		
Accessible docs (fonts, spaces etc.)		
Accessible pdf		
Accessible powerpoint		
Accessible daisy		
Accessible epub		
Digital images		
Pictograms in digital texts		
Digital texts with simplified language		

<b>Accessible Digital Material</b>	How often you use it (or you have used it)	How significant is their use
Paper conceptual and mental maps		
Digital conceptual/mental maps		
Color correction of texts		
Videos with captions		
Videos (including YouTube, Documentaries)		
Accessible Mathematical formulas		
Symbolic languages		
Audiobooks		
Recorded lectures (audio,video)		
Highlighted texts		
Lecture summaries		

### **Assistive-Technology Devices**

<b>Assistive-Technology Devices</b>	How often you use it (or you have used it)	How significant is their use
Text to speech devices (e.g. reading devices)		
Daisy-player device (players that are used to play DAISY audio books and are designed to be used by people with print impairments)		
Personal digital assistant (PDA, small handheld computers)		

### **Assistive-Technology Software/Apps**

<b>Assistive-Technology Software/Apps</b>	How often you use it (or you have used it)	How significant is their use
Highlighting text application		
Text-to-Speech software/apps (e.g. Voice Dream reader)		
Accessible calculators		
Screen/Text magnification		
Concept map program (e.g. Cmap)		
Reminder app/calendar with notifications		
Speech-to-text software (e.g. Dragon anywhere, Google Gboard, Apple dictation)/Transcription apps		
Spell checker/word correction programs		
Word prediction software/app		
Word completion software/app		
Time management apps		

### Mainstream Technology

<b>Mainstream Technology</b>	How often you use it (or you have used it)	How significant is their use
Audio-recorder		
Computer		
Clocks		
Word processing software		

<b>Mainstream Technology</b>	How often you use it (or you have used it)	How significant is their use
Tablet		
Pad and pen		
Accessible online (synchronous and asynchronous) communication (e.g. MS Teams, Zoom)		
Summarizing programs (e.g. ePico!)		
Learning management systems (platform for all education processes - lessons, notes, exams etc)		
Digital dictionaries		

### **Needs revealed for Distance Education (DE)**

<b>Needs revealed for Distance Education (DE)</b>	How significant is the need
Have an outline of the topics to be covered before the course and a summary of the main subjects after the course	
Be able to participate in the lecture (for instance, "raise the hand" through the relative digital feature of a DE platform)	
Have an accessible platform (compatible with text-to-speech apps or a screen reader)	
Have channels for facilitation of communication with the professors in real time (e.g. oral communication)	
Have channels for facilitation of communication with the professors beyond the class time	

<b>Needs revealed for Distance Education (DE)</b>	How significant is the need
Have channels for facilitation of communication with the students in real time (e.g. oral communication)	
Have channels for facilitation of communication with the students beyond the class time	
Have accessible educational material (e.g. pdf, presentations, notes)	
Have accessible educational material (e.g. pdf, presentations, notes) early-before the course at hand	
Have accessible documents and all kind of forms that should be filled in	
Have plenty of time when I have to fill in documents and all kind of forms	
Have plenty of time during the examinations and other activities	
Have breaks and flexibility for the realization of courses and exams to avoid fatigue	
Have a smooth/organized use of the necessary tools during the course to be able to follow	
Have access to accessible tools/information (e.g. accessible sites, databases)	
Avoid using symbols or special fonts for the need to emphasize something, since this is not recognizable by screen reading programs or text-to-speech apps	
Have various platforms available for communication and educational purposes (e.g. Moodle, Skype)	
Have the flexibility to decide the pace of the educational program's progress on my own	
Participate from wherever I decide	

<b>Needs revealed for Distance Education (DE)</b>	How significant is the need
Have the lecture recorded	
Have the ability to participate orally in the class	
Have administrative support available	
Have technical/accessibility support available	
Take feedback from and be in contact with the professors systematically	
Follow a hybrid model (from distance and physically) to have the ability to meet students and teachers in person	
Have all the information I need online (for instance, announcements, program)	
Can choose the form of examination (e.g. oral examination, paper composition, written exams)	