

Smart Solutions for the Inclusion of Students with Disabilities in  
Higher Education

# Data Analyses and Publication about the Requirements of Disabled Students in Higher Education

National Report - Greece

University of Patras, Patras, September 2021

# **1. Introduction**

## **1.1 Aims/Objectives of Report**

This report aims to perform an evaluation of assistive support needs and usage in higher education institutions of Greece as a part of the Erasmus+ project "Smart Solutions for the Inclusion of Students with Disabilities in Higher Education".

## **1.2 Scope of Research**

From the Euro student Survey, administered to students across the European Higher Education Area is evident that there exists different cultural understanding of disability. Similar difficulties in cross country comparisons emerge when attempting to compare rates of participation in higher education by disabled people in different European countries. Research data reflect the fact that some countries have more expansive understandings of what constitutes impairment and suggest the need for more research on the experiences and outcomes of disabled students in different European countries.

Disability is not just a congenital or acquired physical limitation. It is, according to the United Nations, primarily a social condition between the individual and his or her environment. In order for the discrimination of disability to be abolished in practice, an environment capable of removing any barriers is required. To this end, the development of new technological applications can enhance the required support services.

## **1.3 Method**

This report uses results from both a desk-based research concerning legislation and current practices in Greece as well as the questionnaire results that were submitted.

# **2. Key findings from Desk Review**

## 2.1 Legislative Framework in Greece

In Greece there is a strong legislative framework that defines the obligations of the State and Universities to provide all possible assistance to people with some form of disability. The requirement for equal treatment is a constitutional imperative: *Law no. 3699/2008 - GOVERNMENT GAZETTE (FEK) 199/A/2-10-2008 "Special Education and Education of Persons with Disabilities or Special Educational Needs"* *Article 3: Students with disabilities and special educational needs.* Students with disabilities and special educational needs are considered to be those who, for all or part of their school life, have significant learning difficulties due to sensory, cognitive, developmental, mental and neuropsychological disorders which, according to multidisciplinary assessment, affect the process of school adaptation and learning. Students with disabilities and special educational needs include, in particular, those with intellectual disabilities, sensory visual impairments (blind, partially sighted with low vision), sensory hearing impairments (deaf, hard of hearing), motor disabilities, chronic non-curable diseases, speech disorders, specific learning difficulties such as dyslexia, dysgraphia, dyscalculia, dysnumeria, dyslexia, dyslexia, dyslexia, attention deficit disorder with or without hyperactivity, pervasive developmental disorders (autism spectrum), mental disorders and multiple disabilities. The category of students with disabilities and special educational needs does not include students with low academic achievement causally linked to exogenous factors such as language or cultural differences.

Students with complex cognitive, emotional and social difficulties, delinquent behaviour due to abuse, parental neglect and abandonment or domestic violence, belong to the category of students with special educational needs.

Students with special educational needs are also pupils who have one or more cognitive abilities and talents developed to a degree that far exceeds the expectations for their age group. By decision of the Minister of National Education and Religious Affairs, on the recommendation of the Pedagogical Institute, the development of assessment standards and special educational programmes for such students is entrusted to schools or departments of higher education institutions which, following an invitation from the Ministry of National Education

and Religious Affairs, express an interest. The other provisions of this Law shall not apply to such students.

## **2.2 Digital Accessibility in Greek Higher Institutions**

### **2.2.1 Digital Accessibility in the University of Patras**

- Conversion of University's educational material into an accessible format

In many academic courses, the provision of notes and slides are main means to assist students' study. If these materials are not appropriately designed, then they only appeal to a part of the student population and do not meet the needs of so-called print-disabled students, i.e. those who are unable to read something in print and whose study requires the use of assistive technologies (for example, voice synthesizers, braille, etc.). For this reason, Social Care in collaboration with the librarian of the action converts (upon request of the interested parties) educational material of the University of Patras into an accessible format for print-disabled users.

- Accessibility Guidelines for Original Educational Material

To support faculty members, the Social Care Department in collaboration with the Library and Information Centre provides the "Accessibility Guidelines for Original Educational Material" which are developed in the framework of the project "Supporting Social Care Interventions for Students of the University of Patras" and which give advice on how lecturers can make their educational material (such as note texts and presentation slides) accessible to their entire student audience through simple and easy adjustments.

One of the most effective practices to make a note text accessible is by curating its structure and making it navigable. The structure and its markup allow the assistive technologies, such as voice synthesizers, to deploy the text smoothly and easily and at the same time allow the user to navigate through its sections.

Also, a properly structured document can be easily converted into a format preferred by the user and can be correctly reproduced by the preferred assistive technologies, e.g. it can be read by a voice synthesizer and provide browsing

capability through screen readers or other assistive technologies, while maintaining the logical order contained in the text.

- Workstations for people with disabilities

The Social Care of the University of Patras was created in the framework of the Action "Supporting Social Care Interventions for Students of the University of Patras". Part of the Action is the strengthening of the Social Care Structures of the University of Patras, the support of students coming from Sensitive / Vulnerable Social Groups and to provide equal education, opportunities, and accessibility to all students.

The basic framework of the action is "Equal Education - Accessibility for All". Its goal is to increase the rate of early completion of the study cycle, to reduction of academic drop-out as well as subsequent integration into society and the labor market.

For the above reasons and in order to achieve the support of students with disabilities, the Social Care of the University of Patras, with the support of the Library and Information Centre, has set up workstations for the access of people with disabilities to printed and electronic information material. These workstations are intended for use by people with visual impairments (partial or total blindness) and/or mobility problems. These stations have been installed in the libraries of the individual cities where the University of Patras departments are located.

There are different types of disabilities that can make it difficult for a person to read and study printed and electronic information material. These disabilities are divided into 4 main categories and some examples are given accordingly.

- Visual
  - ✓ Blindness
  - ✓ Reduced vision
  - ✓ Color blindness
- Auditory
  - ✓ Deafness
  - ✓ Difficulty in hearing

- Motor
  - ✓ Difficulty in moving the hands and wrists
  - ✓ Limited accuracy in focusing
  - ✓ Low response time
- Perception and neurological
  - ✓ Inability to visually and aurally understand what he sees and hears respectively
  - ✓ Inability to concentrate and easy distraction
- Supporting Equipment and Software for the disabled at the University of Patras

In order to assist students with disabilities, supportive software and equipment is available:

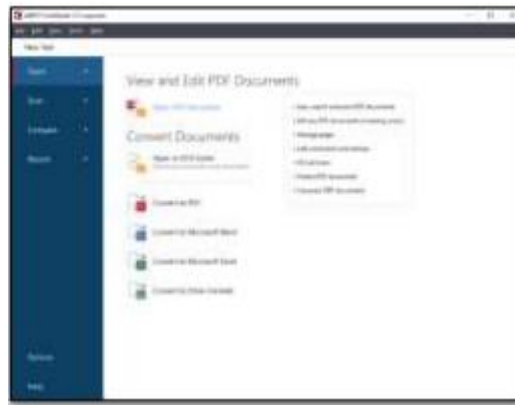
- **Students with Visual Impairment**



## **Software**

- Optical Character Recognition (OCR) software

The software allows the conversion of scanned files (using a scanner), PDF files and even image files into an editable format. The software fully supports Greek characters, has the ability to export documents to text, html and pdf. The resulting file is then edited using special software (available), and can be converted to Braille, oral speech or can even be enlarged for easier reading.



- Screen reader software via voice synthesis and screen magnification

Software necessary for people who have a visual disability, either complete or partial loss of vision. It fully supports Greek, has the ability to magnify screen data up to 60 times, it works as a screen reader to convert anything seen on the screen into speech.

It makes it easier for users to type text, since it speaks out what the user has typed, and it can display what the user has typed in the screen, making it easier for users to see what the screen is saying in words, and it can be used as a screen reader.

At the same time, it is able to translate from and to Braille and cooperates with the Braille display. It is also possible to modify the visual presentation of the information, by changing size, colour and other features.

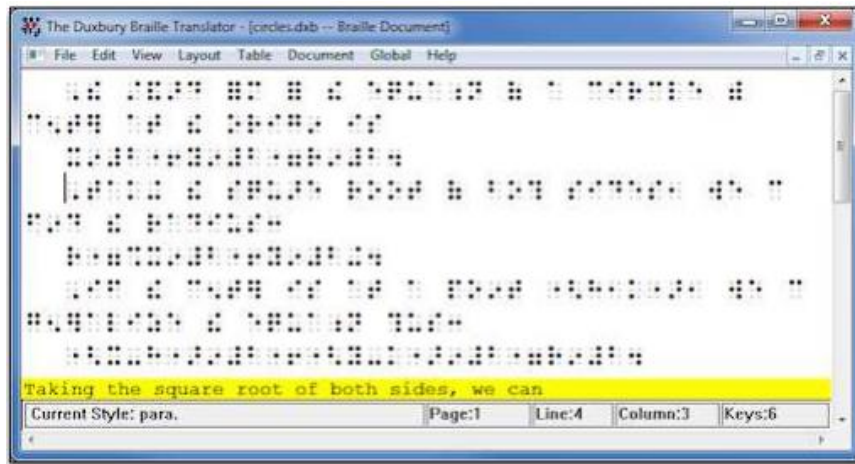
\* This software, through special configurations, can also facilitate people with attention deficit disorder or some form of dyslexia.



- Braille conversion software

This software allows the automation of the process of converting text into Braille (and vice versa) and at the same time provides text editing capabilities of this text.

This feature allows the program to be used both by people who know Braille or by those who do not know Braille but want to produce text in Braille. It is compatible with a Braille printer, supports Greek and can support input of mathematical characters and symbols.



- Voice reader software (Speechwriter)

Software that allows the user to speak text (instead of typing it) using a microphone and then his words are automatically converted into text either in the speechwriter's word processor or in Microsoft Word. It provides the ability to convert pre-recorded speech from a file format (wav, mp3, mp4, wma) to text.

\* This software is also used by people with physical disabilities who cannot at all or have difficulties in typing text



## Equipment

- Refreshable Braille screen



Device for displaying Braille characters, where the blind or partially sighted users can use to read the text output. It has 44 characters, three of which are also used to display special information. It fully supports Greek.

\*Users with deafness may also use refreshable Braille screens.



- Braille printer

This device allows the printing of text in Braille. The printer supports Greek and English Braille, has the ability to print directly from the Internet and uses computerised paper, so that the reading of the Braille text is not interrupted.



- High performance headphones



- Audio recorder



- Electronic Closed-Circuit Television (CCTV) magnifier

Electronic magnification is a solution for a large category of people with vision problems. The device presents an image (or anything in print) enlarged to the computer screen (up to 30 times magnification). Its main feature is its ability to be used for writing.



- 3D Printer

3D printers help the blind and visually impaired to "see" the world in new and innovative ways. By printing everyday objects, characters from books, art paintings, maps, illustrations of buildings and many more, students with visual impairments better understand their environment and possibly their field of study.



- **Students with Mobility Disabilities**

### **Equipment**

- Trackball mouse

It is a special mouse that performs the functionality of the mouse using trackball. It is specially designed to serve computer users with limited hand control, motor skills difficulties, with weak opto-motor skills, with a weak visual-motor

coordination, with limited dexterity and involuntary muscle twitches. It also provides a special tremor compensation function, allowing use without bending the user wrist and finally it can be used just as efficiently by either right-handed or left-handed users.



- Wireless Head Controlled Mouse

It is used by people with physical disabilities who cannot use a mouse or keyboard. It fits on the head like glasses (it can even be worn over myopia glasses) and allows extremely precise control of the cursor on the screen by moving the head. It is also connected to the pressure switches listed below.

- Pressure switch

It is an assistive device for computer users with limited vision or users with motor disabilities who need a larger target area, compared to that provided by a conventional mouse. The switch is available in different colours (red, blue, yellow and green) to meet individual needs of users.

- Special keyboard

Keyboard that offers more relaxed and faster text typing for people with handicaps and especially one-handed people. It has concentrated all the keys in a layout that allows a proper finger placement, fingertip positioning, and typing with only one hand, avoiding long strokes, avoiding wrist strain, and avoiding RSI (Repetitive Strain Injury).



### 2.2.2 Supporting Equipment and Software for the disabled at the Aristotle University of Thessaloniki

The Library and Information Centre of the Aristotle University of Thessaloniki in cooperation with the Office of Support for Students of Sensitive Social Groups, the Health Committee and the Centre for Integration Policy (KEP), provides students with visual impairments, and/or with perceptual or reading disabilities, and/or with physical disability the following:

- Three workstations with the following tools
  - ✓ Braille display device connected to a workstation that allows tactile access to Braille texts without the need to produce Braille documents or books
  - ✓ Braille printer
  - ✓ Closed-circuit television. It provides magnification, artificial colour switching and reversal functions, visual highlighting and focus on printed material.
  - ✓ PIAF embossing device: This special device enables embossed graphics to be produced on the page of a special microcapsule paper. Ideal for geometric shapes, graphs, maps, pictures, musical pentagrams, etc.
  - ✓ Supernova software that works as:

Screen reader. With the help of the voice synthesis program the reading of screen data is achieved

Screen manager. Through this software the user has the possibility to display on the screen all graphic data in enlarged form. It also has colour

and contrast switching, colour inversion, visual highlighting and focusing functions.

- Easy Reader application with the following functions:

Create an e-book library. User can upload the book he/she wants to the application in various accessible formats (doc, epub, daisy, txt).

Reading of e-books in Greek and English using embedded voices

Use of tools with various auxiliary features (navigating the contents, creating bookmarks, search, selecting/changing colors, focus and font size and more).

- Software Logographer Greek-English, which enables the conversion of spoken speech (Greek and/or English) into written speech
- Portable closed-circuit television (CCTV) device. It can be placed over text (books, notes and other documents) and provides magnification, artificial colour changing and inversion, visual highlighting and focusing functions.
- Portable Mechanical Braille Typewriter. Prints up to 25 lines of 42 Braille cells.
- Independent Eye Detection Unit to simulate the mouse. The PCEye5 device in combination with the computer to which it is connected allows people with disabilities to fully operate a computer with their eyes.
- Big Keys keyboard. It has a limited number of keys so that the user's attention is not distracted and is focused on the most used keys. The keys are 4 times the size of conventional keyboards. It is accompanied by a key guide (key isolation grid) that prevents unintentional keystrokes.
- Mouse trackball. Aimed at people with mobility problems in the upper limbs. It replaces the conventional mouse. It consists of a trackball that replaces the movement of the cursor and six keys for the basic functions of the mouse. It also provides three connection inputs for external switches that provide additional functionality.
- Mouse Lever. Aimed for people with mobility problems in the upper limbs. It replaces the conventional mouse. It consists of three different handles (lever, ball and T-shaped) that replace the cursor movement and six keys for the basic functions of the mouse. It also provides three connection inputs for external switches that provide additional functional facilitation.

- Switch mounting bracket for alternative mice or other peripheral devices. Accompanied by an attachment mechanism to various flat or round surfaces or even to wheelchairs.
- Circular Selector Switches for people with upper limb disabilities. They provide an alternative click option, replacing the basic functions of a conventional mouse.
- Epson DS-50000 scanner capable of scanning up to A3 size
- Computer headset

- Writings in electronic form. Students with disabilities can request their academic texts in accessible format. The service contacts the publishers, then converts and modifies the material into an accessible format and finally uploads the material to the "Accessible Multimodal Controlled Access Digital Library" AMELib.
- Use of AMELib (Accessible Multi-modal Electronic Library). Access to this database is only possible with controlled access codes for print disabled users. Users are bound by a declaration of responsibility for the correct and lawful use of the database and its contents, taking note of the consequences of the law on copyright protection (Law 2121/1993 - Government Gazette 25/A/4-3-1993) in case of its violation.

AMELib (Accessible Multi-modal Electronic Library) was created in the framework of SEAB action 9.7 and is addressed to users of Greek academic libraries. It offers accessible content through an equally accessible web application. About 2300 book titles in accessible electronic format (pdf, word, e-pub, daisy) are posted on AMELib (October 2020) and actively continued to be posted by the participating institutions. The material is accessible to all active registered users.

- Conversion of e-learning material into accessible format. Students with disabilities have the possibility to request e-learning materials in an accessible format. The service contacts the teachers, then converts and modifies the material into an accessible format and finally, in cooperation with the e-

learning support service, posts it on the eLearning platform. Students gain access to the material they have requested through this platform.

### 2.2.3 National and Kapodistrian University of Athens

The mission of the Accessibility Unit for Students with Disabilities is to achieve in practice equal access to academic studies for students with different abilities and requirements. The Accessibility Unit also supports students with learning difficulties or serious illnesses. The main means employed for its purposes are Adaptations to the Environment, Assistive Information Technologies and Access Services. The aim is to meet the basic needs and requirements of Students with Disabilities such as: interpersonal communication with members of the academic community, note-taking and assignment writing, access to university buildings, educational materials, classroom blackboard and projections, examinations and internet content.

The Accessibility Unit for Students with Disabilities includes:

- Needs Registration Service of the Students with Disabilities,
- Department of Electronic Accessibility,
- Department of Accessibility in the Built Environment,
- Transportation Service,
- The Service of Psychological Counselling for Students with Disabilities.

The Needs Registration Service of the Students with Disabilities is concerned with the systematic registration of the needs of all Students with Disabilities. The registration does not only concern students who were admitted to the university with special provisions, but also Students with Disabilities who were admitted with regular or special examinations, as well as those who acquired a disability during their studies.

The e-Accessibility Department includes a) Assessment of Students with Disabilities Capabilities with a scientific methodology in order to propose a specialized solution of advanced Assistive Technologies (AT). It also provides assistance in the procurement of appropriate IT equipment and software and technical support, b) Volunteer Support Service to coordinate the systematic, discreet and safe service of PWDs by qualified volunteer fellow students on issues



related to their studies, c) Teleinterpretation Service in Greek Sign Language and d) Production of accessible textbooks in different formats.

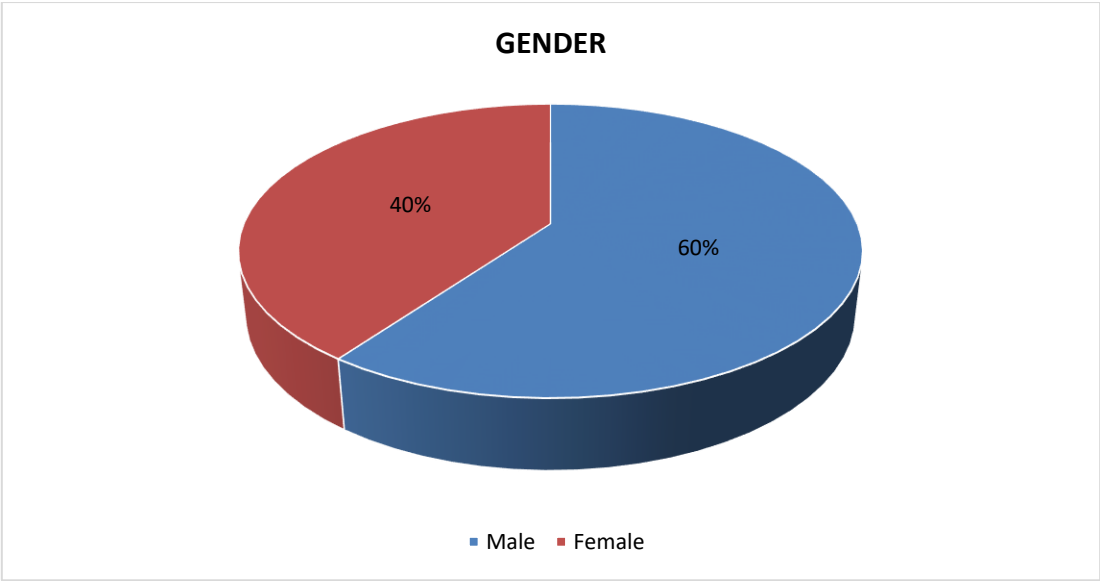
The Transport Service deals with the daily transport of the students from their homes to their places of study and vice versa. It has specially adapted vehicles for the transportation of students using wheelchairs.

In the area of Accessibility in the Built Environment, accessibility standards are ensured in the new buildings under construction at the UCA and modifications are made to existing buildings to make them accessible.

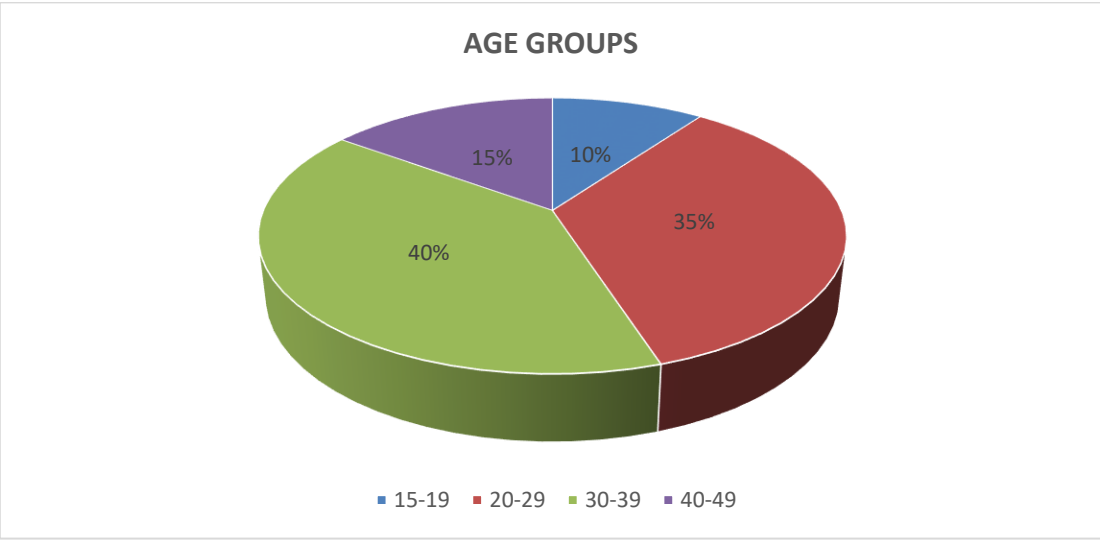
### **3. Research results**

#### **3.1 Demographic**

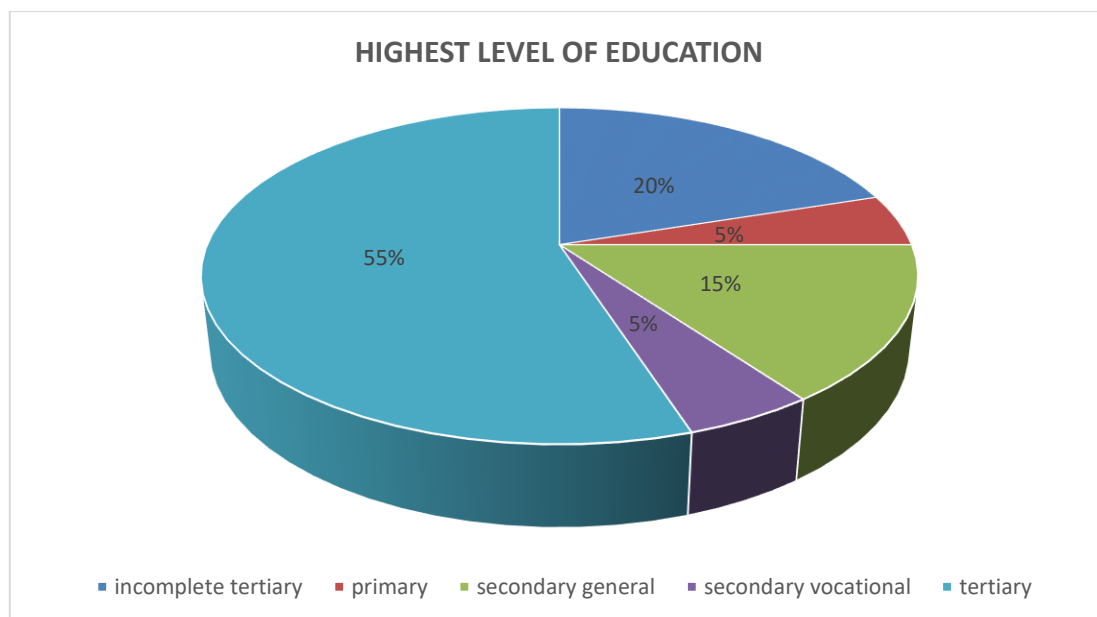
The size of sample who participated in the study was 20 people - 12 males, 8 females (Fig. 1) with disabilities having age range from 15 years to 46 years. As Fig. 2 shows, the most prevalent age groups are those of 30-39 and 20-29. The majority of the participants haven't finished yet the tertiary education (55%), while the 20% has already gained their degree. Just 15% of the respondents stated that have finished Secondary General education and only 5% stated that finished Secondary Vocational and Primary (Fig. 3).



*Figure 1. Gender*



*Figure 2. Age groups*

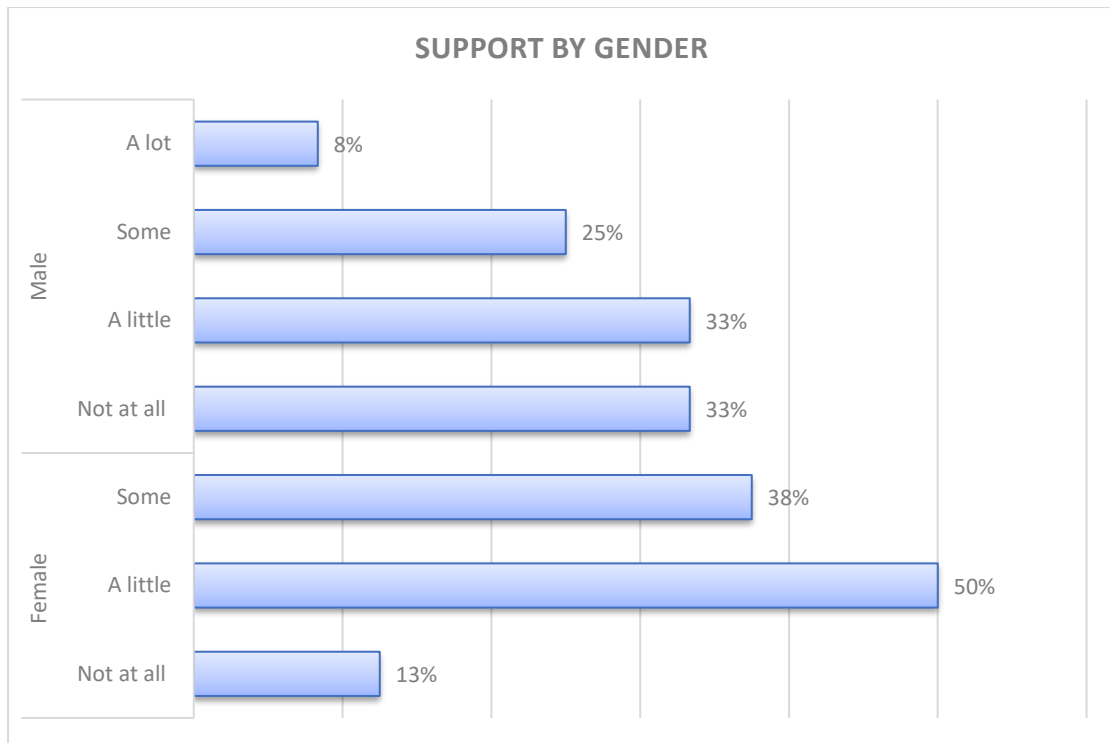


*Figure 3. Highest level of education*

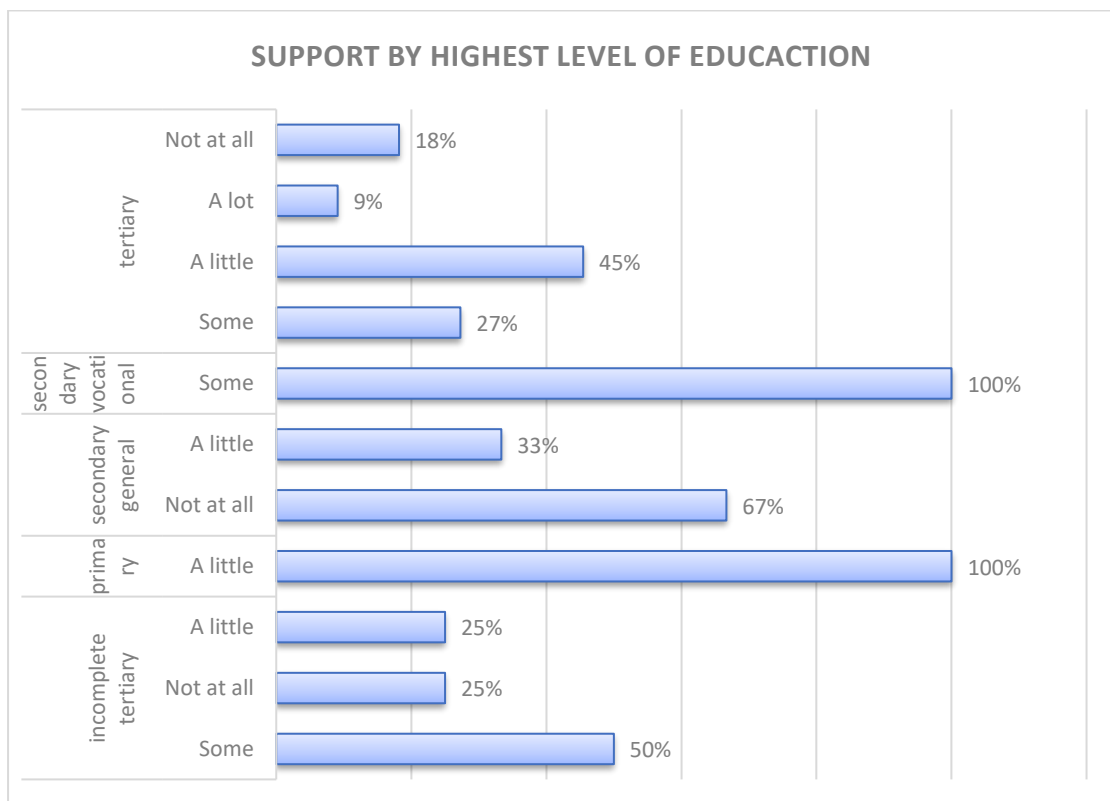
### 3.2 Support with the studying process analysis

The way the questionnaire was designed, there were cases where some participants gave answers to 11 questions and some that gave answers to (up to) 25 depending on the question 'I need/would need support in the study process'. The analysis shows that 20% of the participants do not need any support in the study process. Examining the level of support each gender needs (Fig. 4), it is obvious that more male respondents claimed that they don't need support at all. At the same time, a male respondent answered that he needs a lot of support while there was no answer from a female participant for the specific option. The answers given about "some" or "a little" support have a similar distribution among genders.

The crosstabulation of variables of educational background and support level (Fig.5) shows that most respondents having completed tertiary education need "a little" support (45%), while the 27% needs "some", 18% doesn't need any support and 9% needs "a lot". Participants that haven't finished tertiary education need "some" support (50%), while those who have finished secondary general level of education, they don't need at all any support (67%) or "a little" (33%). At the same time, respondents who have finished secondary vocational level of education need "some". Finally, those who have finished primary education need "a little" support.

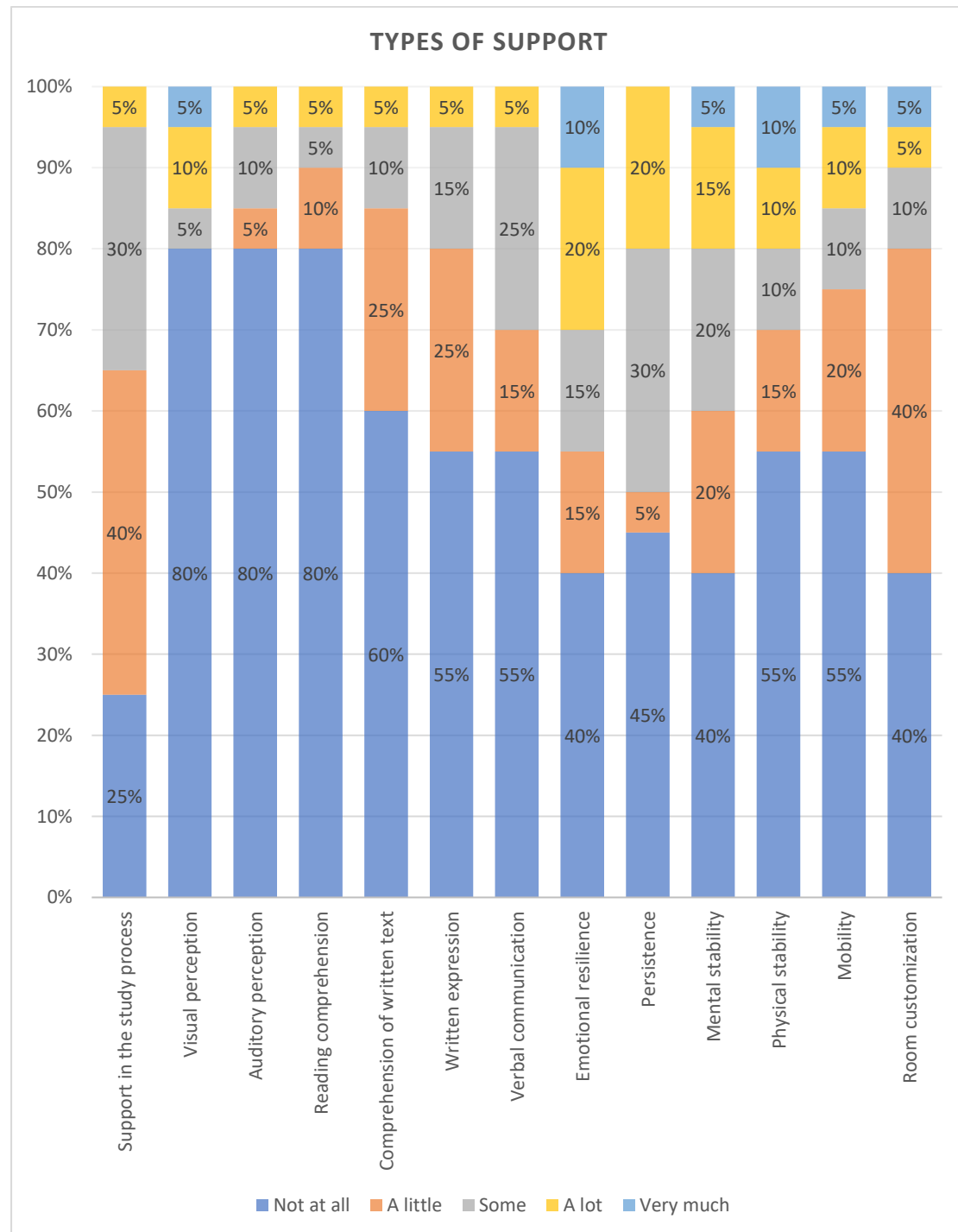


*Figure 4. Support by Gender*



*Figure 5. Support by Highest Level of Education*

The answer to the question "I need/would need support in the study process" was a prerequisite for the participant to continue answering a number of questions regarding the type of support. For data analysis reasons in the present study, we consider that the people who answered the prerequisite question "not at all" answered equally for all types of support that they do not need them at all.



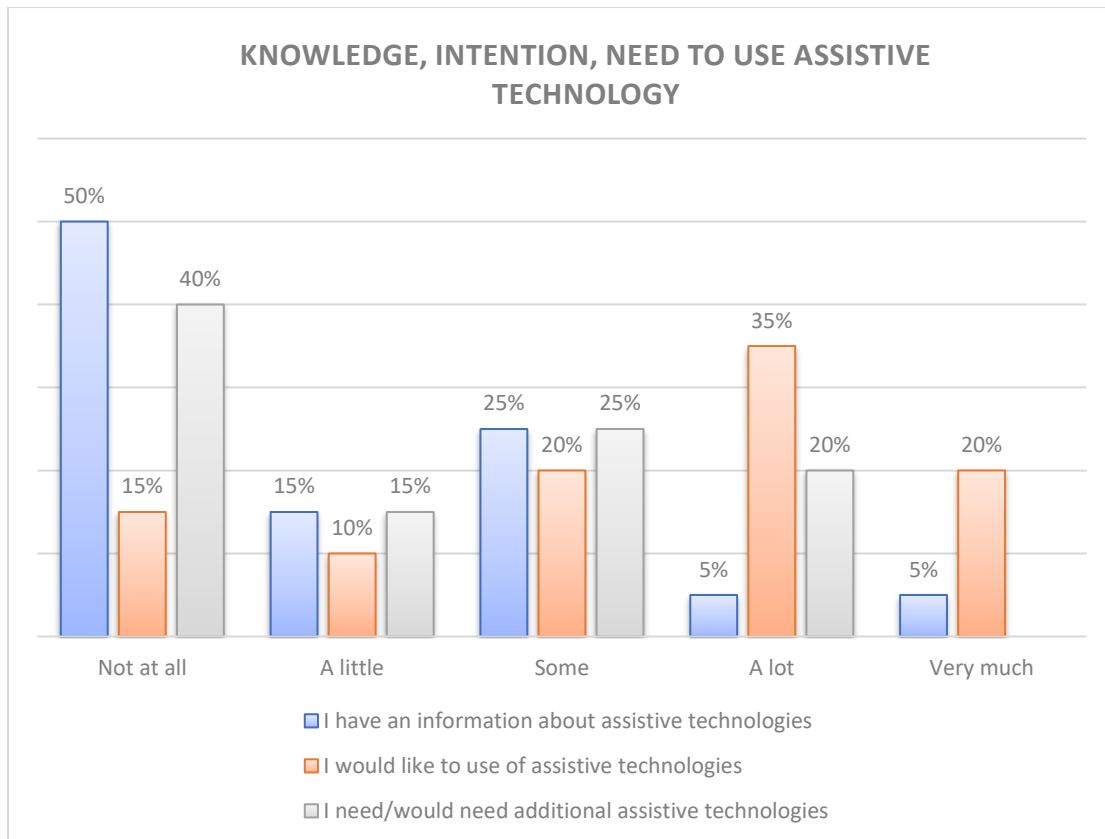
*Figure 6. Types of support*

As Figure 6 shows, three types of support seem to have less significance than the other for people with disabilities. “Visual perception”, “Auditory perception” and “Reading comprehension” are regarded less valuable for 80% of the participants. It is followed by a less important type support with 60% the “Comprehension of written text”. A 55% of the respondents claimed that they don’t need support at all in “Written communication”, “Verbal communication”, “Physical stability” and “Mobility”. The participants that answered they need little support, are focusing mainly in “Room customization”, “Written communication” (40%) and “Verbal communication” (25%). Some 20% of the respondents claimed that need little support at “Mental stability” and “Mobility”.

The respondents that need some support indicated that they need support in “Persistence” (30%), “Verbal Communication” (25%) and “Mental stability” (20%). “Persistence” remains in the center of interest of those who answered that they need a lot of support. Three types of support such as “Persistence” (20%), “Verbal communication” (20%) and “Mental stability” (15%) are pointed as the most valuable types of support for the specific group. On the other hand, a 10% of the respondents claimed that need “Emotional resilience” and “Physical stability” support.

Regarding the level of information that participants acquire over assistive technologies, it is evident that the 50% of the respondents don’t have any information about it, while 15% has “a little”. Some 25% has some information, while 5% acquire a lot or very much information. On the other hand, respondents seem to be more open to use assistive technology. 15% don’t have any intention to use it or 10% have “a little”. Contrary, 20% have “some” intention, 35% “a lot” of intention and 20% definitely intends to use assistive technologies (Fig. 7).

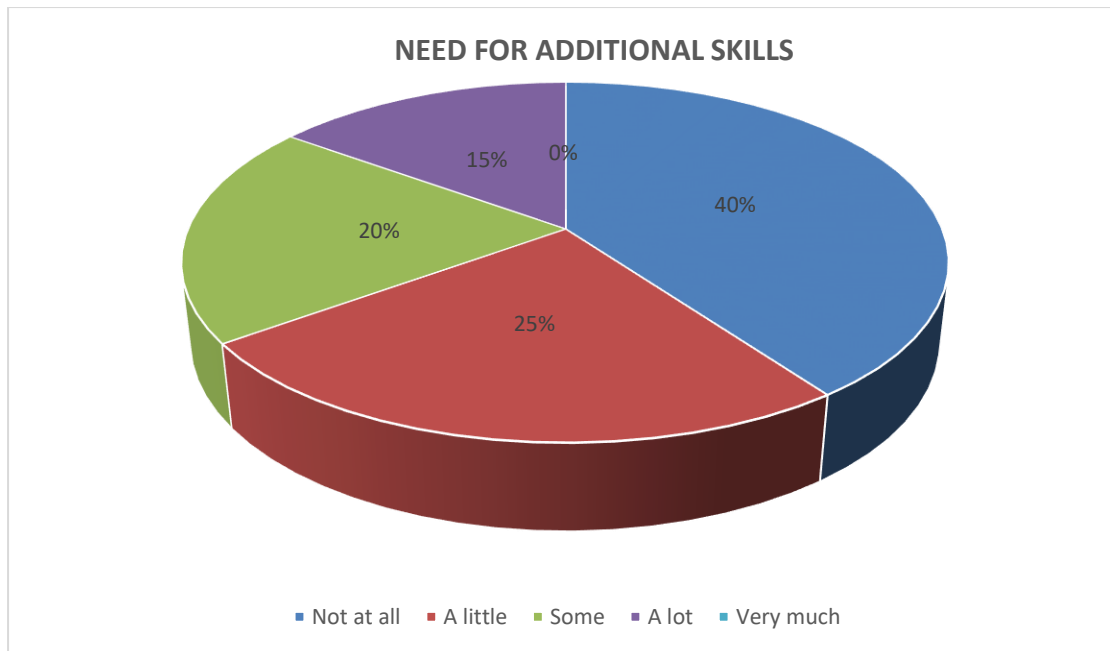
People who already use these technologies were called to specify the technologies used. Most participants responded that they generally use personal computers for accomplishing their everyday tasks and few of them indicated specific applications such as Webex, Magnifying Glass and Screen readers. This means that people with disabilities rely on their traditional hardware and attempt to exploit communication and reading enhancement technologies.



*Figure 7. Knowledge and intention to use assistive technology*

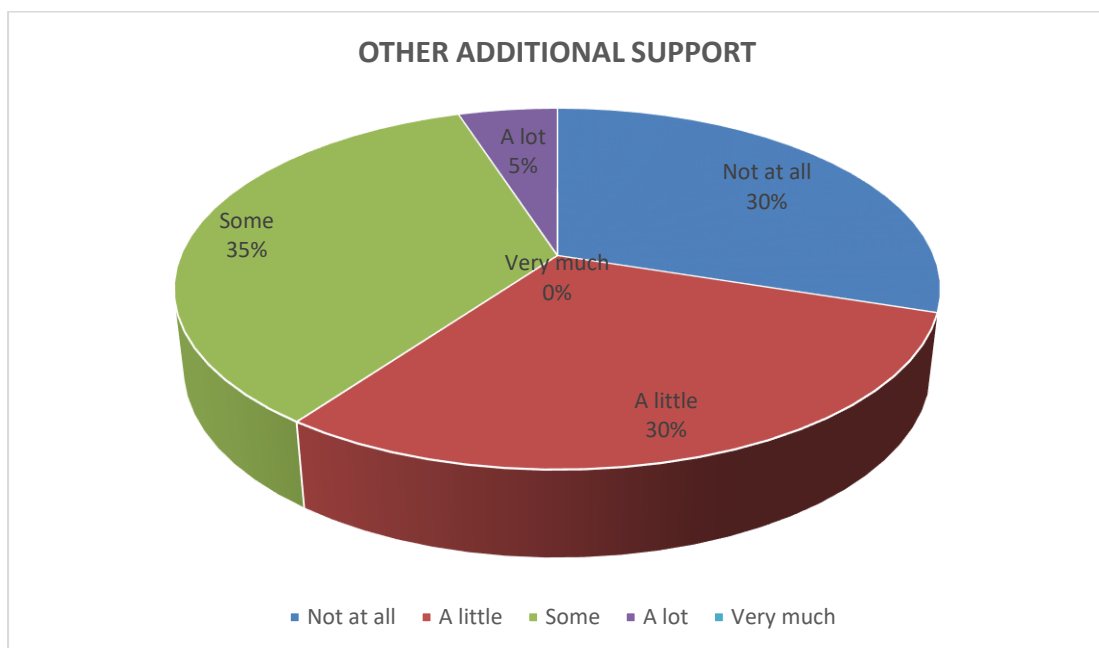
Furthermore, participants were asked if they need/would need additional assistive technologies. To this question, participants were sparing in their answers. Those who answered underlined the fact that either they need more information in order to know which of them are appropriate for their needs or they need to become technologically literate in order to use them.

Participants also asked if “In the study process they need/would need to acquire additional skills for the use of assistive technologies”. Some 40% of the participants answered that they don’t need any additional skills, while 15% claimed that needs “a little” support. Additionally, 25% needs “some” support, 20% needs “a lot” and no one expressed an excessive need for additional skills.



*Figure 8. Need for additional skills*

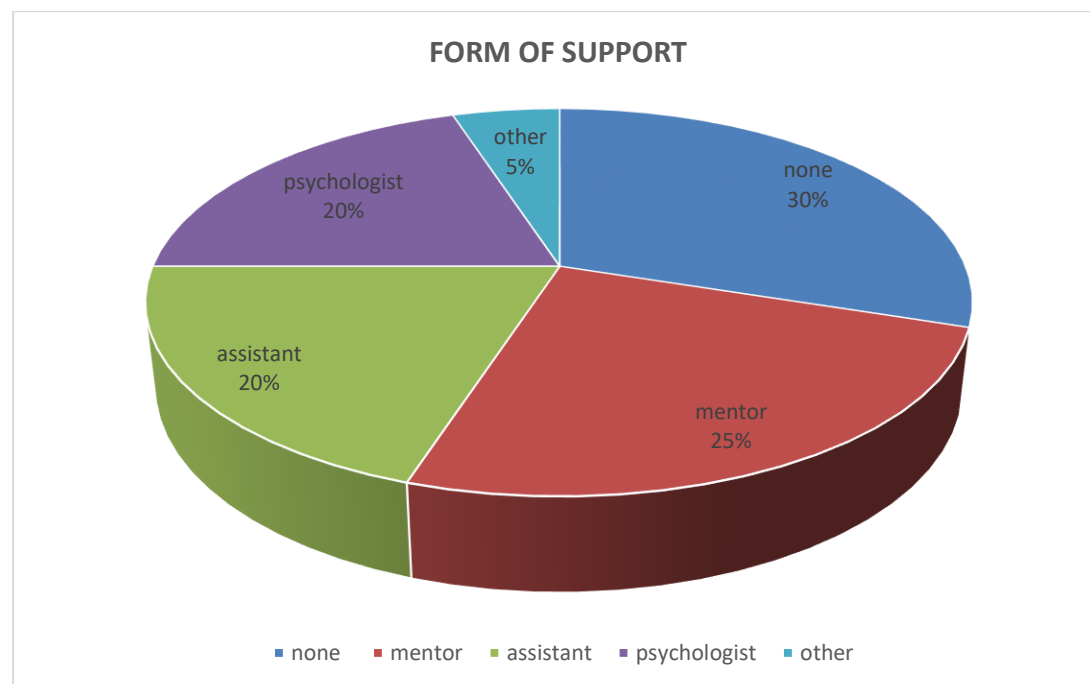
The last section of the questionnaire was aimed at the identification of any additional support for people with disabilities. Some 30% of the participants answered that they don't need any other additional support, while 30% claimed they need "a little" additional support. Furthermore, 35% need "some" additional support, 5% need "a lot" and no one expressed an excessive need for additional support.



*Figure 9. Other additional support*

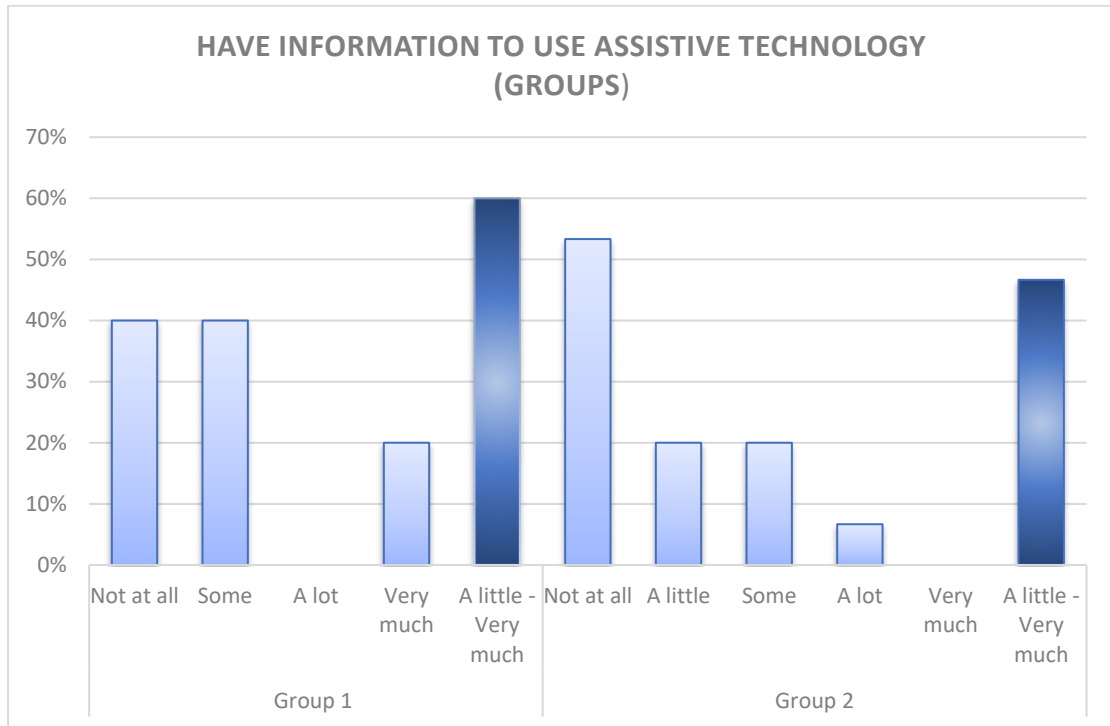


Participants were asked to specify the form of support that they would need. Figure 10 presents the forms that participants prefer. Some 30% didn't give any specific answer and the most popular form was mentoring (25%), assistance (20%) and psychological support (20%). Some 5% didn't specify any other type of support. Disabled people feel that they would be more effective having the support of another person.

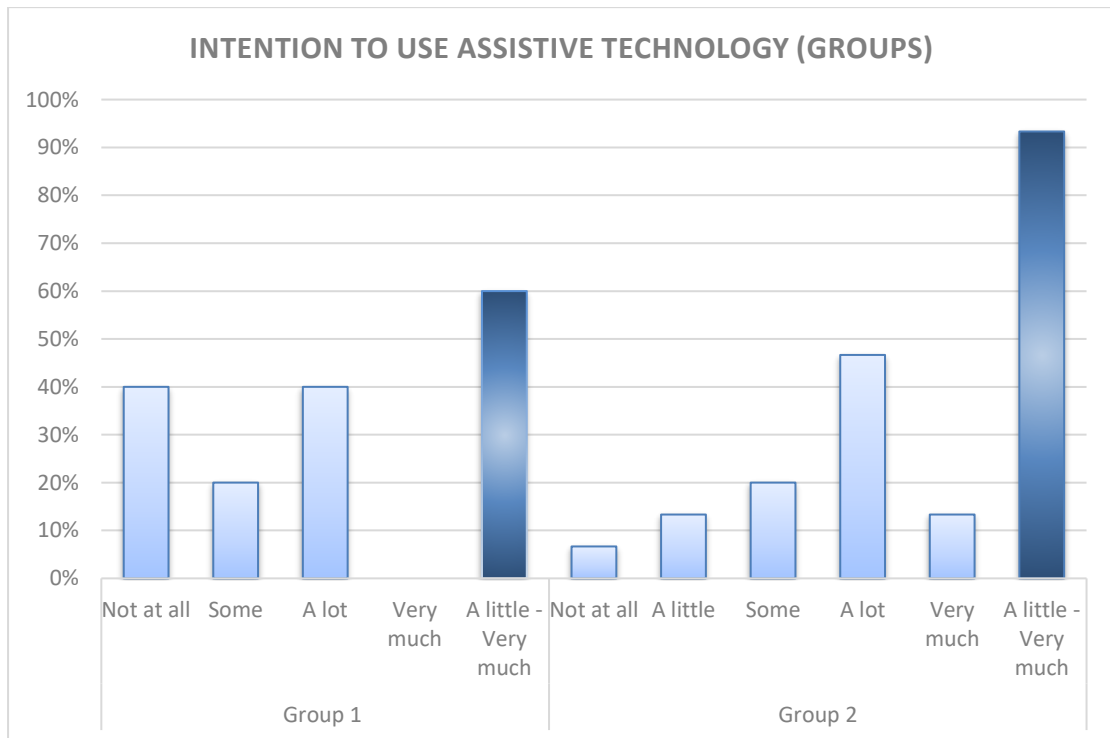


*Figure 10. Form of support*

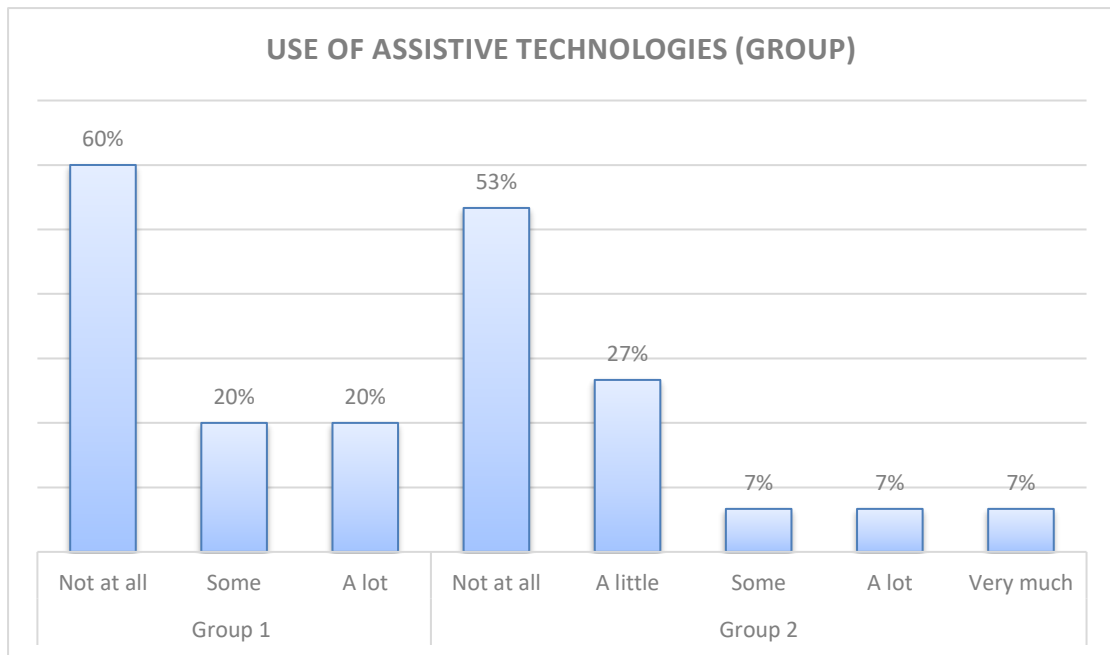
Under the criterion the answers at the question about the need of support in the study process, two groups were created dividing the participants to those who answered that they need support and answered related questions (Group 2) in the study process and those who don't need and therefore haven't answered the specific questions (Group 1). Under that lens, one can notice differences in the totality of the answers. Figures 11, 12 show the differences between the two groups on knowledge and intention to use assistive technologies. Group 2 seems to be more aware than Group 1 and also more open for the adoption of assistive technologies. It is also prominent that already make use of these technologies although there is not an emphatic indication. As Figure 13 presents the allocation of the answers of Group 2 indicates that people from this group are familiar as they use even some technological products.



*Figure 11. Knowledge to use assistive technology (Groups)*

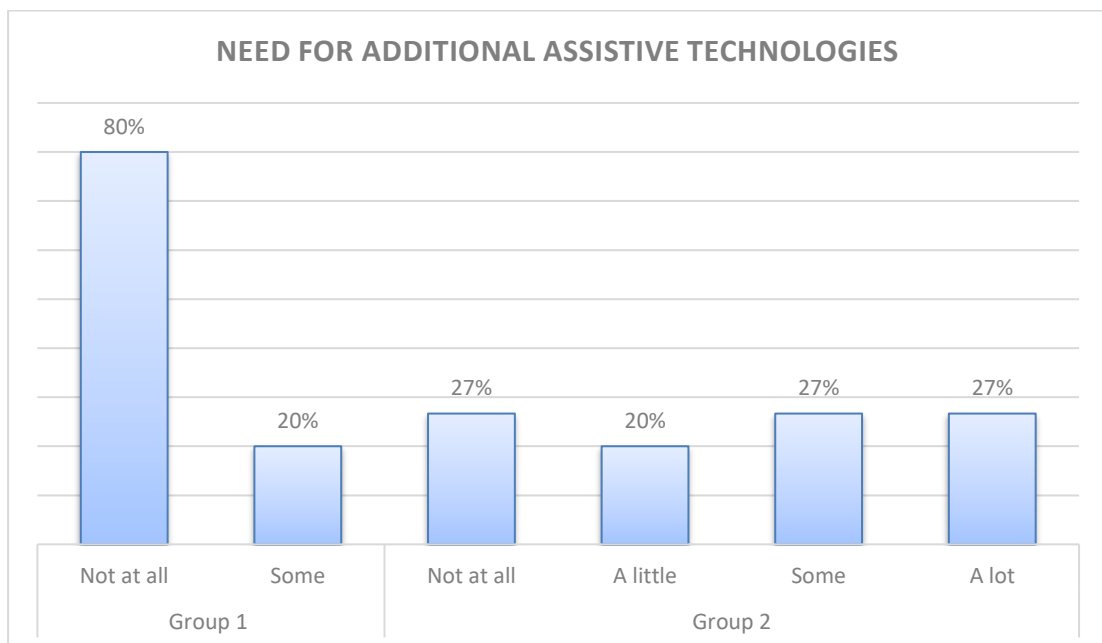


*Figure 12. Intention to use assistive technology (Groups)*

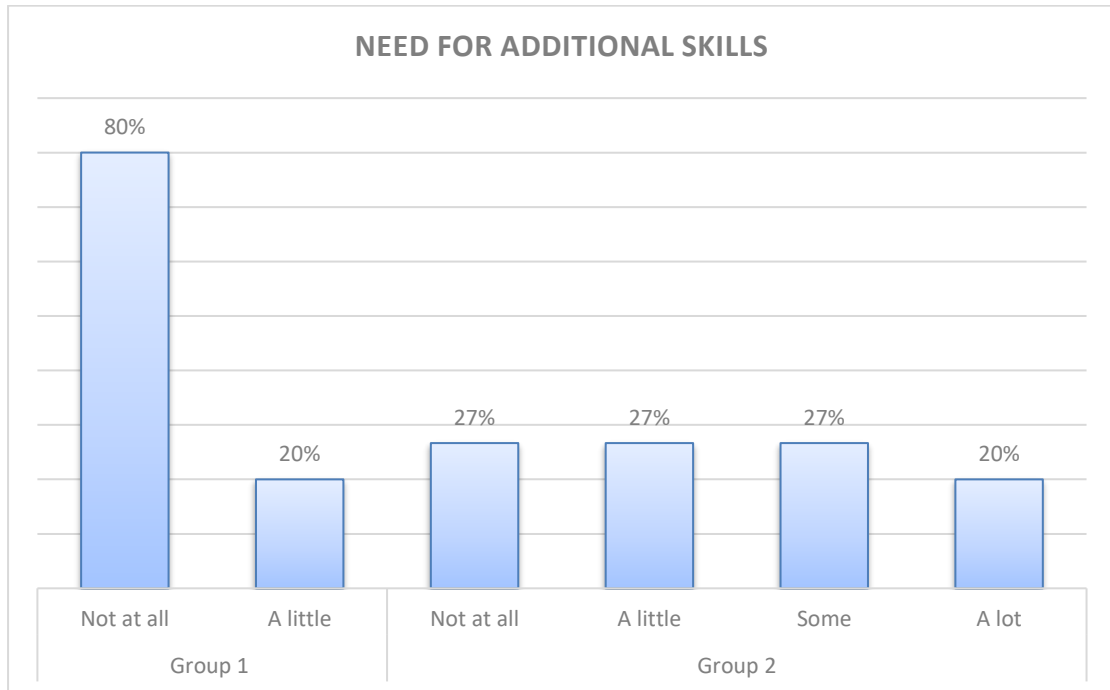


*Figure 13. Use of assistive technologies (Groups)*

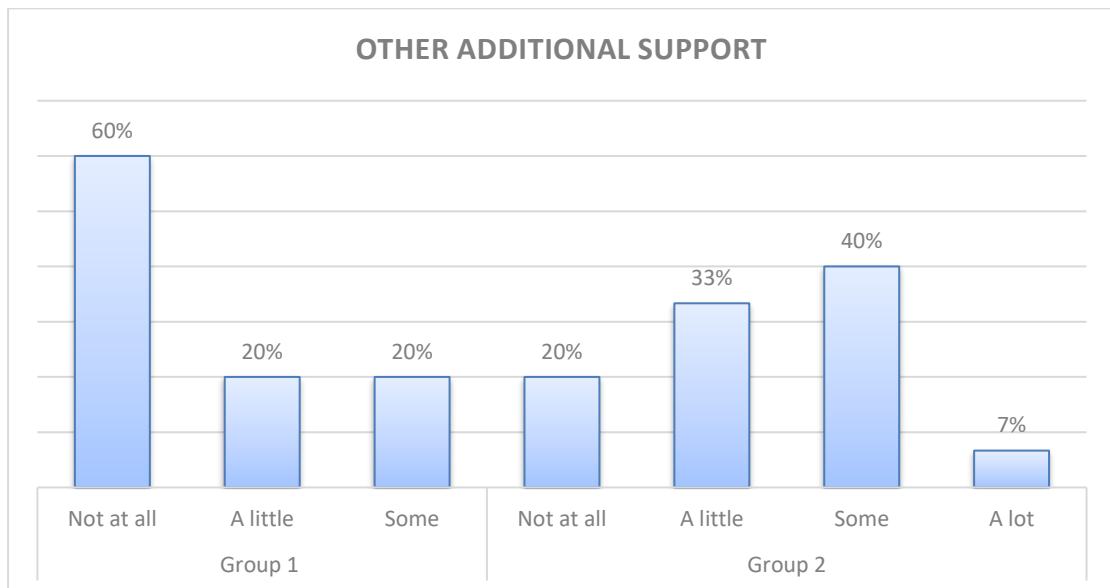
Figure 14 presents participants' answer about their need for additional assistive technologies. It is also evident that Group2 needs more additional assistive technologies than Group 1. Group1 seems to be consistent to its answers and current's readers report can also notice it from Figures 15 – 16. Participants from Group 1 are not receptive to any kind of support and they don't need to be trained in order to use assistive technologies.



*Figure 14 Need for additional assistive technologies*



*Figure 15 Need for additional skills*



*Figure 16 Other additional support*

### **3.3 Requirements of Disabled Students in Higher Education**

Disabled students are not all open either to human or technological support. Those who are not willing to have a support in study process tend to be more negative/skeptical to any kind of assistance. In fact, those participants they don't use any technology in order to accomplish everyday tasks and consider themselves independent. On the other hand, Group 2 respondents are willing to ameliorate their efficiency and functionality using technological solutions. "Persistence", "Verbal communication" and "Mental stability" are sectors of support that students need to the study process. Hall (2010, p. 275) has also pointed out that people with disabilities should be able to "find stability and build resilience in difficult bodily and social circumstances". In recent years there have been developed solutions that focus on these dimensions. For example, Khan et al (2019) realized the need of disabled people for verbal communication and developed an efficient application.

The support that students need should be combinational as it should embraces psychological and cognitive dimension. Students claimed that need a mentor and a psychologist as an additional support. It is indicative that Higher Education Institutions should adopt initiatives that have an holistic view of the problems that disable students face.

Finally, the qualitative results are in line with the existing literature over barriers of usage of assistive technology (Boot et al., 2018, Okonji & Ogwezzy, 2019, van den Heuvel, Jowitt, & McIntyre, 2012, Carey, & Sale, 1994) regarding the barriers that affect assistive technology. Participants pointed that either have incomplete awareness of applications that make help them or they lacking familiarity with them. Disabled students should be aware of the variety and types of technological products that are available in order to choose the appropriate one and consequently to be trained on it. The awareness of products' availability may bend the resilience even those who don't believe that need any support.

### **3.4 Conclusions and Recommendations**

From the results of the study, it is evident that there is widespread need for assistive support by students of Higher Education. Most Students either already use some technologies or are very willing to use them. This leads to the conclusion that the barrier for the use of assistive technologies is not the intention of the users but mostly their availability and diversity. It is therefore recommended that assistive technologies are diversified so they can aim at all different target groups which will significantly increase user engagement.

### **References**

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