HEDforALL: Holistic Approach to Accessible Higher Education

D2.2

Knowledge and Skills of Teaching staff and Accessibility Advisors – part B

ERASMUS+
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ABBREVIATIONS

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

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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 competencies 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 educational material, development practices, and distance education/e-Learning methodologies for the implementation of digital education in higher education.

INTRODUCTION

This report presents the activities and results of the second trial of the research implemented in the work package "Project Result 2 (RES2)" titled "Knowledge and Skills of Teaching Staff and Accessibility Advisors", which was carried out with individuals who participated in a short training/informative program implemented within the project. In particular, like the first trial of the same research, this second trial aims to identify:

a) the types/forms of adapted educational materials for SwD advisors and teaching staff are aware of and their experience in using and/or developing them,
b) the knowledge and know-how of advisors and teaching staff on assistive technology (software and hardware) aimed at SwD and on mainstream technology with features beneficial to SwD, and
c) the experience of advisors and teaching staff on distance education (DE) for SwD.
d) the possible impact of the training/informative program on the knowledge of the participants concerning the types/forms of adapted educational materials for SwD are aware of and their experience in using and/or developing them.

Initially, interviews were conducted for advisors and teaching staff separately to identify a) the types/forms of adapted educational materials they are aware SwD use for different courses taught in higher education, b) the adapted educational materials they can produce on their own, c) their experience in DE programs/courses with SwD and any adaptations on the material they have made while working on them for each group of SwD, and d) the needs revealed by distance education for the advisors and teaching staff themselves. The findings from the qualitative analysis of the interviews were used for the design of questionnaires (**see**

APPENDIX I: Questionnaires) that were answered by the advisors and teaching staff of SwD in the first and the second trials 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 consist of closed-type questions. Actually, each questionnaire consists of a list of items concerning the types/forms of adapted educational materials, the assistive equipment (devices and applications/software), and the mainstream technology SwD may need, and two questions on the experience of the advisors and teaching staff concerning DE for SwD. 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 results of the second trial of the study, and the second section **(Section-B)** concerns the results of statistical analysis concerning the impact of the training/informative program on the knowledge of the participants (accessibility advisors and teaching staff) concerning the types/forms of adapted educational materials for SwD are aware of and their experience in using and/or developing them.

The impact of the training/informative program on the participants' knowledge about assistive and mainstream technology was not studied, as a) it was not part of the project objectives and b) the training/informative program did not concern assistive and mainstream technology.

SECTION-A: SECOND TRIAL OF THE STUDY

1. Participants

This second trial of the study did not include participants from Germany. The questionnaire for advisors was answered by ***35 accessibility advisors*** (10 from Italy, 7 from Spain, and 18 from Greece). The participants' ages ranged from 25 to 60 (M = 42.14) years of age, and they had 8.40 years (on average) of experience as accessibility advisors. Twenty-two of the participants were females, and 13 were males. Twenty-five of the participants stated that they were graduates of a program (seminar, bachelor, or postgraduate) related to the education of individuals with disabilities, and 10 stated that they had not received any relevant training. Of those who had received training, 15 attended a seminar, 8 graduated from a postgraduate program, one from both a seminar and postgraduate program, and one graduated from a bachelor program.

The questionnaire for teaching staff was answered by ***92 members of the teaching staff*** (30 from Italy, 31 from Spain, and 31 from Greece). The participants' ages ranged from 24 to 66 (M = 50.1) years of age, and they had 18.1 years (on average) of experience as teaching staff. Fifty-one of the participants were females, and 41 were males. Thirty-eight of the participants stated that they were graduates of a program (seminar, bachelor, or postgraduate) related to the education of individuals with disabilities, and 54 stated that they had not received any relevant training. Of those who had received training, 15 attended a seminar, 8 graduated from a postgraduate program, 3 from both a seminar and postgraduate program, and 12 graduated from a bachelor program.

2. Research Instruments

The findings from the qualitative analysis of the interviews were used for the design of the two questionnaires (see **APPENDIX I: Questionnaires**), one for advisors and one for teaching staff, that were answered by the participants in each country in the first and second trial of this study, which is presented in the present report.

3. Results

3.1 Results for the Advisors

Educational material

The following tables present the results of the descriptive statistics (mean and standard deviation) of the accessibility advisors' responses for each item of the questionnaire and for each of the three questions concerning the educational material. The questions answered by the participants were:

Q1: To what extent do you know (are you aware of the features of) this educational material?

Q2: To what extent have you used this educational material?

Q3: What is your experience in producing this type of educational material?

Accessible Printed Material	**Q1**		**Q2**		**Q3**	
	M	**SD**	**M**	**SD**	**M**	**SD**
1. Large prints (included enlarged books)	2.800	1.079	1.629	1.352	1.314	1.367
2. Braille prints (included braille books)	2.971	0.857	1.257	1.379	1.171	1.445
3. Tactile books (Text and graphics)	2.486	1.095	1.000	1.350	0.629	1.165
4. Tactile graphics/images	2.343	1.187	1.086	1.422	0.743	1.268
5. Microcapsule paper prints (e.g., Piaf prints)	1.686	1.568	0.857	1.264	0.743	1.245
6. Tiger embossed prints	1.543	1.462	0.714	1.250	0.571	1.092
7. Plastic paper prints/ thermoform	1.529	1.440	0.657	1.187	0.600	1.090
8. Relief printed material	1.600	1.479	0.600	1.143	0.371	0.808
9. Pictures with Braille description	2.286	1.384	1.029	1.317	0.657	1.083
10. Tactile maps	2.371	1.239	0.971	1.382	0.629	1.060
11. Verbal descriptions in braille	2.559	1.260	1.143	1.458	0.800	1.302
12. Raised-line paper for writing or graphing	1.343	1.589	0.657	1.162	0.657	1.136
13. 3D printed material (by 3D printer)	2.486	1.314	0.800	1.158	0.486	0.818
14. Printed material (e.g. lecture notes)	2.800	1.389	1.714	1.487	1.857	1.574
15. Printed material with images, graphics, and visual elements	2.743	1.358	1.714	1.447	1.914	1.634
16. Accessible text (books, notes etc.)	3.382	0.985	2.829	1.339	2.543	1.482
17. Accessible presentations	2.914	1.292	2.229	1.716	1.857	1.498

Accessible Printed Material	**Q1**		**Q2**		**Q3**	
18. Adapted books (added tactile pieces and images/picture annotation)	2.486	1.422	1.429	1.520	1.057	1.434
19. Printed conceptual/mental map	2.714	1.447	1.829	1.671	1.543	1.521
20. Flash cards (a study or memorisation tool, with information on one or both sides.)	2.314	1.367	0.829	1.124	0.571	0.917
21. Notes with mathematical equations	2.441	1.418	0.857	1.264	0.829	1.248

Accessible Digital Material	**Q1**		**Q2**		**Q3**	
	M	**SD**	**M**	**SD**	**M**	**SD**
1. Accessible word	3.441	0.960	2.914	1.380	3.343	1.136
2. Accessible pdf	3.429	0.948	2.971	1.248	3.143	1.141
3. Accessible presentations (Powerpoint)	3.371	1.114	3.057	1.187	3.114	1.345
4. Accessible daisy	1.743	1.559	1.229	1.416	1.086	1.502
5. Accessible epub	2.057	1.514	1.486	1.579	1.257	1.615
6. Accessible excel files	2.143	1.192	1.057	1.514	1.086	1.560
7. Ebooks	3.029	0.985	1.686	1.491	1.114	1.367
8. Accessible books with HTML / HTML content	1.800	1.471	1.086	1.422	0.914	1.380
9. Audio recorded material (e.g., lecture notes, books)	2.743	1.268	1.543	1.421	0.829	1.248
10. Video recorded material (e.g. lectures)	2.800	1.368	2.029	1.424	0.971	1.425
11. Pictures with verbal-audio description	2.543	1.268	1.829	1.706	1.343	1.714
12. Images with alternative text	3.200	1.132	2.171	1.871	2.059	1.938
13. Verbal description in audio file	2.286	1.405	0.857	1.353	0.886	1.430
14. Digital books with legible texts (e.g., arial fonts, tahoma, san serif, helvetica)	3.400	0.914	2.229	1.395	1.600	1.594
15. Accessible videos	2.629	1.395	1.257	1.421	1.314	1.471
16. Videos with sign language	2.412	1.373	1.086	1.422	0.714	1.250
17. Videos with transcriptions (including YouTube, lectures)	2.794	1.321	1.629	1.516	1.171	1.524
18. Video with subtitles	2.771	1.374	2.229	1.308	1.343	1.571
19. Google docs	3.286	1.100	2.800	1.279	2.600	1.666
20. Video lessons with slow rhythm	1.686	1.388	0.543	0.886	0.429	0.739

Accessible Digital Material	Q1		Q2		Q3	
21. Live streaming with captions (e.g. lectures given synchronously online)	2.314	1.409	1.171	1.294	0.743	1.268
22. Digital material with images, graphics, and visual elements	2.829	1.382	2.629	1.716	2.429	1.703
23. Pictograms in digital texts	1.800	1.451	0.771	1.215	0.686	1.132
24. Digital texts with simplified language	2.400	1.288	1.143	1.556	1.029	1.218
25. Digital conceptual/mental maps	2.543	1.597	1.857	1.611	1.857	1.768
26. Color corrected texts	2.114	1.345	0.914	1.314	0.771	0.910
27. Accessible Mathematical formulas	1.971	1.424	1.000	1.350	0.914	1.337
28. Symbolic languages	1.486	1.401	0.486	0.981	0.371	0.942
29. Audiobooks	2.714	1.250	1.486	1.358	0.571	0.979
30. Highlighted texts	1.886	1.409	1.114	1.430	0.914	1.422
31. Lecture summaries	2.400	1.439	1.600	1.538	1.114	1.451
32. Accessible websites	3.000	1.283	1.886	1.409	1.457	1.686
33. Digital media	2.943	1.235	2.314	1.451	1.371	1.555
34. Accessible Music	1.441	1.397	0.743	1.268	0.457	0.852

Haptic Material	Q1		Q2		Q3	
	M	SD	M	SD	M	SD
1. Haptic models (e.g., haptic pictures, graphs, maps etc, manufactured from everyday material attached onto a surface)	1.743	1.578	0.771	1.190	0.686	1.105
2. Manipulatives (e.g., Plastic shapes/objects, Tactile globes, Tactile dolls)	1.343	1.474	0.600	0.976	0.441	0.860

Audio-tactile material	Q1		Q2		Q3	
	M	SD	M	SD	M	SD
1. Audio-tactile pictures for IVEO/TTT (Systems with audio-tactile feedback)	1.143	1.417	0.457	0.852	0.343	0.765

Assistive Technology

The following tables present the results of the descriptive statistics (mean and standard deviation) of the accessibility advisors' responses for each item of the questionnaire and for

each of the two questions concerning the assistive or mainstream technology. The questions answered by the participants were:

Q1: To what degree are you familiar with this device/software/app (are you aware of its features)?

Q2: To what degree do you know how to use this device/software/app?

Assistive-Technology Devices	**Q1**		**Q2**	
	M	**SD**	**M**	**SD**
1. Hand held magnifiers (e.g., reading stone, monocular, magnifying glass)	1.743	1.578	1.353	1.495
2. Text to speech devices (e.g., reading devices)	2.943	1.162	1.912	1.602
3. Daisy-player device (talking book machine)	1.429	1.632	1.143	1.458
4. Traditional Braille typewriter (e.g., Perkins, Tatrapoint)	1.600	1.666	0.886	1.278
5. Electronic Braille typewriter (e.g., Mountbatten)	1.200	1.324	0.686	1.051
6. Braille keyboard	1.714	1.582	0.857	1.240
7. Notetakers (e.g., Braille N' Speak, Braille Lite)	1.229	1.516	0.571	1.119
8. Handheld media player (e.g., Victor Reader Stream)	0.971	1.445	0.353	0.691
9. Touch tablet (e.g., IVEO or TTT)	1.200	1.431	0.600	1.168
10. Refreshable Braille display	1.314	1.586	0.686	1.183
11. Braille printer/ Embosser (e.g., Index Everest, Viewplus Tiger)	1.743	1.704	1.114	1.623
12. CCTV (e.g., MagniLink magnifier, Onyx, Topaz, Optelec ClearView)	1.657	1.731	1.371	1.699
13. Computer monitor magnifier (i.e., device that hooks on the screen and magnifies it)	1.824	1.817	1.400	1.612
14. Portable CCTV/ Portable video magnifier (i.e., devices consisting of a camera, monitor, lighting and provide magnified image)	1.771	1.716	1.200	1.530
15. Adjusted keyboards (enlarged keys, braille keys)	1.971	1.654	1.286	1.619
16. Adapted notebooks (e.g., enlarged pages, grid paper, colored pages)	1.559	1.561	0.914	1.422
17. Tactile-image enhancer (e.g., Piaf, Thermoform)	1.571	1.650	0.914	1.358
18. Scan & text-to-speech devices (e.g., Portable scan translation pen)	1.943	1.327	1.114	1.530

Assistive-Technology Devices	**Q1**		**Q2**	
19. Slate and Stylus (tools used by individuals with visual impairment to write text in braille)	0.857	1.264	0.314	0.583
20. Personal digital assistant (PDA, small handheld computers)	1.229	1.457	0.800	1.346
21. Connectclip (Enables hands-free phone calls and music streaming from smartphone)	0.771	1.262	0.457	0.919
22. FM systems (wireless assistive hearing devices that enhance the use of hearing aids)	1.229	1.592	0.943	1.434
23. Loop systems or audio induction loop (for individuals with hearing impairments)	1.371	1.437	0.914	1.245
24. Speech amplification devices (e.g. ChatterVOX)	1.086	1.463	0.514	0.919
25. 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)]	1.371	1.374	0.657	0.906
26. Soundproof equipment for indoors environment (i.e., equipment that improve the overall sound quality and intelligibility for individuals with hearing impairment)	0.971	1.224	0.600	1.063
27. 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)	0.886	1.207	0.314	0.583
28. Head stylus (users with mobility impairments control the stylus to interact with touchscreens or other devices)	1.235	1.304	0.629	1.031
29. Adapted keyboards (e.g. small keyboards, ergonomic)	2.314	1.491	1.600	1.631
30. Virtual keyboards/mouse	2.200	1.568	1.571	1.632
31. Adapted mouses (i.e., mouse that has been modified or designed to accommodate individuals with specific physical or cognitive challenges; e.g., ergonomic)	2.343	1.552	1.657	1.679
32. Alternative mouses (e.g. jelly-bean switches, trackball, joystick, leg switch)	2.429	1.577	1.657	1.731
33. Sip and Puff system (users control electronic devices, such as computers or wheelchairs, by using their breath, either blowing or sucking air)	1.286	1.426	0.714	1.274
34. Remote control of computer (e.g. eye tracking system, head mouse)	2.086	1.483	1.486	1.687

Assistive-Technology Devices	**Q1**		**Q2**	
35. Personal Emergency response system (i.e., typically a wearable device, equipped with an emergency button that can be pressed to request assistance)	1.057	1.413	0.486	0.818
36. Augmentative and alternative communication devices/software	1.176	1.527	0.857	1.438
37. Tactile blackboard (i.e., a raised-line drawing board)	1.676	1.471	0.943	1.349
38. Tactile screens	1.879	1.596	1.500	1.523

Assistive-Technology Software/Apps	**Q1**		**Q2**	
	M	**SD**	**M**	**SD**
1. Screen reader (e.g., Jaws, VoiceOver, NVDA, TalkBack)	2.514	1.380	1.943	1.589
2. Text-to-speech applications/programs (e.g., Natural Reader, ReadAloud, VoiceDream reader)	2.371	1.352	1.829	1.636
3. Daisy-player software (e.g., Dolphin easy reader, AMIS)	1.543	1.669	1.343	1.474
4. Math-ML player (enables assistive technology such as screen readers and screen magnifiers to speak, navigate math expressions and convert to braille)	1.400	1.557	1.143	1.417
5. Ebook readers (e.g., Dolphin EasyReader, Read2go, Thorium)	1.743	1.651	1.429	1.481
6. Multifunctional text-to-speech software (e.g., Voice Dream Reader, Voice Dream Writer)	1.657	1.494	1.229	1.308
7. Screen magnification software (e.g., Supernova)	2.029	1.823	1.829	1.706
8. Screen magnification apps (e.g., Microsoft windows magnifier)	2.057	1.662	1.800	1.451
9. Braille to speech software (e.g., TELEO)	1.057	1.305	0.686	1.207
10. Braille translator/ text-to-braille software	1.235	1.415	0.943	1.434
11. Document and Word Processing software with braille translator (e.g., Biblos, Odt2braille with OpenOffice Writer)	1.286	1.564	1.000	1.534
12. Document and Word Processing software with text-to-speech conversion (e.g., Speak with MS Office)	1.486	1.616	1.371	1.497
13. Word prediction software/app	1.743	1.400	1.543	1.559
14. Word completion software/app	1.743	1.421	1.400	1.576
15. Scan & speech apps (e.g., Voice Dream Scanner)	1.400	1.594	1.057	1.327
16. Digital voice recorder	2.000	1.455	1.600	1.241
17. Talking calculator	1.588	1.500	1.029	1.150

Assistive-Technology Software/Apps	**Q1**		**Q2**	
18. 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)	1.086	1.358	0.600	1.063
19. Object identification apps	1.229	1.308	0.914	1.314
20. Color identification apps	1.114	1.323	0.824	1.290
21. Light identification apps	0.771	1.215	0.559	1.106
22. Speech-to-Text software/audio transcription apps (e.g. Dragon anywhere, Google Gboard, Apple dictation)	1.857	1.396	1.486	1.442
23. Voice recognition systems (e.g. ListenAll)	1.686	1.471	1.257	1.442
24. Automatic captioning software/app (Communication Access Realtime Translation (CART))	1.200	1.451	0.571	0.917
25. Voice control apps (e.g. Dragon naturally speaking)	1.486	1.380	0.971	1.175
26. Scanning input (screen scanning software/application)	1.314	1.451	0.829	1.043
27. Highlighting text application	1.429	1.441	1.029	1.248
28. Accessible calculators	1.143	1.498	0.743	1.094
29. Concept map program (e.g. Cmap)	3.029	7.127	1.600	1.576
30. Reminder app/calendar with notifications	2.514	1.358	1.971	1.445
31. Spell checker/word correction programs	2.514	1.269	1.857	1.417
32. Time management apps	2.114	1.367	1.543	1.462
33. EDICO (a Scientific Editor specifically designed for the blind)	1.086	1.358	0.457	0.817
34. Atkinson Hyper Legible font	1.057	1.413	0.686	1.301

Mainstream Technology	**Q1**		**Q2**	
	M	**SD**	**M**	**SD**
1. Tablet	3.853	0.359	3.800	0.473
2. Laptop	3.943	0.338	3.914	0.373
3. Personal Computer (PC)	3.971	0.169	3.943	0.236
4. MS Windows software	3.800	0.632	3.686	0.796
5. Scanner	3.514	0.702	3.400	0.914
6. OCR (optical character recognition e.g., Abbyy Finereader)	3.029	1.150	2.571	1.420
7. Cell phone	3.765	0.781	3.676	0.912
8. Smart phone	3.943	0.236	3.829	0.382
9. Additional light sources	2.500	1.376	1.914	1.463

Mainstream Technology	**Q1**		**Q2**	
10. Color adjustment on screens	3.371	0.973	2.514	1.292
11. Audio recorder	3.143	1.332	2.629	1.330
12. Microphones	3.429	1.008	2.943	1.056
13. Accessible online (synchronous and asynchronous) communication (e.g. MS Teams, Zoom)	3.629	0.942	3.457	1.120
14. Virtual board	2.857	1.309	2.543	1.482
15. Headset/Headphones	3.771	0.808	3.629	0.808
16. Video recording software/apps (e.g. OBS)	3.143	1.240	2.429	1.420
17. Media players for video with subtitles (e.g. VLC)	3.286	0.825	2.714	1.296
18. Book scanner desktop or portable (e.g., Irispen scan)	2.571	1.501	2.057	1.454
19. Cortana on windows (virtual assistant for setting reminders, searching and answering questions for the user)	2.000	1.534	1.600	1.418
20. Email apps	3.857	0.430	3.857	0.430
21. Touch devices (interaction through touch)	2.829	1.599	2.543	1.615
22. Smart watches	3.257	1.197	2.829	1.465
23. Clocks	3.686	0.676	3.486	1.040
24. Word processing software	3.600	0.946	3.686	0.796
25. Pad and pen	3.514	1.011	3.171	1.403
26. Learning management systems (platform for all education processes - lessons, notes, exams etc.)	2.971	1.124	2.514	1.522
27. Summarizing programs (e.g. ePico!)	1.486	1.483	0.829	1.294
28. Digital dictionaries	3.114	0.932	2.971	1.248

Existing experience in distance education of Students with Disabilities

The following table presents the results of the descriptive statistics (mean and standard deviation) of the accessibility advisors' responses for each of the two questions.

	M	**SD**
1. What is your experience in distance education of students with disabilities	1.629	1.06
2. To what degree are you considered to have the knowledge and experience to provide distance education for students with disabilities?	1.743	1.04

3.2 Results for the Teaching Staff

Educational material

The following tables present the results of the descriptive statistics (mean and standard deviation) of the teaching staff' responses for each item of the questionnaire and for each of the three questions concerning the educational material. The questions answered by the participants were:

Q1: To what extent do you know (are you aware of the features of) this educational material?

Q2: To what extent have you used this educational material?

Q3: What is your experience in producing this type of educational material?

Accessible Printed Material	**Q1**		**Q2**		**Q3**	
	M	**SD**	**M**	**SD**	**M**	**SD**
1. Braille prints (included braille books)	1.9239	1.179	0.4674	0.883	0.4022	1.028
2. Large prints (included enlarged books)	2.3261	1.101	0.7065	0.944	0.6196	1.057
3. Tactile books (Text and graphics)	1.9565	1.231	0.3696	0.780	0.1957	0.633
4. Tactile graphics/images	1.8696	1.224	0.3626	0.810	0.2637	0.728
5. Tactile maps	1.3587	1.306	0.2935	0.704	0.2283	0.697
6. Printed conceptual/mental map	2.0217	1.292	1.4239	1.639	0.8587	1.263
7. Microcapsule paper prints (e.g., Piaf prints)	0.7826	1.004	0.1739	0.640	0.0978	0.515
8. Tiger embossed prints	0.5761	0.699	0.0870	0.410	0.0543	0.272
9. Plastic paper prints/ thermoform	0.9891	1.032	0.1304	0.497	0.0652	0.289
10. 3D printed material (by 3D printer)	1.7174	1.287	0.3587	0.846	0.1630	0.452
11. Pictures with Braille description	1.4565	1.270	0.3111	0.774	0.2174	0.677
12. Adapted books (added tactile pieces and images/picture annotation)	1.0978	1.293	0.4457	0.869	0.2717	0.713
13. Accessible text (books, notes etc.)	2.5543	1.031	1.5556	1.350	0.8804	1.156

Accessible Digital Material	**Q1**		**Q2**		**Q3**	
	M	**SD**	**M**	**SD**	**M**	**SD**

Accessible Digital Material	Q1		Q2		Q3	
1. Accessible word	2.8152	1.266	2.5109	1.330	2.0326	1.271
2. Accessible pdf	2.1630	1.312	2.5000	1.403	2.0217	1.292
3. Accessible presentations (Powerpoint)	1.9565	1.482	2.4565	1.386	2.0652	1.239
4. Accessible daisy	0.5109	0.858	0.1739	0.483	0.0870	0.320
5. Accessible epub	0.9457	1.113	0.2391	0.454	0.1087	0.346
6. Accessible excel files	1.2174	1.265	0.7391	0.936	0.7500	0.872
7. Ebooks	1.6957	1.435	1.4891	1.209	0.8370	1.009
8. Digital books with legible texts (e.g., Arial fonts, Tahoma, San serif, Helvetica)	2.4457	1.217	2.1196	1.489	1.3804	1.274
9. Digital texts with simplified language	1.5000	1.395	1.0543	1.171	0.5761	1.071
10. Audio recorded material (e.g., lecture notes, books)	2.2283	1.196	1.8804	1.650	1.8000	1.630
11. Audiobooks	2.2717	1.159	1.5543	1.613	0.4348	0.731
12. Pictures with verbal-audio description	1.3261	1.498	1.1957	1.151	0.7065	1.105
13. Images with alternative text	1.4130	1.625	1.8152	1.511	1.0326	1.370
14. Videos with sign language	1.3043	1.517	0.8587	1.044	0.2935	0.565
15. Videos with transcriptions (including YouTube, lectures)	1.8696	1.605	1.4674	1.271	0.7935	1.115
16. Videos with subtitles	1.9783	1.519	2.0000	1.453	0.9239	1.447
17. Live streaming with captions (e.g., lectures given synchronously online)	1.5543	1.485	1.3370	1.243	0.4130	0.800
18. Digital conceptual/mental maps	2.0000	1.406	1.6522	1.572	0.5978	0.938
19. Color corrected texts	1.1087	1.378	0.6739	1.140	0.6413	1.115
20. Multimodal material (e.g., mixture of linguistic, visual, gestural, spatial and audio elements)	1.5543	1.217	1.3043	1.357	0.8261	1.182
21. Serious games (the educational process takes part through the game)	1.3152	1.460	0.9130	1.364	0.6196	1.274
22. METACOM symbols (Augmentative and Alternative Communication (AAC))	0.8587	1.228	0.3333	0.861	0.2667	0.818
23. Accessible mathematical equations	0.6957	1.014	0.2391	0.635	0.1957	0.539

Haptic Material	Q1		Q2		Q3	
	M	SD	M	SD	M	SD
1. Haptic models (haptic pictures, graphs, maps etc., manufactured from everyday material attached onto a surface)	0.9674	1.313	0.4891	1.053	0.3804	0.982
2. Manipulatives (Plastic shapes/objects, Tactile globes, Tactile dolls)	0.9674	1.208	0.4891	0.943	0.4130	0.891

Audio-tactile material	Q1		Q2		Q3	
	M	SD	M	SD	M	SD
1. Audio-tactile pictures for IVEO/TTT (Systems with audio-tactile feedback)	0.5978	0.852	0.1630	0.519	0.0978	0.421

Assistive Technology

The following tables present the results of the descriptive statistics (mean and standard deviation) of the teaching staff' responses for each item of the questionnaire and for each of the two questions concerning the assistive or mainstream technology. The questions answered by the participants were:

Q1: To what degree are you familiar with this device/software/app (are you aware of its features)?

Q2: To what degree do you know how to use this device/software/app?

Assistive-Technology Devices	Q1		Q2	
	M	SD	M	SD
1. Tactile screens	2.8242	1.532	1.070	1.453
2. Loop systems or audio induction loop (for individuals with hearing impairments)	0.8478	1.213	0.469	1.036
3. Hand held magnifiers (e.g., reading stone, monocular, magnifying glass)	1.1522	1.390	0.791	1.291
4. Text to speech devices (e.g., reading devices)	2.6739	1.310	0.946	1.313
5. Daisy-player device (i.e., talking book machine)	0.5217	0.989	0.369	0.890
6. Traditional Braille typewriter (e.g., Perkins, Tatrapoint)	0.8152	1.204	0.357	0.942

Assistive-Technology Devices	**Q1**		**Q2**	
7. Electronic Braille typewriter (e.g., Mountbatten)	0.7283	1.159	1.4783	1.544
8. Braille keyboard	0.8261	1.182	0.3804	0.912
9. Notetakers (e.g., Braille N' Speak, Braille Lite)	0.7391	1.078	0.7174	1.261
10. Handheld media player (e.g., Victor Reader Stream)	0.5543	1.329	1.3587	1.306
11. Touch tablet (e.g., IVEO or TTT)	1.4239	1.207	0.1196	0.415
12. Refreshable Braille display	0.4891	0.896	0.3152	0.783
13. Braille printer/ Embosser (Index Everest, Viewplus Tiger)	0.6522	1.063	0.3152	0.740
14. CCTV (e.g., MagniLink magnifier, Onyx, Topaz, Optelec ClearView)	0.6196	1.108	0.3587	0.806
15. Computer monitor magnifier (i.e., device that hooks on the screen and magnifies it)	0.9348	1.247	0.1413	0.434
16. Portable CCTV/ Portable video magnifier (i.e., devices consisting of a camera, monitor, lighting and provide magnified image)	0.6196	0.993	0.1196	0.326
17. Adjusted keyboards (enlarged keys, braille keys)	1.0889	1.363	0.3587	0.859
18. Adapted notebooks (e.g., enlarged pages, grid paper, colored pages)	0.8043	1.225	0.1124	0.438
19. Tactile-image enhancer (e.g., Piaf, Thermoform)	0.5618	1.097	0.1087	0.479
20. Scan & text-to-speech devices (e.g., Portable scan translation pen)	0.7717	1.159	0.2174	0.836
21. Slate and Stylus (tools used by individuals with visual impairment to write text in braille)	0.5761	0.963	0.4565	0.919
22. Personal digital assistant (PDA, small handheld computers)	0.8370	1.225	0.1848	0.645
23. Connectclip (Enables hands-free phone calls and music streaming from smartphone)	0.5109	1.011	0.6087	1.222
24. FM systems (wireless assistive hearing devices that enhance the use of hearing aids)	0.8261	1.246	0.6087	1.167
25. Speech amplification devices (e.g. ChatterVOX)	0.6522	1.021	0.2174	0.626
26. 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)	0.8370	1.198	1.0326	1.313

Assistive-Technology Devices	**Q1**		**Q2**	
27. Soundproof equipment for indoors environment (i.e., equipment that improve the overall sound quality and intelligibility for individuals with hearing impairment)	0.5652	0.929	0.3804	0.912
28. 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)	0.4565	0.895	0.4891	0.978
29. Head stylus (users with mobility impairments control the stylus to interact with touchscreens or other devices)	0.6087	1.069	0.2826	0.775
30. Adapted keyboards (e.g. small keyboards, ergonomic)	1.5000	1.471	0.4674	1.114
31. Virtual keyboards/mouse	1.3913	1.555	0.3696	0.946
32. Adapted mouses (i.e., mouse that has been modified or designed to accommodate individuals with specific physical or cognitive challenges; e.g., ergonomic)	1.4457	1.507	0.3152	0.937
33. Alternative mouses (e.g. jelly-bean switches, trackball, joystick, leg switch)	1.5326	1.463	0.2283	0.728
34. Sip and Puff system (users control electronic devices, such as computers or wheelchairs, by using their breath, either blowing or sucking air)	0.5652	1.122	0.2198	0.696
35. Remote control of computer (e.g. eye tracking system, head mouse)	0.9674	1.313	0.3587	0.979
36. Personal Emergency response system (i.e., typically a wearable device, equipped with an emergency button that can be pressed to request assistance)	0.8370	1.320	0.8242	1.395
37. Augmentative and alternative communication devices/software	0.8152	1.300	0.8696	1.360
38. Tactile blackboard (i.e., a raised-line drawing board)	1.2967	1.410	0.9348	1.341

Assistive-Technology Software/Apps	**Q1**		**Q2**	
	M	**SD**	**M**	**SD**
1. Contrast tools	0.8587	1.219	0.5870	1.101
2. Exe learning software	0.6304	1.045	0.3696	0.886
3. Voice recognition systems (e.g. ListenAll)	1.1848	1.452	0.7174	1.261
4. Screen reader (e.g., Jaws, VoiceOver, NVDA, TalkBack)	1.0326	1.271	0.6522	1.104

Assistive-Technology Software/Apps	**Q1**		**Q2**	
5. Text-to-speech applications/programs (e.g., Natural Reader, ReadAloud, VoiceDream reader)	1.2065	1.314	0.7391	1.194
6. Daisy-player software (e.g., Dolphin easy reader, AMIS)	0.4239	0.867	0.1848	0.610
7. Math-ML player (enables assistive technology such as screen readers and screen magnifiers to speak, navigate math expressions and convert to braille)	0.4239	0.842	0.2022	0.606
8. Ebook readers (e.g., Dolphin EasyReader, Read2go, Thorium)	1.0326	1.313	0.5435	0.988
9. Multifunctional text-to-speech software (e.g., Voice Dream Reader, Voice Dream Writer)	0.8778	0.981	0.4130	0.854
10. Screen magnification software (e.g., Supernova, Microsoft windows magnifier)	1.1630	1.295	0.7065	1.153
11. Braille to speech software (e.g., TELEO)	0.4348	0.881	0.1630	0.498
12. Braille translator/ text-to-braille software	0.4835	0.899	0.1196	0.415
13. Document and Word Processing software with braille translator (e.g., Biblos, Odt2braille with OpenOffice Writer)	0.4783	0.883	0.1630	0.540
14. Document and Word Processing software with text-to-speech conversion (e.g., Speak with MS Office)	0.9457	1.370	0.4457	0.906
15. Word prediction software/app	1.0787	1.448	0.9341	1.389
16. Word completion software/app	1.0326	1.386	0.8152	1.185
17. Scan & speech apps (e.g., Voice Dream Scanner)	0.5326	0.966	0.3587	0.779
18. Digital voice recorder	1.5652	1.514	1.0870	1.348
19. Talking calculator	0.9348	1.341	0.3696	0.874
20. 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)	0.5217	0.955	0.1304	0.425
21. Object identification apps	0.6413	0.956	0.2826	0.635
22. Color identification apps	0.5000	0.858	0.2065	0.525
23. Light identification apps	0.4022	0.742	0.1413	0.459
24. Speech-to-Text software/audio transcription apps (e.g. Dragon anywhere, Google Gboard, Apple dictation)	1.1413	1.154	0.6304	1.066
25. Automatic captioning software/app (Communication Access Realtime Translation (CART))	0.6304	0.991	0.2935	0.704

Assistive-Technology Software/Apps	**Q1**		**Q2**	
26. Voice control apps (e.g. Dragon naturally speaking)	0.8261	1.106	0.2935	0.819
27. Scanning input (screen scanning software/application)	0.6522	0.977	0.2717	0.713
28. Highlighting text application	0.8043	1.112	0.4348	0.905
29. Concept map program (e.g. Cmap)	1.2391	1.312	0.8478	0.971

Mainstream Technology	**Q1**		**Q2**	
	M	**SD**	**M**	**SD**
1. Tablet	3.3804	0.837	3.3261	0.891
2. Laptop	3.4457	0.830	3.4239	0.815
3. Personal Computer (PC)	3.4565	0.804	3.4239	0.815
4. Smart phone	3.4457	0.830	3.3913	0.838
5. Smart watches	2.9239	1.216	2.8478	1.309
6. MS Windows software	3.1848	1.167	3.1739	1.125
7. OCR (optical character recognition e.g., Abbyy Finereader)	1.5000	1.661	2.0543	1.493
8. Additional light sources	1.3370	1.528	1.2826	1.550
9. Color adjustment on screens	2.2174	1.747	2.9565	1.128
10. Audio recorder	3.0111	1.241	2.9674	1.235
11. Microphones	3.0435	1.176	3.1111	1.175
12. Accessible online (synchronous and asynchronous) communication (e.g. MS Teams, Zoom)	3.4270	0.851	3.2609	1.026
13. Virtual board	3.0435	1.037	2.7609	1.189
14. Headset/Headphones	3.2747	1.023	3.0549	1.058
15. Video recording software/apps (e.g., OBS)	2.3478	1.448	2.4674	1.418
16. Media players for video with subtitles (e.g., VLC)	2.3696	1.495	2.5111	1.408
17. Book scanner desktop or portable (e.g., Irispen scan)	1.7826	1.709	1.3261	1.591
18. Virtual assistant for setting reminders, searching and answering questions for the user. (e.g., Cortana on windows, Google assistant, Siri etc.)	1.7500	1.545	1.3913	1.547
19. Touch devices (interaction through touch)	2.5326	1.296	1.6087	1.684
20. Learning management systems (platform for all education processes - lessons, notes, exams etc.)	2.8152	1.309	2.0978	1.684
21. Summarizing programs (e.g. ePico!)	1.0326	1.094	0.6087	1.048

Existing experience in distance education of Students with Disabilities

The following table presents the results of the descriptive statistics (mean and standard deviation) of the teaching staff's responses for each of the two questions.

	M	SD
1. What is your experience in distance education of students with disabilities	1.228	0.950
2. To what degree are you considered to have the knowledge and experience to provide distance education for students with disabilities?	1.489	1.064

SECTION-B: THE IMPACT OF TRAINING/INFORMATIVE PROGRAM

This section concerns τη διερεύνηση του possible impact of the training/informative program on the knowledge of the accessibility advisors and teaching staff concerning the types/forms of adapted educational materials for SwD are aware of and their experience in using and/or developing them. The training/informative program included real-time participation in the multiplier event implemented in the framework of the project and the study of the "Accessible Material Guide," developed in the framework of the project. This Guide was shared with all potential survey participants who were invited to respond to the questionnaire, with the suggestion that they complete the questionnaire after reading the Guide. However, the researchers were unable to confirm whether participants had studied the Guide and to what extent.

The impact of the training/informative program on the participants' knowledge about assistive and mainstream technology was not studied, as a) it was not part of the project objectives and b) the training/informative program did not concern assistive and mainstream technology.

1. Participants

1.1 Participants in the first trial

The questionnaire for advisors was answered by *33 accessibility advisors* (1 from Italy, 9 from Germany, 9 from Spain, and 14 from Greece). The participants' ages ranged from 21 to 57 (M = 41.06) years of age, and they had 9.18 years (on average) of experience as accessibility advisors. Twelve of the participants were male and 21 were female. Twenty participants had attended educational programs on the education of SwD, accessibility, or producing accessible material. Specifically, 12 had attended a seminar, 7 had participated in a postgraduate program and 1 had attended both.

The questionnaire for teaching staff was answered by *131 members of the teaching staff* (48 from Italy, 25 from Germany, 24 from Spain and 34 from Greece). The participants' ages ranged from 22 to 68 (M = 49.8) years of age and on average they had 18.7 years of experience as teaching staff. Fifty-five of the participants were male, 74 were female and 2

identified as gender diverse. Thirty-eight of the participants had attended educational programmes on teaching SwD, while 93 had not. From those that had attended programmes, 27 had attended a seminar, 7 had attended a postgraduate programme, 2 had attended both and 2 had attended a bachelor programme.

1.1 Participants in the second trial

The second trial of the study did not include participants from Germany. The questionnaire for advisors was answered by *35 accessibility advisors* (10 from Italy, 7 from Spain, and 18 from Greece). The participants' ages ranged from 25 to 60 (M = 42.14) years of age, and they had 8.40 years (on average) of experience as accessibility advisors. Twenty-two of the participants were females, and 13 were males. Twenty-five of the participants stated that they were graduates of a program (seminar, bachelor, or postgraduate) related to the education of individuals with disabilities, accessibility, or producing accessible material, and 10 stated that they had not received any relevant training. Of those who had received training, 15 attended a seminar, 8 graduated from a postgraduate program, one from both a seminar and postgraduate program, and one graduated from a bachelor program.

The questionnaire for teaching staff was answered by *92 members of the teaching staff* (30 from Italy, 31 from Spain, and 31 from Greece). The participants' ages ranged from 24 to 66 (M = 50.1) years of age, and they had 18.1 years (on average) of experience as teaching staff. Fifty-one of the participants were females, and 41 were males. Thirty-eight of the participants stated that they were graduates of a program (seminar, bachelor, or postgraduate) related to the education of individuals with disabilities, and 54 stated that they had not received any relevant training. Of those who had received training, 15 attended a seminar, 8 graduated from a postgraduate program, 3 from both a seminar and postgraduate program, and 12 graduated from a bachelor program.

2. Results

2.1 Results for the Accessibility Advisors

The following table presents the results of the descriptive statistics (mean and standard deviation) of the accessibility advisors' responses for the first and second trials of the study,

for each category of the questionnaire and each of the three questions concerning the educational material. The questions answered by the participants were:

Q1: To what extent do you know (are you aware of the features of) this educational material?

Q2: To what extent have you used this educational material?

Q3: What is your experience in producing this type of educational material?

	First Trial		Second Trial	
Categories	**Mean**	**SD**	**Mean**	**SD**
Accessible Printed Material_Q1	**1.862**	0.815	**2.365**	0.925
Accessible Printed Material_Q2	1.239	0.701	1.230	0.859
Accessible Printed Material_Q3	1.146	0.806	1.026	0.821
Accessible Digital Material_Q1	2.189	0.993	2.512	0.853
Accessible Digital Material_Q2	1.709	0.750	1.612	0.806
Accessible Digital Material_Q3	1.535	0.772	1.325	0.829
Haptic Material_Q1	1.712	1.386	1.543	1.472
Haptic Material_Q2	1.091	1.162	0.686	1.001
Haptic Material_Q3	0.818	1.185	0.586	0.927
Audio-tactile material_Q1	1.303	1.571	1.143	1.417
Audio-tactile material_Q2	0.939	1.298	0.457	0.852
Audio-tactile material_Q3	0.750	1.295	0.343	0.765

The implementation of the T-test revealed a statistically significant difference between the two trials only in one of the variables (see Table below), which concerns the participants' knowledge regarding the accessible printed material. Their knowledge was better in the second trial. This finding probably indicates that the training/informative program affected the knowledge of the accessibility advisors.

Independent Samples T-Test

	Statistic	df	p
Accessible Printed Material_Q1	-2.3739	66.0	**0.021**
Accessible Printed Material_Q2	0.0488	66.0	0.961
Accessible Printed Material_Q3	0.6081	66.0	0.545
Accessible Digital Material_Q1	-1.4422	66.0	0.154
Accessible Digital Material_Q2	0.5155	66.0	0.608

Accessible Digital Material_Q3	1.0788	66.0	0.285
Haptic Material_Q1	0.4874	66.0	0.628
Haptic Material_Q2	1.5434	66.0	0.128
Haptic Material_Q3	0.9039	66.0	0.369
Audio-tactile material_Q1	0.4419	66.0	0.660
Audio-tactile material_Q2	1.8217	66.0	0.073
Audio-tactile material_Q3	1.5829	65.0	0.118

2.2 Results for the Teaching Staff

The following table presents the results of the descriptive statistics (mean and standard deviation) of the teaching staff's responses for the first and second trials of the study, for each category of the questionnaire and each of the three questions concerning the educational material. The questions answered by the participants were:

Q1: To what extent do you know (are you aware of the features of) this educational material?

Q2: To what extent have you used this educational material?

Q3: What is your experience in producing this type of educational material?

	First Trial		**Second Trial**	
Categories	**Mean**	**SD**	**Mean**	**SD**
Accessible Printed Material_Q1	1.166	0.922	1.5870	0.851
Accessible Printed Material_Q2	0.398	0.656	0.5121	0.497
Accessible Printed Material_Q3	0.418	0.659	0.3319	0.454
Accessible Digital Material_Q1	1.461	0.986	1.5963	0.906
Accessible Digital Material_Q2	0.889	0.867	1.3263	0.747
Accessible Digital Material_Q3	0.747	0.832	0.8452	0.527
Haptic Material_Q1	0.705	1.073	0.9674	1.233
Haptic Material_Q2	0.329	0.767	0.4891	0.952
Haptic Material_Q3	0.376	0.862	0.3967	0.860
Audio-tactile material_Q1	0.496	1.046	0.5978	0.852
Audio-tactile material_Q2	0.266	0.748	0.1630	0.519
Audio-tactile material_Q3	0.289	0.898	0.0978	0.421

The implementation of the T-test revealed a statistically significant difference between the two trials only in two of the variables (see Table below), which concerns the participants' knowledge regarding the accessible printed material and the participants' use of accessible digital material. Their knowledge regarding the accessible printed material was better in the second trial. This finding probably indicates that the training/informative program affected the knowledge of the teaching staff. The second finding concerning the improvement of the extent of use of accessible digital material is not directly related to the implementation of the training/informative program, as they did not use these materials in the program. It could probably be attributed to two different causes a) the participants in the second trial were more familiar with the accessible digital material compared to the participants in the first trial, **AND** b) the participants in the second trial were assisted by the training/informative program to perceive that they had used some of the accessible digital materials presented in the questionnaire.

Independent Samples T-Test

	Statistic	df	p
Accessible Printed Material_Q1	-3.463	221	**< .001**
Accessible Printed Material_Q2	-1.409	221	0.160
Accessible Printed Material_Q3	1.088	221	0.278
Accessible Digital Material_Q1	-1.043	221	0.298
Accessible Digital Material_Q2	-3.923	221	**< .001**
Accessible Digital Material_Q3	-0.997	221	0.320
Haptic Material_Q1	-1.681	219	0.094
Haptic Material_Q2	-1.379	219	0.169
Haptic Material_Q3	-0.177	219	0.860
Audio-tactile material_Q1	-0.767	217	0.444
Audio-tactile material_Q2	1.134	218	0.258
Audio-tactile material_Q3	1.898	218	0.059

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: QUESTIONNAIRES (AUTHORS: PAPADOPOULOS, K., KOUSTRIAVA, E., & ISARAJ, L.)

Questionnaire for Advisors

Below you may find a list with the different types of Accessible Educational Material. Please, answer: a) to what degree do you know (are you aware of the features of) each educational material, b) to what degree have you used each educational material, c) what is your experience in producing each educational material.

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

0 = not at all

1 = small

2 = medium

3 = great

4 = very great

Educational material

Accessible Printed Material	To what degree do you know (are you aware of the features of) this educational material	To what degree have you used this educational material	What is your experience in producing this type of educational material?
1. Large prints (included enlarged books)			
2. Braille prints (included braille books)			
3. Tactile books (Text and graphics)			

Accessible Printed Material	To what degree do you know (are you aware of the features of) this educational material	To what degree have you used this educational material	What is your experience in producing this type of educational material?
4. Tactile graphics/images			
5. Microcapsule paper prints (e.g., Piaf prints)			
6. Tiger embossed prints			
7. Plastic paper prints/ thermoform			
8. Relief printed material			
9. Pictures with Braille description			
10. Tactile maps			
11. Verbal descriptions in braille			
12. Raised-line paper for writing or graphing			
13. 3D printed material (by 3D printer)			
14. Printed material (e.g. lecture notes)			

Accessible Printed Material	To what degree do you know (are you aware of the features of) this educational material	To what degree have you used this educational material	What is your experience in producing this type of educational material?
15. Printed material with images, graphics, and visual elements			
16. Accessible text (books, notes etc.)			
17. Accessible presentations			
18. Adapted books (added tactile pieces and images/picture annotation)			
19. Printed conceptual/mental map			
20. Flash cards (a study or memorisation tool, with information on one or both sides.)			
21. Notes with mathematical equations			

Accessible Digital Material	To what degree do you know (are you aware of the features of) this educational material	To what degree have you used this educational material	What is your experience in producing this type of educational material?
1. Accessible word			
2. Accessible pdf			
3. Accessible presentations (Powerpoint)			
4. Accessible daisy			
5. Accessible epub			
6. Accessible excel files			
7. Ebooks			
8. Accessible books with HTML / HTML content			
9. Audio recorded material (e.g., lecture notes, books)			
10. Video recorded material (e.g. lectures)			
11. Pictures with verbal-audio description			
12. Images with alternative text			

Accessible Digital Material	To what degree do you know (are you aware of the features of) this educational material	To what degree have you used this educational material	What is your experience in producing this type of educational material?
13. Verbal description in audio file			
14. Digital books with legible texts (e.g., arial fonts, tahoma, san serif, helvetica)			
15. Accessible videos			
16. Videos with sign language			
17. Videos with transcriptions (including YouTube, lectures)			
18. Video with subtitles			
19. Google docs			
20. Video lessons with slow rhythm			
21. Live streaming with captions (e.g. lectures given synchronously online)			

Accessible Digital Material	To what degree do you know (are you aware of the features of) this educational material	To what degree have you used this educational material	What is your experience in producing this type of educational material?
22. Digital material with images, graphics, and visual elements			
23. Pictograms in digital texts			
24. Digital texts with simplified language			
25. Digital conceptual/mental maps			
26. Color corrected texts			
27. Accessible Mathematical formulas			
28. Symbolic languages			
29. Audiobooks			
30. Highlighted texts			
31. Lecture summaries			
32. Accessible websites			
33. Digital media			
34. Accessible Music			

Haptic Material	To what degree do you know (are you aware of the features of) this educational material	To what degree have you used this educational material	What is your experience in producing this type of educational material?
1. Haptic models (e.g., haptic pictures, graphs, maps etc, manufactured from everyday material attached onto a surface)			
2. Manipulatives (e.g., Plastic shapes/objects, Tactile globes, Tactile dolls)			

Audio-tactile material	To what degree do you know (are you aware of the features of) this educational material	To what degree have you used this educational material	What is your experience in producing this type of educational material?
1. Audio-tactile pictures for IVEO/TTT (Systems with audio-tactile feedback)			

Assistive-Technology

Below you may find: 1) a list of Assistive Technology Devices and software, 2) a list including mainstream technology. Please, answer: a) To what degree are you familiar with each device/ software/app (are you aware of their feature), b) To what degree do you know how to use each device/software/app.

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

0 = not at all

1 = small

2 = medium

3 = great

4 = very great

Assistive-Technology Devices	To what degree are you familiar with this device (are you aware of its features)	To what degree do you know how to use this device
1. Hand held magnifiers (e.g., reading stone, monocular, magnifying glass)		
2. Text to speech devices (e.g., reading devices)		
3. Daisy-player device (talking book machine)		
4. Traditional Braille typewriter (e.g., Perkins, Tatrapoint)		
5. Electronic Braille typewriter (e.g., Mountbatten)		
6. Braille keyboard		
7. Notetakers (e.g., Braille N' Speak, Braille Lite)		
8. Handheld media player (e.g., Victor Reader Stream)		

Assistive-Technology Devices	To what degree are you familiar with this device (are you aware of its features)	To what degree do you know how to use this device
9. Touch tablet (e.g., IVEO or TTT)		
10. Refreshable Braille display		
11. Braille printer/ Embosser (e.g., Index Everest, Viewplus Tiger)		
12. CCTV (e.g., MagniLink magnifier, Onyx, Topaz, Optelec ClearView)		
13. Computer monitor magnifier (i.e., device that hooks on the screen and magnifies it)		
14. Portable CCTV/ Portable video magnifier (i.e., devices consisting of a camera, monitor, lighting and provide magnified image)		
15. Adjusted keyboards (enlarged keys, braille keys)		
16. Adapted notebooks (e.g., enlarged pages, grid paper, colored pages)		
17. Tactile-image enhancer (e.g., Piaf, Thermoform)		
18. Scan & text-to-speech devices (e.g., Portable scan translation pen)		
19. Slate and Stylus (tools used by individuals with visual impairment to write text in braille)		

Assistive-Technology Devices	To what degree are you familiar with this device (are you aware of its features)	To what degree do you know how to use this device
20. Personal digital assistant (PDA, small handheld computers)		
21. Connectclip (Enables hands-free phone calls and music streaming from smartphone)		
22. FM systems (wireless assistive hearing devices that enhance the use of hearing aids)		
23. Loop systems or audio induction loop (for individuals with hearing impairments)		
24. Speech amplification devices (e.g. ChatterVOX)		
25. 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))		
26. Soundproof equipment for indoors environment (i.e., equipment that improve the overall sound quality and intelligibility for individuals with hearing impairment)		
27. 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)		

Assistive-Technology Devices	To what degree are you familiar with this device (are you aware of its features)	To what degree do you know how to use this device
28. Head stylus (users with mobility impairments control the stylus to interact with touchscreens or other devices)		
29. Adapted keyboards (e.g. small keyboards, ergonomic)		
30. Virtual keyboards/mouse		
31. Adapted mouses (i.e., mouse that has been modified or designed to accommodate individuals with specific physical or cognitive challenges; e.g., ergonomic)		
32. Alternative mouses (e.g. jelly-bean switches, trackball, joystick, leg switch)		
33. Sip and Puff system (users control electronic devices, such as computers or wheelchairs, by using their breath, either blowing or sucking air)		
34. Remote control of computer (e.g. eye tracking system, head mouse)		
35. Personal Emergency response system (i.e., typically a wearable device, equipped with an emergency button that can be pressed to request assistance)		

Assistive-Technology Devices	To what degree are you familiar with this device (are you aware of its features)	To what degree do you know how to use this device
36. Augmentative and alternative communication devices/software		
37. Tactile blackboard (i.e., a raised-line drawing board)		
38. Tactile screens		

Assistive-Technology Software/Apps	To what degree are you familiar with this software/app (are you aware of its features)	To what degree do you know how to use this software/app
1. Screen reader (e.g., Jaws, VoiceOver, NVDA, TalkBack)		
2. Text-to-speech applications/programs (e.g., Natural Reader, ReadAloud, VoiceDream reader)		
3. Daisy-player software (e.g., Dolphin easy reader, AMIS)		
4. Math-ML player (enables assistive technology such as screen readers and screen magnifiers to speak, navigate math expressions and convert to braille)		

Assistive-Technology Software/Apps	To what degree are you familiar with this software/app (are you aware of its features)	To what degree do you know how to use this software/app
5. Ebook readers (e.g., Dolphin EasyReader, Read2go, Thorium)		
6. Multifunctional text-to-speech software (e.g., Voice Dream Reader, Voice Dream Writer)		
7. Screen magnification software (e.g., Supernova)		
8. Screen magnification apps (e.g., Microsoft windows magnifier)		
9. Braille to speech software (e.g., TELEO)		
10. Braille translator/ text-to-braille software		
11. Document and Word Processing software with braille translator (e.g., Biblos, Odt2braille with OpenOffice Writer)		
12. Document and Word Processing software with text-to-speech conversion (e.g., Speak with MS Office)		
13. Word prediction software/app		
14. Word completion software/app		
15. Scan & speech apps (e.g., Voice Dream Scanner)		
16. Digital voice recorder		
17. Talking calculator		

Assistive-Technology Software/Apps	To what degree are you familiar with this software/app (are you aware of its features)	To what degree do you know how to use this software/app
18. 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)		
19. Object identification apps		
20. Color identification apps		
21. Light identification apps		
22. Speech-to-Text software/audio transcription apps (e.g. Dragon anywhere, Google Gboard, Apple dictation)		
23. Voice recognition systems (e.g. ListenAll)		
24. Automatic captioning software/app (Communication Access Realtime Translation (CART))		
25. Voice control apps (e.g. Dragon naturally speaking)		
26. Scanning input (screen scanning software/application)		
27. Highlighting text application		
28. Accessible calculators		

Assistive-Technology Software/Apps	To what degree are you familiar with this software/app (are you aware of its features)	To what degree do you know how to use this software/app
29. Concept map program (e.g. Cmap)		
30. Reminder app/calendar with notifications		
31. Spell checker/word correction programs		
32. Time management apps		
33. EDICO (a Scientific Editor specifically designed for the blind)		
34. Atkinson Hyper Legible font		

Mainstream Technology	To what degree are you familiar with this device (are you aware of its features)	To what degree do you know how to use this device
1. Tablet		
2. Laptop		
3. Personal Computer (PC)		
4. MS Windows software		
5. Scanner		
6. OCR (optical character recognition e.g., Abby FineReader)		

Mainstream Technology	To what degree are you familiar with this device (are you aware of its features)	To what degree do you know how to use this device
7. Cell phone		
8. Smart phone		
9. Additional light sources		
10. Color adjustment on screens		
11. Audio recorder		
12. Microphones		
13. Accessible online (synchronous and asynchronous) communication (e.g. MS Teams, Zoom)		
14. Virtual board		
15. Headset/Headphones		
16. Video recording software/apps (e.g. OBS)		
17. Media players for video with subtitles(e.g. VLC)		
18. Book scanner desktop or portable (e.g. Irispen scan)		
19. Cortana on windows (virtual assistant for setting reminders, searching and answering questions for the user)		
20. Email apps		

Mainstream Technology	To what degree are you familiar with this device (are you aware of its features)	To what degree do you know how to use this device
21. Touch devices (interaction through touch)		
22. Smart watches		
23. Clocks		
24. Word processing software		
25. Pad and pen		
26. Learning management systems (platform for all education processes - lessons, notes, exams etc)		
27. Summarizing programs (e.g. ePico!)		
28. Digital dictionaries		

Existing experience in distance education of Students with Disabilities

Below you may find Questions about existing experience in distance education of Students with Disabilities

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

0 = not at all

1 = limited

2 = moderate

3 = extensive

4 = very extensive

Question	Answer

1. What is your experience in distance education of students with disabilities	Likert score
2. To what degree are you considered to have the knowledge and experience to provide distance education for students with disabilities?	Likert score

Demographic information

1. Age: (number)
2. Gender: 1. Male, 2. Female
3. Nationality (text)
4. How many years do you work as an accessibility advisor? (number)
5. Have you attended a bachelor/seminar/postgraduate program concerning teaching of students with disabilities, accessibility or the production of accessible material?
   1. Yes, 2. No
6. If yes, please specify: 1. bachelor, 2. seminar, 3. postgraduate

Questionnaire for Teaching Staff

Below you may find a list with the different kinds of Accessible Educational Material. Please, answer: a) to what degree do you know (are you aware of the features of) each educational material, b) to what extent have you used each educational material, c) what is your experience in producing each educational material.

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

0 = not at all

1 = small

2 = medium

3 = great

4 = very great

Educational material

Accessible Printed Material	To what degree do you know (are you aware of the features of) this educational material	To what degree have you used this educational material	What is your experience in producing this type of educational material?
1. Braille prints (included braille books)			
2. Large prints (included enlarged books)			
3. Tactile books (Text and graphics)			
4. Tactile graphics/images			
5. Tactile maps			

Accessible Printed Material	To what degree do you know (are you aware of the features of) this educational material	To what degree have you used this educational material	What is your experience in producing this type of educational material?
6. Printed conceptual/mental map			
7. Microcapsule paper prints (e.g., Piaf prints)			
8. Tiger embossed prints			
9. Plastic paper prints/ thermoform			
10. 3D printed material (by 3D printer)			
11. Pictures with Braille description			
12. Adapted books (added tactile pieces and images/picture annotation)			
13. Accessible text (books, notes etc.)			

Accessible Digital Material	To what degree do you know (are you aware of the features of) this educational material	To what degree have you used this educational material	What is your experience in producing this type of educational material?
1. Accessible word			
2. Accessible pdf			
3. Accessible presentations (Powerpoint)			
4. Accessible daisy			
5. Accessible epub			
6. Accessible excel files			
7. Ebooks			
8. Digital books with legible texts (e.g., arial fonts, tahoma, san serif, helvetica)			
9. Digital texts with simplified language			
10. Audio recorded material (e.g., lecture notes, books)			
11. Audiobooks			

Accessible Digital Material	To what degree do you know (are you aware of the features of) this educational material	To what degree have you used this educational material	What is your experience in producing this type of educational material?
12. Pictures with verbal-audio description			
13. Images with alternative text			
14. Videos with sign language			
15. Videos with transcriptions (including YouTube, lectures)			
16. Videos with subtitles			
17. Live streaming with captions (e.g., lectures given synchronously online)			
18. Digital conceptual/mental maps			
19. Color corrected texts			
20. Multimodal material (e.g., mixture of linguistic, visual, gestural, spatial and audio elements)			

Accessible Digital Material	To what degree do you know (are you aware of the features of) this educational material	To what degree have you used this educational material	What is your experience in producing this type of educational material?
21. Serious games (the educational process takes part through the game)			
22. METACOM symbols (Augmentative and Alternative Communication (AAC))			
23. Accessible mathematical equations			

Haptic Material	To what degree do you know (are you aware of the features of) this educational material	To what degree have you used this educational material	What is your experience in producing this type of educational material?
1. Haptic models (haptic pictures, graphs, maps etc, manufactured from everyday material attached onto a surface)			

Haptic Material	To what degree do you know (are you aware of the features of) this educational material	To what degree have you used this educational material	What is your experience in producing this type of educational material?
2. Manipulatives (Plastic shapes/objects, Tactile globes, Tactile dolls)			

Audio-tactile material	To what degree do you know (are aware of) and/or use this educational material	To what degree have you used this educational material	What is your experience in producing this type of educational material?
1. Audio-tactile pictures for IVEO/TTT (Systems with audio-tactile feedback)			

Assistive-Technology

Below you may find: 1) a list of Assistive Technology Devices and software, 2) a list including mainstream technology. Please, answer: a) To what degree are you familiar with each device (are you aware of their features), b) To what degree do you know how to use each device. In order to answer, please, use one of the following options:

0 = not at all

1 = small

2 = medium

3 = great

4 = very great

Assistive-Technology Devices	To what degree are you familiar with this device (are you aware of its features).	To what degree do you know how to use this device
1. Tactile screens		
2. Loop systems or audio induction loop (for individuals with hearing impairments)		
3. Hand held magnifiers (e.g., reading stone, monocular, magnifying glass)		
4. Text to speech devices (e.g., reading devices)		
5. Daisy-player device (i.e., talking book machine)		
6. Traditional Braille typewriter (e.g., Perkins, Tatrapoint)		
7. Electronic Braille typewriter (e.g., Mountbatten)		
8. Braille keyboard		
9. Notetakers (e.g., Braille N' Speak, Braille Lite)		
10. Handheld media player (e.g., Victor Reader Stream)		
11. Touch tablet (e.g., IVEO or TTT)		

Assistive-Technology Devices	To what degree are you familiar with this device (are you aware of its features).	To what degree do you know how to use this device
12. Refreshable Braille display		
13. Braille printer/ Embosser (Index Everest, Viewplus Tiger)		
14. CCTV (e.g., MagniLink magnifier, Onyx, Topaz, Optelec ClearView)		
15. Computer monitor magnifier (i.e., device that hooks on the screen and magnifies it)		
16. Portable CCTV/ Portable video magnifier (i.e., devices consisting of a camera, monitor, lighting and provide magnified image)		
17. Adjusted keyboards (enlarged keys, braille keys)		
18. Adapted notebooks (e.g., enlarged pages, grid paper, colored pages)		
19. Tactile-image enhancer (e.g., Piaf, Thermoform)		
20. Scan & text-to-speech devices (e.g., Portable scan translation pen)		
21. Slate and Stylus (tools used by individuals with visual impairment to write text in braille)		
22. Personal digital assistant (PDA, small handheld computers)		

Assistive-Technology Devices	To what degree are you familiar with this device (are you aware of its features).	To what degree do you know how to use this device
23. Connectclip (Enables hands-free phone calls and music streaming from smartphone)		
24. FM systems (wireless assistive hearing devices that enhance the use of hearing aids)		
25. Speech amplification devices (e.g. ChatterVOX)		
26. 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))		
27. Soundproof equipment for indoors environment (i.e., equipment that improve the overall sound quality and intelligibility for individuals with hearing impairment)		
28. 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)		
29. Head stylus (users with mobility impairments control the stylus to interact with touchscreens or other devices)		
30. Adapted keyboards (e.g. small keyboards, ergonomic)		

Assistive-Technology Devices	To what degree are you familiar with this device (are you aware of its features).	To what degree do you know how to use this device
31. Virtual keyboards/mouse		
32. Adapted mouses (i.e., mouse that has been modified or designed to accommodate individuals with specific physical or cognitive challenges; e.g., ergonomic)		
33. Alternative mouses (e.g. jelly-bean switches, trackball, joystick, leg switch)		
34. Sip and Puff system (users control electronic devices, such as computers or wheelchairs, by using their breath, either blowing or sucking air)		
35. Remote control of computer (e.g. eye tracking system, head mouse)		
36. Personal Emergency response system (i.e., typically a wearable device, equipped with an emergency button that can be pressed to request assistance)		
37. Augmentative and alternative communication devices/software		
38. Tactile blackboard (i.e., a raised-line drawing board)		

Assistive-Technology Software/Apps	To what degree are you familiar with this software/app (are you aware of its features).	To what degree do you know how to use this software/app
1. Contrast tools		
2. Exe learning software		
3. Voice recognition systems (e.g. ListenAll)		
4. Screen reader (e.g., Jaws, VoiceOver, NVDA, TalkBack)		
5. Text-to-speech applications/programs (e.g., Natural Reader, ReadAloud, VoiceDream reader)		
6. Daisy-player software (e.g., Dolphin easy reader, AMIS)		
7. Math-ML player (enables assistive technology such as screen readers and screen magnifiers to speak, navigate math expressions and convert to braille)		
8. Ebook readers (e.g., Dolphin EasyReader, Read2go, Thorium)		
9. Multifunctional text-to-speech software (e.g., Voice Dream Reader, Voice Dream Writer)		
10. Screen magnification software (e.g., Supernova, Microsoft windows magnifier)		
11. Braille to speech software (e.g., TELEO)		

Assistive-Technology Software/Apps	To what degree are you familiar with this software/app (are you aware of its features).	To what degree do you know how to use this software/app
12. Braille translator/ text-to-braille software		
13. Document and Word Processing software with braille translator (e.g., Biblos, Odt2braille with OpenOffice Writer)		
14. Document and Word Processing software with text-to-speech conversion (e.g., Speak with MS Office)		
15. Word prediction software/app		
16. Word completion software/app		
17. Scan & speech apps (e.g., Voice Dream Scanner)		
18. Digital voice recorder		
19. Talking calculator		
20. 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)		
21. Object identification apps		
22. Color identification apps		
23. Light identification apps		

Assistive-Technology Software/Apps	To what degree are you familiar with this software/app (are you aware of its features).	To what degree do you know how to use this software/app
24. Speech-to-Text software/audio transcription apps (e.g. Dragon anywhere, Google Gboard, Apple dictation)		
25. Automatic captioning software/app (Communication Access Realtime Translation (CART))		
26. Voice control apps (e.g. Dragon naturally speaking)		
27. Scanning input (screen scanning software/application)		
28. Highlighting text application		
29. Concept map program (e.g. Cmap)		

Mainstream Technology	To what degree are you familiar with this device (are you aware of its features).	To what degree do you know how to use this device
1. Tablet		
2. Laptop		
3. Personal Computer (PC)		

Mainstream Technology	To what degree are you familiar with this device (are you aware of its features).	To what degree do you know how to use this device
4. Smart phone		
5. Smart watches		
6. MS Windows software		
7. OCR (optical character recognition e.g., Abby FineReader)		
8. Additional light sources		
9. Color adjustment on screens		
10. Audio recorder		
11. Microphones		
12. Accessible online (synchronous and asynchronous) communication (e.g. MS Teams, Zoom)		
13. Virtual board		
14. Headset/Headphones		
15. Video recording software/apps (e.g. OBS)		
16. Media players for video with subtitles(e.g. VLC)		
17. Book scanner desktop or portable (e.g. Irispen scan)		

Mainstream Technology	To what degree are you familiar with this device (are you aware of its features).	To what degree do you know how to use this device
18. Virtual assistant for setting reminders, searching and answering questions for the user. (e.g., Cortana on windows, Google assistant, Siri etc.)		
19. Touch devices (interaction through touch)		
20. Learning management systems (platform for all education processes - lessons, notes, exams etc.)		
21. Summarizing programs (e.g. ePico!)		

Existing experience in distance education of Students with Disabilities

Below you may find Questions about existing experience in distance education of Students with Disabilities

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

0 = not at all

1 = limited

2 = moderate

3 = extensive

4 = very extensive

Question	Answer
What is your experience in distance education of students with disabilities	
To what degree are you considered to have the knowledge	

and experience to provide distance education for students with disabilities?	

Demographic information

1. Age: (number)
2. Gender:
   1. Male, 2. Female
3. Nationality (text)
4. How many years do you work as a professor/teaching staff? (number)
5. Have you attended a bachelor/seminar/postgraduate program concerning teaching of students with disabilities?
   1. Yes, 2. No
6. If yes, please specify: 1. bachelor, 2. seminar, 3. postgraduate