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

Online course

Creative Information Technologies and Assistive Programs for Disabled Students in Education

Developed by: **Liepaja University** (Latvia), **CSI Center for Social Innovation LTD** (Cyprus), **University of Maribor** (Slovenia), **University of Patras** (Greece)

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Content

Context

The international Erasmus+ partnership project “Smart Solutions for the Inclusion of Students with Disabilities in Higher Education”, https://sssd-he.liepu.lv/, is implemented by four partner institutions – Liepaja University, Institute of Educational Sciences (Latvia), CSI Center for Social Innovation LTD (Cyprus), University of Patras (Greece) and University of Maribor (Slovenia).

The aim of the project is to develop innovative, inclusive higher education system solutions that promote social inclusion and innovative digital assistive technology solutions. Thus, promoting the availability of information and communication technologies for various groups of the society and their integration into the academic and social environment. Innovative solutions are developed in direct cooperation with students, representatives of higher education institutions and digital solution specialists, taking into account the diversity of needs, requirements and recommendations.

The University E-course is part of the project’s outputs.

Introduction

The University E-course, developed by the Erasmus+ partnership project "Smart Solutions for the Inclusion of Students with Disabilities in Higher Education," includes contributions from Liepaja University, University of Maribor, Center for Social Innovation LTD, and the University of Patras. Available in English, Latvian, Slovenian, and Greek, this e-course promotes the inclusion of students with disabilities in higher education by providing support through assistive technologies.

It is crucial for higher education institutions to support individuals with disabilities. To address this need, we have designed this e-course specifically for educators interested in learning how to better support students with special needs.

The E-course comprises three modules: (1) an overview of political documents and trends related to supporting students with special needs in higher education, (2) an examination of specific technologies designed to aid individuals with special needs, (3) and the integration of assistive support into educational settings.

Module 1

The Needs of Inclusive Education Organization in Higher Education

Module Outlines

Author: Liepaja University

Module Duration: 10 hours (3 hours taught; 7 hours research/discussion/assignment)

Module Aim (-s):

- To provide an insight into the conditions and basic principles of an inclusive higher education organization
- To introduce the legal regulation of inclusive higher education, approaches to its implementation, research in the field of inclusive higher education
- To present the experience, solutions, and examples of good practices of various countries and organizations in providing inclusive higher education

Expected Learning Outcomes/Skills:

- Knowledge and understanding of the conditions and basic principles of an inclusive higher education organization
- Knowledge and understanding of the legal regulation of inclusive higher education and approaches to its implementation
- Skills to analyze the implementation of guidelines set by regulatory documents in an inclusive higher education organization
- Skills to analyze the specifics and applicability of various approaches in the implementation of inclusive higher education
- Ability to see the problems of implementing inclusive higher education and design possible solutions
- ICT
- Improving own learning & performance
- Analytical & problem-solving skills

Description of the unit (Methods/techniques used; unit outlines):

- self-directed learning, perceiving the content of the sub-course topic on the conditions and basic principles of an inclusive higher education organization;
- transformative learning, improving competence on the conditions and basic principles of an inclusive higher education organization;
- instrumental learning, seeing the implementation problems and possible solutions of inclusive higher education;
- constructivism approach as a teaching strategy

Recourses

Name of the document	Type of the document
Topic 1 International and national legal regulation of inclusive higher education	
Higher Education and Inclusion. Paper commissioned for the 2020 Global Education Monitoring Report, Inclusion and education. (2020.)	Appendix material
Right to higher education: unpacking the international normative framework in light of current trends and challenges. (2020).	Appendix material
Cera, R. (2015). National Legislations on Inclusive Education and Special Educational Needs of People with Autism in the Perspective of Article 24 of the CRPD. In: Della Fina, V., Cera, R. (eds) *Protecting the Rights of People with Autism in the Fields of Education and Employment*. Springer, Cham. https://doi.org/10.1007/978-3-319-13791-9_4	Appendix material
CGHE 2022 – KEYNOTE: Reinventing Higher Education for an Inclusive World	Appendix material / video
Topic 2 Approaches to the implementation of inclusive higher education	

European Education Area. Inclusive and connected higher education.	Informative text
Matthew J., S. (2018). *Implementing inclusive education.*	Appendix material
La, H., Dyjur, P., & Bair, H. (2018). *Universal Design for Learning in Higher Education.* Taylor Institute for Teaching and Learning. Calgary: University of Calgary.	Appendix material
What are inclusive pedagogies in higher education?	Appendix material / video
The Inclusive Practice Pyramid	Appendix material / video
Topic 3 Research and international/national reports on inclusive higher education	
Global Education Monitoring 2020 Report: Inclusion and Education.	Informative text
The social and economic rationale of inclusive education: An overview of the outcomes in education for diverse groups of students. OECD Education Working Paper No. 263.	Appendix material
Ortiz Colón, A., Agreda Montoro, M., & Colmenero Ruiz, M. (2018). Toward Inclusive Higher Education in a Global Context. *Sustainability, 10(8),* 2670. MDPI. http://dx.doi.org/10.3390/su10082670	Appendix material
Launch of the 2020 GEM Report - Inclusion in education: All means all.	Appendix material / video
Topic 4 Experience, solutions, and good practice examples of various countries and organizations in providing inclusive higher education	
The European Agency for Special Needs and Inclusive Education.	Informative text
Diversity, Equity and Inclusion in European Higher Education Institutions. Results from the INVITED project. (2019).	Appendix material
For Inclusive Higher Toolkit Education Institutions: from Vision to Practice. (2018).	Appendix material

Nora Jansone-Ratinika on inclusive education and MyHUB materials.	Appendix material / video
Intellectual Disability and College? It Is Possible!	Appendix material / video

Essential Reading:

1. **European Agency for Special Needs and Inclusive Education. (2017).** ***Inclusive education for learners with disabilities***. Brussels: European Union. Retrieved from: https://www.europarl.europa.eu/RegData/etudes/STUD/2017/596807/IPOL_STU(2017)596807_EN.pdf
2. **La, H., Dyjur, P., & Bair, H. (2018).** ***Universal Design for Learning in Higher Education***. Taylor Institute for Teaching and Learning. Calgary: University of Calgary.
3. **Samant Raja, D., (2016). Bridging the Disability Divide through Digital Technologies.** *Background paper for the World Development Report 2016.* Washington, DC: World Bank. Retrieved from: https://thedocs.worldbank.org/en/doc/123481461249337484-0050022016/original/WDR16BPBridgingtheDisabilityDividethroughDigitalTechnologyRAJA.pdf

Recommended Reading:

1. **UN General Assembly. (2007).** ***Convention on the Rights of Persons with Disabilities: resolution / adopted by the General Assembly.*** 24 January 2007, A/RES/61/106. Retrieved from: https://www.refworld.org/docid/45f973632.html
2. **European Commission. (2010).** ***European Disability Strategy 2010-2020*****.** Brussels: European Commission. Retrieved from: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM%3A2010%3A0636%3AFIN%3Aen%3APDF
3. ***Universal Design for Learning: A Concise Introduction.*** **(2011).** Colorado State University, ACCESS Project. Retrieved from: https://anyflip.com/mjpg/iixd/basic

Topic 1 International and national legal regulation of inclusive higher education

Inclusive higher education is one of the priorities of modern social development. This is confirmed by several important international and local documents. The UN General Assembly (UN General Assembly, 2015) resolution "Transforming Our World: A 2030 Agenda for Sustainable Development" adopted in 2015 included among its 17 sustainable development goals the goal of "Providing inclusive and quality education and promoting lifelong learning for all". The goal is to ensure equal access to all education and vocational training levels for vulnerable people, including people with disabilities, by 2030. The "UN Convention on the Rights of Persons with Disabilities" (hereinafter "the Convention") (UN General Assembly, 2007, Article 24, paragraph 5) also requires its member states to ensure equal access for persons with disabilities to tertiary, vocational, adult, and lifelong learning, and to reasonable adjustments to implement this option. The main goal in education of the European Disability Strategy 2010-2020 (European Commission, 2010, Article 2, paragraph 2.1, subsection 5) is to promote inclusive education for pupils and students with disabilities. The European Commission has identified inclusion and gender equality as one of the six dimensions of the development of the European Education Area (European Commission, 2020, Article 2).

In Europe, education is recognized at the highest political levels as important for improving people's living standards, creating jobs, economic growth, social justice, and raising European identity (Kottmann et al., 2019). The renewed EU Agenda for Higher Education emphasizes the unique role of higher education in building a successful, inclusive society and notes that higher education institutions provide students with advanced knowledge, skills, and competencies, complementing society's human capital and promoting social mobility and inclusion (European Commission, 2017).

The “Latvian Sustainable Development Strategy for 2030” (The Parliament (Saeima) of the Republic of Latvia, 2010, Article 3, Paragraph 134) states that “the goal of the 21st-century education system is to develop the ability of people with disabilities to continuously learn and learn innovations “.

Guidelines for the Development of Education of the Republic of Latvia 2014-2020 (Education Development Guidelines 2014-2020, 2014) mentions people-oriented education as one of the basic principles of the state education policy, emphasizing the importance of providing inclusive education. At the same time, it is pointed out that a safe educational environment, inclusive education, and an individualized approach play an important role in the implementation of the principle, emphasizing the role of inclusive education. The overarching goal of education development for the period up to 2020 is high-quality and inclusive education for personal development, human well-being, and sustainable growth of the country. Looking at the educational environment, it is pointed out that one of the criteria for determining its quality at all levels is the implementation of the principles of inclusive education, which provide equal opportunities for all, regardless of ability, need, property, and social status, race, nationality, gender, religion, and political beliefs, health status, place of residence and occupation in an accessible, dignified and supportive environment (Education Development Guidelines 2014-2020, 2014, point II, paragraph 1).

Order No. 672 of the Cabinet of Ministers of 12 December 2018 "On the Plan of Implementation of the United Nations Convention on the Rights of Persons with Disabilities 2014-2020 for the period 2018-2020" (Order No. 672 of the Cabinet of Ministers of 12 December 2018, 2018, paragraph 1) states that in education as one of the directions for the implementation of the plan, the measures are: aimed at promoting access to higher education for people with disabilities.

Latvia's new “Education Development Guidelines 2021-2027” (Education Development Guidelines 2021–2027, 2021, summary) the overarching goal set for the year 2021 is “to provide quality education opportunities to all Latvians in order to promote the development and realization of their potential throughout their lives and to develop their ability to change and responsibly manage permanent changes in society and the economy” is based on the Latvian National Development Plan 2021-2027 (Latvian National Development Plan 2021-2027, 2020, paragraph 9), which is also characterized by equal rights and quality of life for every inhabitant of Latvia in accordance with modern requirements. In “Guidelines for the Development of Education 2021-2027” (Education Development Guidelines 2021–2027, 2021, summary) one of the future characteristics of the Latvian education system is an individualized learning approach, providing an educational offer according to the needs and

opportunities of the individual, while the most important issues to be addressed in the Latvian education system are an insufficiently inclusive and emotionally safe environment.

The Latvian Disability Law (Disability Law, 2010, Article 5, Paragraph 1) states that “disability is a long-term or permanent restriction of a very severe, severe or moderate degree of functioning that affects a person's mental or physical ability, ability to work, self-care and integration into society” and a person with a disability is “a person who has a disability determined following the procedures provided for in this Law” (Disability Law, 2010, Section 1). The Law on Disability (Disability Law, 2010, Article 12, Paragraph 1, Subparagraphs 4, 5) stipulates that students with disabilities in higher education institutions and colleges have the right to receive a paid assistant service and a paid sign language interpreter service from the state budget.

The Latvian Law on Social Services and Social Assistance (Law on Social Services and Social Assistance, 2002, Article 1) defines technical aids as equipment or technical systems that “prevent, compensate, alleviate or neutralize a reduction in function or disability” and provide for the provision of technical aid services from public funds, “which ensures the functional assessment of a person, the manufacture, adaptation, training, repair, maintenance, and delivery of technical aids at the person's place of residence”. The service of technical aids is provided for certain groups of persons, incl. persons with disabilities of all groups and “persons who need a technical aid to reduce or prevent functional impairment” (Law on Social Services and Social Assistance, 2002, Article 25, Paragraph 1). The State of Latvia has delegated the provision of technical aids to non-governmental organizations (NGOs) - the Latvian Association of the Deaf and the Latvian Association of the Blind (Law on Social Services and Social Assistance, 2002, Article 13, Paragraph 21).

In Greece, a strong legislative framework defines the obligations of the State and Universities to provide all possible assistance to people with some form of disability.

Self-test questions:

1. **What regulatory documents determine the conditions for the implementation of inclusive higher education?**
2. **What is the main goal in education of the European Disability Strategy 2010-2020?**
3. **What do higher education institutions provide for students in the European Union?**

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Topic 2 Approaches to the implementation of inclusive higher education

The interpretation and use of the concepts of "inclusion" and "inclusive education" vary significantly in different EU countries, and no universal definition of "inclusive education" has been adopted in the EU countries. In general, inclusive education is based on innovative approaches and practices to create effective and equal education systems from the perspective of lifelong learning, covering all aspects of education (European Agency for Special Needs and Inclusive Education, 2014, 2017; Kirschner, 2015). Most often, the concept of "inclusive education" is used in the context of the inclusion of persons with various physical and mental disabilities, while also applying it to the implementation of inclusive education for a wider group of society (Kirschner, 2015). In the "Education Development Guidelines 2021-2027" of the Republic of Latvia (2021, Appendix 1, 69) inclusive education is explained as "a process in which the diverse needs of all learners are met, increasing the opportunities for participation of each learner in the learning process, culture, and different communities and reducing the opportunities for exclusion from education and the educational process ".

To promote the creation of an inclusive and student-friendly study environment and understanding of students' needs for higher education, the Ministry of Welfare of the Republic of Latvia (2020) in cooperation with Latvian higher education institutions, students, and NGOs have developed Guidelines for Higher Education Institutions. The guidelines identify four elements of an inclusive environment – an accessible information environment, an accessible physical environment, an adapted learning process, and an inclusive emotional environment. The guidelines mainly contain recommendations and guidance on the issues of accessible information and physical environment, as well as information on eligibility and access to assistant and technical assistance services. In the context of an inclusive emotional environment, the guidelines highlight the need to better understand the individual needs of students and the necessary forms of support and adjustment.

In order to ensure equally accessible high-quality higher education, it is necessary to increase the ability of the education system to meet the needs of students without categorizing and labeling them (European Agency for Special Needs and Inclusive Education, 2017).

In order to assess student learning achievement, the assessment tool must be universally accessible to students with disabilities and disability must be accepted as a variable that affects assessment outcomes (Edelstein, Abbott, & Kimball, 2020).

Universal Design for Learning (UDL) is widely implemented in US schools and universities. UDL is a guideline for creating inclusive learning spaces and accessible learning materials that includes three principles: (1) multiple representation methods, which allow students to obtain information and build knowledge in different ways, (2) multiple means of student activity and expression that provide alternative ways for students to demonstrate what they have learned, (3) multiple methods of student engagement that reach their interests, directly challenge and motivate learning (*Universal Design for Learning: A Concise Introduction*, 2011).

UDL includes information availability and the pedagogical approach that is important to the learning experience (La, Dyjur, & Bair, 2018). At the same time, UDL does not advocate any particular teaching approach but encourages using and combining different methods and approaches (*Universal Design for Learning: A Concise Introduction*, 2011).

UDL can improve the involvement of every student in the higher education study process. Based on the principles of UDL, the academic staff can promote the prerequisites for equal involvement. UDL principles offer options, flexibility, and goals to adapt the study process to different students in any study discipline. UDM encourages academic staff to consider how they could improve their teaching activities, taking into account the diversity of students' personalities and activities. Academic staff who implement the principles of UDL in their teaching activities in higher education institutions must be based on the belief that (1) different students may be involved in the study course, (2) all students have the right to higher education, (3) lecturers will try to create equal access to the study course for all students (La et al, 2018).

Schmidt and Čagran (2006) defined three approaches in the education of the deaf and hard of hearing: Oral, total communication and the bilingual / bicultural approach. The oral approach means that deaf people read from lips and try to speak orally. The total communication approach is a combination of sign and spoken language. The bilingual / bicultural approach, however, includes only sign language, which is

considered the mother tongue of the deaf and hard of hearing. The first two approaches allow the deaf and hard of hearing to enrol in traditional educational institutions, while the third approach allows enrolment only in special schools that are adapted to it.

Self-test questions:

1. **What is the essence of the concept of inclusive education?**
2. **What are the main principles of UDL?**
3. **What approach is recommended for educators to use in UDL?**

References

Edelstein, J., Abbott, J., & Kimball, E. (2020). Disabling Assessment Plans: Considering Disability Constructs and Implications in Learning Outcomes Assessment. *Journal of Postsecondary Education and Disability, 33(3),* 283-290. Retrieved from: https://www.ahead.org/professional-resources/publications/jped

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Universal Design for Learning: A Concise Introduction. (2011). Colorado State University, ACCESS Project. Retrieved from: https://anyflip.com/mjpg/iixd/basic

Topic 3 Research and international/national reports on inclusive higher education

The importance of providing inclusive higher education in the context of quality of life is shown by research in Scotland, which confirms that students with disabilities enter the labor market as well as non-disabled students after higher education and that, similarly to non-disabled people with disabilities, are more employed as opposed to individuals without higher education (Riddell, 2016).

Although there has been talked about increased involvement in higher education for three decades, the 2018 Bologna Progress Report shows that students with illness are still under-represented in higher education and that many of them drop out without a degree (Kottmann et al., 2019). At the same time, European statistics show that in several European countries, 25% of students have indicated a disability or impairment. The increase in the number of students with disabilities highlights the need for more inclusive higher education, given that students with disabilities still face several academic, psychological, and social challenges (McNicholl, Casey, Desmond, & Gallagher, 2019).

The preamble to the Convention (UN General Assembly, 2007, preamble) states that the concept of disability is still evolving and that "disability results from the interaction between persons with impairments and attitudinal and environmental barriers that hinders their full and effective participation in society on an equal basis with others". According to the Convention (UN General Assembly, 2007, Article 1) a person with a disability is considered to be a person who has a long-term physical, mental, intellectual, or sensory disability that, in interaction with various obstacles, may impede their equal, effective and full participation in society.

Riddell (2016) points to difficulties in comparing data on the involvement of students with disabilities in higher education from different EU countries, citing different concepts and understandings of disability.

A study carried out by the European Agency for Special Needs and Inclusive Education (2017) (hereinafter the European Agency) concludes that special educational needs are defined differently in different countries under their legislation. These definitions are used to identify and assess the special needs of pupils and students (including those with recognized disabilities) and to provide the necessary support.

The study indicates that education legislation of the European Agency's member states does not use specific, externally generated definitions of disability and special needs.

It can be concluded from the analysis that students with disabilities may have special needs for inclusive higher education, whereas not every student with special needs has a recognized disability.

A study carried out by the Ministry of Welfare of the Republic of Latvia (Ministry of Welfare of the Republic of Latvia, 2017) indicates that the range of persons in need of assistance within the meaning of the UN Convention on the Rights of Persons with Disabilities (the Convention) could be wider than that set by the National Commission of Medical Examiners (NCME), because not all people apply to the NCME for a medically determined disability. At the same time, attention is drawn to the fact that support in education is not linked to disability status.

The study points to the statement in the Education Development Guidelines 2014-2020 that people with disabilities largely do not continue their studies in higher education study programs because of their inflexibility and unsuitability for special needs. Attention is also drawn to the fact that university staff has difficulty accessing in-service teacher training to prepare for working with people with special needs, as this does not take place within a common framework (Ministry of Welfare of the Republic of Latvia, 2017).

The study, comparing the definition of disability in Latvia and how the concept is interpreted in the Convention, concludes that in the Latvian Disability Law “the definitions of disability and predictable disability allow the use of disability as a criterion for granting certain measures and services” and that 'the law defines disability more narrowly - more medically and more categorically - than the Convention, which defines disability socially, explaining that disability is a social construct - the result of a person's interaction with the environment which is flowing or can vary considerably in different areas and contexts of life (in one area or context, it may be felt, in another not)”. The study also states that “the Convention understands disability as a more nuanced, complex and context-sensitive phenomenon, requiring inclusive and personalized services to be provided in any sector, while statutory formal support for a particular group of persons but does not include rules for the implementation of the principle of access to and inclusion of services in any sector "(Ministry of Welfare of the Republic of Latvia, 2017).

The study indicates that Latvia's medium and long-term development documents envisage action in support of inclusive education. The results of the study show that higher education is the area with the least support for people with disabilities. In higher education, assistant services are available for people with certain types of functional disorders, but they do not always meet the needs of people with special needs. Differences in the physical accessibility of university buildings and the availability of learning resources for students with special needs are also mentioned (Ministry of Welfare of the Republic of Latvia, 2017).

Although the Law on Higher Education Institutions does not mention persons with disabilities or special needs, certain support measures are available for persons with disabilities in higher education: (1) a state-guaranteed study loan for the acquisition of accredited study programs, for the receipt of which a person with a disability does not need a second guarantor and which is cancelled after graduation of the study program, (2) scholarships are available from individual funds, (3) persons with disabilities in higher education are covered by the assistant service in local governments (Ministry of Welfare of the Republic of Latvia, 2017).

The study points to several factors influencing access to higher education: (1) disruption of the education system, (2) availability of environment, (3) Lack of guidelines for university teachers to work with people with disabilities, (4) the support measures currently offered by the state are not always available to the extent indicated (Ministry of Welfare of the Republic of Latvia, 2017).

In 2017, no aggregated information was available on available support measures in higher education for persons with disabilities. The study indicates the need for the availability of such information in each university. The data collected in the study show that there is no systematic support mechanism or special education program in higher education, as well as no information on the number of persons with disabilities in educational institutions. In addition, in cases where disability is not easily visible, persons with disabilities most often choose not to inform the higher education institution and its staff for fear of discrimination, different treatment, or stereotypes. Without informing about the disability, students are denied the opportunity to receive support measures provided by the university in cases where they are available (Ministry of Welfare of the Republic of Latvia, 2017).

Summarizing the results of the study, the following conclusions have been drawn, among others: (1) the main obstacle in obtaining higher education is the lack of information on the availability of the university environment, the available support and study credit opportunities, (2) University staff lack information on the specifics of working with people with disabilities and no guidelines are available for such work (Ministry of Welfare of the Republic of Latvia, 2017).

Daniela (2022) highlights the need for in-depth research into the use of technology in education to understand the possibilities of using technology and promote its use in the educational process, as well as points to the use of technology and technological solutions in inclusive education. The researcher mentions assistive technologies as one of the sub-directions of the use of technologies in education, indicating that assistive technologies provide support in the learning process for individuals with special needs – both functional (vision, hearing, movement) and specific learning needs (learning disabilities).

Research shows that the use of digital assistive technologies in higher education can ensure the academic involvement and social participation of students with special needs, as well as promote inclusion (McNicholl et al., 2019; Samant Raja, 2016).

Self-test questions:

1. **What challenges do students with disabilities face in higher education?**
2. **What is common and what is different between the concepts of disability and special needs?**
3. **What can the use of digital assistive technologies in higher education ensure?**

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Topic 4 Experience, solutions, and good practice examples of various countries and organizations in providing inclusive higher education

Latvian non-governmental organizations have carried out research and implemented projects, including in the field of education. The data of the study of the Latvian Association of the Deaf (2006) show that the preferred way of organizing the study process for young people with hearing impairments would be by providing separate study groups. The project “Success4All: Entrepreneurial Skills e-Course for Inclusive Education” implemented by the Association of People with Disabilities and Their Friends “Apeirons” (2022a) aims to create a freely accessible e-learning platform on entrepreneurship and related skills for students and young people with special needs, with a special focus on hearing and vision problems as well as learning disabilities. In turn, one of the goals of the project “Count Me in” is to create a smart platform for innovative learning tools for the development of digital skills and civic responsibility for people with disabilities, young people, and others who want to improve their digital skills (Association of People with Disabilities and Their Friends “Apeirons”, 2022).

The range of technical aids provided in Latvia includes communication aids, personal mobility aids, Braille aids, and optical aids for the visually impaired (Latvian Society of the Blind, 2023), hearing aids for people with hearing impairments (Latvian Association of the Deaf, 2021), mobility aids for people with movement, sensory and balance disorders and alternative technical aids for communication for people with speech, language, coordination, and movement disorders (Vaivari Technical Aids Center, 2023).

To support faculty members in the University of Patras (Greece), 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.

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 providing of qual 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.

In the 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, Volunteer Support Service to coordinate the systematic, discreet and safe service of PWDs by qualified volunteer fellow students on issues related to their studies, Teleinterpretation Service in Greek Sign Language and 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.

Along with the Slovenian Placement of Children with Special Needs Act[1] pupils and students can be included in all forms of education and training. From the point of view of inclusion and education of the blind and visually impaired, Slovenia is classified in a group of countries with a well-developed system of special education for the blind and visually impaired. It is developing various forms to include the blind and visually impaired in the majority education system constantly (Cankar & Pinterič, 2014).

In Slovenia, within the Equalisation of Opportunities for Persons with Disabilities Act[2], there is also a policy concerning assistive technologies and adaptation of vehicles. Moreover, there is also in use the Personal Assistance Policy, where persons with disabilities (deaf, hard of hearing, blind, people with vison loss or deafblind persons) can choose between personal assistance or communication allowances in the amount of 150 EUR. Based on the Act Regulating the Use of Slovene Sign Language[3], deaf persons can also get vouchers to obtain support in communicating live in public.

When it comes to assistive technologies, the blind and partly sighted pupils, and students at primary and secondary levels of education can turn to the State, which, by law, offers them certain aids, such as a braille bar and a braille display. Later, during their studies, they are also entitled to subsidies and scholarships, and for support technologies they can turn to Lions Clubs, which contribute money for the purchase of support technologies for education (Blažič, 2012).

The Association of Students with Disabilities[4] also plays an important role in the study of blind and partially sighted students, giving a lot to raising awareness about disability. It is a non-governmental organisation that has been operating since 1996 and brings together students with various special needs. For this purpose, they organise various events, such as the event Accessible University. With the event, the Association wants to draw attention to the problems of students with disabilities and call for a university accessible to all. For this purpose,

[1] http://pisrs.si/Pis.web/pregledPredpisa?id=ZAKO5896

[2] https://www.fimitic.org/content/slovenia-law-alignment-opportunities-persons-disabilities-dan%C4%8Di-maraz

[3] http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO1713

[4] http://www.dsis-drustvo.si/en/

workshops are organised at this event, with the help of which the participants get acquainted with the world of disability. At the previous event, participants were able to walk with their eyes closed with a white cane, play board games for the blind and partially sighted and try out various technical aids. The Association emphasises that the study is adapted increasingly to students with disabilities, and many architectural barriers have already been removed, if not completely, at least partially. We can talk about many examples of good practice, but the Association still emphasises that many Faculties do not consider adjustments and are not accessible to students with disabilities (RTV SLO, 2016).

The Association also cooperates with Higher Education Institutes and offers them the following (Association of Students with Disabilities, n.d.a):

- device to improve the accessibility of studies;
- counselling on special adaptations for students with special needs;
- educational workshops and seminars on the needs of students with special needs,;
- training for tutors on providing support to students with special needs;
- seminars and experiential workshops intended for students and employees for greater general awareness of special needs.

In Maribor, for many years, the Student Organisation of the University of Maribor, together with the Association of Students with Disabilities of Slovenia, has been organising the tender "Assistance to students with disabilities", to which students with the status of students with disabilities can apply (Kupčič, 2020). Students with disabilities can apply for the competition throughout the year, or until the funds are used up. They can apply for various aids, teaching aids, travel expenses, living expenses and other possible expenses incurred during their studies. In recent years, the Student Organisation has provided a computer monitor for blind and partially sighted students, for less eye strain of students with visual impairments, and a dictaphone, for recording lectures and easier follow-up of studies (Maribor24, 2017; SOUM, 2017).

In the academic year 2011/2012, the University Library of Maribor arranged a corner for users with blindness and low vision. In the corner is a computer with a scanner, on which the software SuperNova Access Suite is installed (Zupančič, 2016), which enables the selection of magnification, speech support, screen reader and support for Braille screens (Diopta, n. d.). The University Library Maribor also offers blind and partially sighted users an electronic magnifying glass and headphones donated by the Lions Club Piramida Maribor (Zupančič , 2016). In terms of content and technology, they have also adapted the website, where a blind or partially sighted user can adjust the text size and line spacing, change the font style and change the colour of the text and background.

As part of the EODOPEN project[5] the National and University Library of Slovenia plans to digitise more modern publications, where they will try to adapt the material to the 20 needs of the blind and visually impaired and people with reading disabilities. They want to customise functions for text navigation, for changing the appearance of text, image descriptions, using Braille or speech synthesis (Dostopno, 2020). The National and University Library of Slovenia allows users to borrow e-books from Biblos, EBSCO and Audibook. Biblos and EBSCO offer mostly English titles, while Audibook offers 100 audio books in Slovene (NUK, n. d.).

In Slovenia, all citizens have the right to a hearing aid when it comes to hearing loss which cannot be improved with treatment. For a citizen to be entitled to a hearing aid at the expense of compulsory insurance, he also needs a confirmed rehabilitation effect of a hearing aid with tone and speech examination and testing of the amplifier characteristics (ZZZS, n. d.). Financial support can also be obtained from the State, while it is sufficient for between 1/5 and 1/3 of the cost of the hearing aid.

In Slovenia, the Education of Deaf and Hard of Hearing Persons is a subject of the Placement of Children with Special Needs Act (ZUOPP-1, 2011). It determines the ways and forms of carrying out the education of minors and adults with special educational needs. Exceptionally, the provisions of ZUOPP-1 also apply to the education of adults over the age of 21, up to the age of 26, who are in continuous education (ZUOPP-1, 2011).

[5] https://eodopen.eu/

We can offer help to the deaf and hard of hearing in the educational process to make it easier to follow the lectures. Supportive visual media aids, such as graphs, Tables, and spreadsheets, are often used for computer education, as these individuals need to be more dependent on vision due to hearing impairment (Zaharudin et al., 2011). In Slovenia, an interpreter from SZJ (Slovenian Sign Language) is also offered as an aid, who translates the spoken content into Slovene sign language.

According to the Act on the Use of Slovene Sign Language, deaf and hard of hearing pupils and students have the right to additional hours of a sign language interpreter due to additional needs related to education. Thus, instead of 30 hours, they are entitled to 100 hours of interpretation per year. These 100 hours are intended for the student's personal use, for example, for the preparation of a seminar paper with other students, but not for attending lectures at the Faculty (Association of Students with Disabilities of Slovenia, n.d.).

The deaf person acquires the right to an interpreter by applying for the right to an interpreter at the Center for Social Work. The Commission invites the applicant to an interview to check his/her knowledge of sign language, and then issues a decision based on the attached documentation and the interview. This gives the student 100 additional hours of interpretation per year. If a student wishes to exercise the right to the presence of a Slovene Sign Language interpreter at lectures and tutorials, he / she must make an application to the selected Faculty. If the Faculty rejects the application, the student can turn for help to the local Association, the Association of Slovenian Sign Language Interpreters, the Association of Students with Disabilities of Slovenia, or the Association of Deaf and Hard of Hearing Associations of Slovenia (Association of Students with Disabilities of Slovenia, n.d.).

The Rules on the study process of students with disabilities at the University of Maribor enable students with hearing impairments to have a sign language interpreter when taking the exam exam (*Pravilnik o študijskem procesu študentov invalidov Univerze v Mariboru*, 2016). The Rules on Students with Special Needs at the University of Primorska allow students the presence of an interpreter when conducting lectures and exercises, and when taking the exam (*Spremembe in dopolnitve Statuta Univerze na Primorskem, stran 11926*, 2018). For some members of

the University of Ljubljana, a deaf student has some interpretation hours covered based on an individualised plan (*Pravilnik o študentih s posebnimi potrebami in posebnim statusom na univerzi v ljubljani*, 2022).

The University of Cyprus Regulations 1992 - 1998, also provide for the support of students with disabilities. Specifically, the University of Cyprus may arrange special examinations for students with disabilities and in addition, within the framework of the abovementioned regulations, it is mandatory for the University to offer the necessary infrastructure for persons with disabilities.

Means of support at University of Cyprus depend on the needs of each student and are determined under the responsibility of the Student Development Centre, depending on the financial possibilities of the University. Students with learning difficulties, students with psychiatric problems and students with medical problems whose pathological symptoms impede the normal learning process and/or whose medication for a serious medical problem impedes the normal learning process are entitled to tutor support. The Student Development Center may purchase and loan (lend) specialized equipment deemed necessary for the orderly attendance of individuals with disabilities that cannot be provided by appropriate state agencies or other entities. Depending on the specific needs of each student, the necessary accompaniment is provided to facilitate the student's movement. In collaboration with the University Library and Departments to undertake enlargements and translations of texts for the needs of visually impaired students. The University of Cyprus has modern equipment to support students with disabilities. This equipment covers the needs of students, especially those with visual impairments.

Self-test questions:

1. **What would be the preferred way of organizing the study process for young people with hearing impairments?**
2. **What are the basic framework and the goal of the action “Supporting Social Care Interventions for Students of the University of Patras"?**
3. **What is the offer of the Association of Students with Disabilities of Slovenia for higher education institutes?**
4. **What support does the University of Cyprus Library provide to students?**

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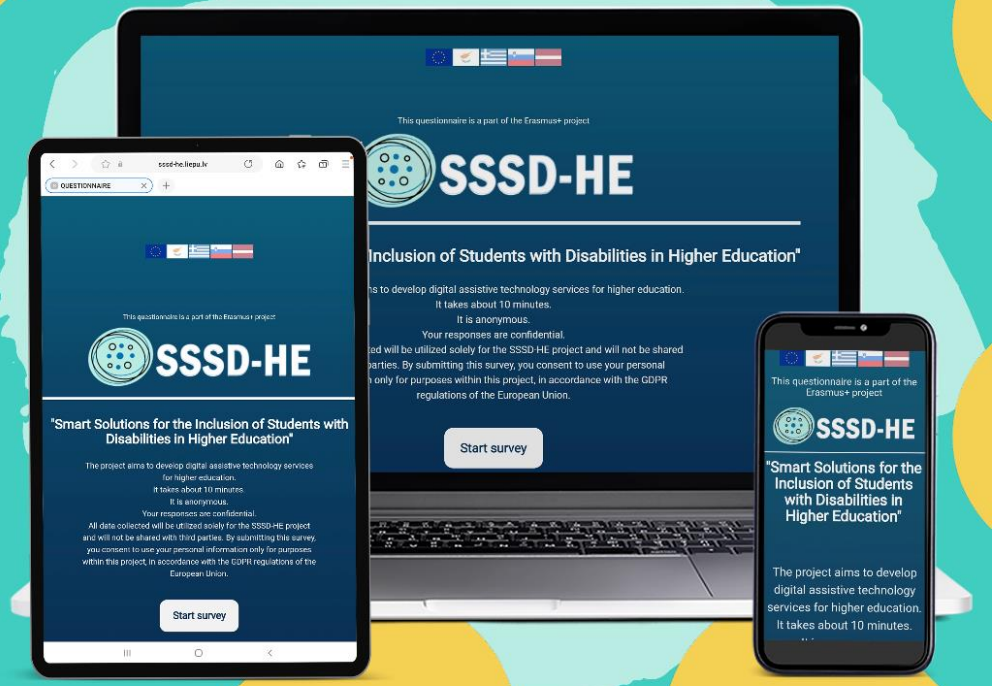
Online course

Scan and Learn

Digital Assessment Tool for the Requirements of Disabled Students in Higher Education



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LIEPAJA UNIVERSITY

Center for Social Innovation

UNIVERSITY OF PATRAS

Module 2

Development of E-Learning materials for the E-Course about the design of the implementation of smart solutions in institutions for inclusion

Module Outlines

Author: CSI Cyprus

Module Duration: 10 hours (3 hours taught; 7 hours research/discussion/assignment)

Module Aim(-s):

- To gain insight on the basics for creating a design for the implementation of smart solutions in institutions
- To acquire knowledge of the various steps required to design the implementation of smart solutions in companies, schools and organisations.
- To learn about strategies that could be followed in institutions for the design of implementation of smart solutions.
- To gain knowledge on the various case studies that exist in different countries and environments.

Expected Learning Outcomes/Skills:

- Knowledge and understanding on the basics for creating a design for the implementation of smart solutions in institutions.
- Knowledge and understanding of the various steps required to design the implementation of smart solutions in companies, schools, and organisations.
- Knowledge regarding the strategies that could be followed in institutions for the design of implementation of smart solutions.

Description of the unit (Methods/techniques used; unit outlines):

- self-directed learning, perceiving the content of the sub-course topic on the conditions and basic principles of an inclusive higher education organization;
- transformative learning, improving competence on the conditions and basic principles of an inclusive higher education organization;
- instrumental learning, seeing the implementation problems and possible solutions of inclusive higher education;

Recourses

Name of the document	Type of the document
Full version Desk research and data analysis	Word document
Overview (PPT) Desk research and data analysis	Power Point Presentation
Assistive Technology and Higher Education	Youtube video
Assistive Technology	Youtube video
Creating Accessible Content	Youtube video
Assistive Technology and the Workplace	Youtube video

Essential Reading:

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Topic 1 Desk research on Assistive Technologies (ATs) used in Higher Education in Latvia, Slovenia, Cyprus and Greece (overview)

This Topic will move from theory to practice. In the context of our project, a transnational report was conducted which aimed to provide results on data collection of testing the Digital Assessment Tool for the Requirement of Disabled Students in Higher Education in the aforementioned European countries; Latvia, Cyprus, Slovenia and Greece. This report also provided the findings of the desk research that took place on the requirements of people with disabilities. The final part of the report was a review of the current research findings on the available assistive technologies supporting these students, and the good practices of the inclusion of these students into the Higher Education process. For the purpose of the E-course some basic findings will be mentioned, and the full report is available in the Additional Material.

Results from the Euro student Survey administered to students across the European Higher Education Area, show that different cultural understandings of disability exist. 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.

The scope of the research were students with all types of disabilities (Physical (e.g. muscular dystrophy, chronic asthma, epilepsy), developmental (e.g. dyslexia, processing disorder, autism), behavioural/emotional (e.g. ADHD, oppositional defiance disorder, panic attacks) and the sensory impaired (e.g. blind, visually impaired, limited hearing)). According to the expertise of the University of Maribor team and as derived from the application form of the project, the emphasis of this Report is on students with sensory and hearing disabilities.

The method that this research followed was a consolidation of the desk-based research concerning legislation and current practices in Latvia, Cyprus, Greece and Slovenia as well as the questionnaire results sampling students from the prementioned counties.

The first part of the report is desk-based research which provides insight into the current practices in these four countries in Higher Education. In Cyprus, Laws 113 (1)/1999 and Regulations for Education and Training of Children with Special Needs [186/2001] set out the legal framework which makes it mandatory for every higher education institute to respond to the needs of every student with disabilities registered at the institution as regards to his/her education, examinations, housing, psychological support etc.

In Greece, the legislative framework that defines the obligations of the State and the Universities to provide all possible assistance to people with some form of disability are the Law no.3699/2008 – GOVERNMENT GAZETTE (FEK) 199/A/2-10-2088 “Special Education and Education of Persons with Disabilities or Special Educational Needs” Article 3: Students with disabilities and special educational needs. The report covers digital accessibility in universities, workstations, software and equipment.

In Slovenia there are various Assistive Technologies that meet the needs of students with disabilities and more specifically for blind and visually impaired students, as well as students that are deaf and/or hard of hearing. There are several requirements as far as the environment and infrastructure is concerned, access to information, provision of technical devices, and best practices.

In Latvia, the guidelines for Higher Education Institutions regarding creating an inclusive environment are:

a. Accessible information
b. Accessible physical environment
c. Adapted learning process
d. Inclusive emotional environment

Principles to be followed when designing surveys:

a. Simple and clear questions
b. Provide the possibility of using text-to-speech
c. Have various devices such as computers, tablets, and smartphones
d. Delete unnecessary parts of the survey to decrease excessive volume
e. Provide the possibility to complete the survey in several passes.

More detailed information regarding the data analysis and outputs of the survey can be found in the PDF files "Overview: Desk research and data analysis" and "Full version: Desk research and data analysis" included in the Additional Material.

Self-test questions

1. Based on the research conducted by Euro Student Survey, is there a common understanding of disability?

2. According to the desk-based research in Cyprus, what are the obligations of Higher Education Institutions as far as students with disabilities are concerned?

3. What kind of guidelines and principles are followed in Latvia to promote inclusion in HEI?

References

1. Committee on the Rights of Persons with Disabilities considers initial report of Cyprus, Committee on the Rights of Persons with Disabilities, March 2017.
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Topic 2 Data analysis of survey distributed about the requirements of disabled students in Higher Education (overview)

The second part of the report includes the survey conducted in 2021 in the framework of SSSD-HE project. The purpose of the survey was to set a theoretical dataset, create evidence-based conclusions and suggestions about the requirements of disabled students in higher education in each partner country and to create a scientific publication. This procedure sets a good practice example of assessing the needs of students for Assistive Technologies in Higher Education.

For the purpose of the E-course some basic findings will be mentioned, and the full report is available in the Additional Material.

In this survey, 69 participants completed an online questionnaire.

The survey was divided in three sections:

i. Demographic analysis
ii. Support with the studying process analysis
iii. Requirements of Disabled Students in Higher Education

Each category served a specific role and was analysed separately, as explained below:

i. Demographic analysis & date review

a. Gender

b. Age

c. Education level

ii. **Support with the studying process analysis**

These were the questions that respondents needed to answer using the scoring system provided. The first question was: *I need/would need support in the study process.* If respondents chose “a little”, “some”, “a lot” and “very much” they were required to respond to these following questions:

Questions about students’ special needs

- *I need/would need support in the study process for VISUAL PERCEPTION.*
- *I need/would need support in the study process for AUDITORY PERCEPTION.*
- *I need/would need support in the study process for READING COMPREHENSION.*
- *I need/would need support in the study process for COMPREHENSION OF WRITTEN TEXT.*
- *I need/would need support in the study process for WRITTEN EXPRESSION.*
- *I need/would need support in the study process for VERBAL COMMUNICATION.*
- *I need/would need support in the study process for EMOTIONAL RESILIENCE.*

Questions about students' special needs

- *I need/would need support in the study process for PERSISTENCE.*
- *I need/would need support in the study process for MENTAL STABILITY.*
- *I need/would need support in the study process for PHYSICAL STABILITY.*
- *I need/would need support in the study process for MOBILITY.*
- *I need/would need support in the study process for ROOM CUSTOMIZATION*

Questions about assistive technologies

- *I have information about assistive technologies.*
- *I would like to use an assistive technologies.*
- *I use assistive technologies.*
- *I need/would need additional assistive technologies in the study process.*
- *In the study process I need/would need to acquire additional skills for the use of assistive technologies.*
- *I need/would need the other additional support in the study process.*

Conclusions

A low positive correlation exists *between students needing support and having information about AT*. Additionally, the students who did not use AT, when asked which additional AT are needed in the study process, 65% did not know or could not suggest any AT that are needed, but also many of those who had been using AT could not make suggestions for more AT tools. This is a clear indication that *more information must be made available to students.*

From the consolidation of the National reports of the SSSD-HE project, we can conclude that *in most cases, disabled students are not all open either to human or technological support.* The pupils who identified themselves as students who *need assistive technologies* are identified that to some extent, they would need additional skills to be able to use assistive technologies.

Depending on the country's findings, different technological solutions were more important than others. In the case of Cyprus; "Emotional Resilience", "Persistence" and "Emotional Support" for Greece and Slovenia; "Persistence", "Verbal communication" and "Mental stability.

So, from the data collection and analysis we see that the qualitative results are *in line* with the existing literature on barriers to the 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 out that they either:

- ❑ have incomplete awareness of applications that make help them *or*
- ❑ they lack familiarity with them.

More detailed information regarding the data analysis and outputs of the survey can be found in the PDF files "Overview: Desk research and data analysis" and "Full version: Desk research and data analysis" included in the Additional Material.

Self-test questions

1. What is the purpose of the survey?
2. How many respondents were there?
3. What were the conclusions of the data analysis?

Topic 3: What to consider when developing the design of the implementation of smart solutions in institutions for inclusion.

Developing the design of the implementation of smart solutions in institutions for inclusion entails a wide range of strategies and considerations. The steps for providing assistive technologies should be applied in various institutional contexts because the implementation of Assistive Technologies (ATs) "has the potential to improve functioning, reduce activity limitations, promote social inclusion, and increase participation in education, the labour market and civic life for people with disabilities" (Čakš, P. *et al.,* 2022). One keyway they can do this, is by providing assistive technologies that can help individuals overcome barriers and participate fully in educational, professional and social activities. However, it can be challenging to know where to start and what steps to follow when providing assistive technologies to individuals with disabilities in different institutions. In this training module, we'll explore a step-by-step approach to providing assistive technologies, including identifying individual needs, determining appropriate technologies, acquiring and installing equipment, ensuring accessibility, monitoring and evaluating effectiveness, and providing ongoing support and training.

Starting with the school environment, it is very important to ensure that all students have equal access to educational opportunities. For individuals with disabilities, this means providing assistive technologies that can help them overcome barriers and participate fully in educational activities. By providing effective and appropriate assistive technologies, schools can help students with disabilities to reach their full potential and achieve their educational goals.

The first step that should be done in order to provide assistive technologies (ATs) to students with disabilities is to identify the student's specific needs and limitations related to their disability. This can be done through assessments, evaluations, and conversations with the student, their family and other professionals such as special educators, psychologists etc. Once the student's needs are identified, the decision as to which

assistive technology is appropriate should follow. The criteria for choosing a specific AT are to offer students: "good orientation, sovereign use, transparency, accessibility and encourage motivation to learn" (Čakš *et al.,* 2022). The process of the decision could involve working with AT specialists, educators of general and special education to identify different options. Once this is done, the third step is to acquire and install the specific AT. A very important thing to have in mind here is that educators, parents etc need to be also educated as to how to use this AT with the student, at school and at home. Having just a general knowledge of AT will limit its valuable impact to the student who might not reach their full potential. Educators need more than general skills to support higher and diverse levels of learning. Some specific skills that might need to be taught are to identify the disability, calibrate instructional and Individual Educational Programme (IEP) goals with the use of tech tools, monitor the progress, intervene with students who might face any difficulties and guide parents in supporting those students (National Center for Learning Disabilities, 2019).

In addition, curricula and/or assessments may need to be modified to provide a learning context which supports effective AT use and learners should ideally be able to use that AT home (Hersh, 2020).

Educational institutions also play an important role in ensuring appropriate frameworks for inclusive digital education (European Agency for Special Needs and Inclusive Education, 2022). Institutions have diverse tasks such as creating conductive conditions for teachers and learners to use digital technologies in education at an organisational level with the involvement of education administrators, relevant stakeholders to create the best possible and appropriate infrastructure. Some factors that should be taken into consideration are organisation readiness and resilience, good collaborative practices among school staff, participation of parents and families, and an active role of leadership to implement and ensure inclusive education.

An example of a technology used in the context of higher education (HE), is mobile-learning; in which students may bring their own mobile devices use the institution's networks to access data and academic material. This policy is called 'bring your own device' (BYOD) (European

Agency for Special Needs and Inclusive Education, 2022) and has already been adopted in most HEIs, especially in developed countries. Apart from smartphone and tables, smartwatches can also be a useful tool in the future (ibid). Other possibilities of the use of ATs at universities are the use of PowerPoint, iPads, the classmate reader device and computer programmes – these can have a positive impact on students' sense of autonomy (Aoife et al., 2019).

One final step for measuring the impact of using an AT is monitoring and evaluation to evaluate the impact on the student's educational progress and participation. This could happen through collecting data, soliciting feedback from the student themselves and their family to make the necessary adjustments and modifications. Last but equally important is support and training which should be ongoing in order to ensure the effectiveness of using the AT.

Self-test questions

1. List the steps needed to provide Assistive Technologies to University students for their learning experience.

2. Give examples of ATs used in Higher Education Institutions.

References

Aoife McNicholl, Hannah Casey, Deirdre Desmond & Pamela Gallagher (2019): The impact of assistive technology use for students with disabilities in higher education: a systematic review, Disability and Rehabilitation: Assistive Technology, DOI: 10.1080/17483107.2019.1642395.

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National Center for Learning Disabilities, 2019. *Inclusive technology in the 21st century learning system*. Retrieved from https://www.ncld.org/wp-content/uploads/2019/06/Inclusive-Technology-in-a-21st-Century-Learning-System.Final_.060719.pdf.

Topic 4 Strategies for incorporating e-course into local organisations to maximise its efficiency and services quality.

Societies should strive to be inclusive for people with disabilities for several compelling reasons. Firstly, inclusivity promotes equality and social justice, ensuring that every individual, regardless of their abilities, has the same rights and opportunities. By breaking down barriers and creating accessible environments, societies can empower people with disabilities to participate fully in all aspects of life, including education, employment and social interactions. Secondly, inclusivity enhances diversity, fostering a rich tapestry of perspectives, talents, and contributions. When people with disabilities are included, society benefits from their unique experiences and skills, leading to greater innovation and creativity. Additionally, an inclusive society promotes empathy, compassion and understanding among its members, challenging stigmas and stereotypes associated with disabilities. By embracing diversity and creating inclusive spaces, societies can harness the full potential of all their members, fostering a more equitable and harmonious community for everyone.

The use of assistive technologies at universities can greatly benefit students with disabilities by equipping them with skills, independence and confidence that can be carried forward into society after graduation. Specifically, the tools and technologies that are used and mentioned in the current document but also in other project results of the SSSD-HE project can help students participate in society. The data collected from the project's questionnaire suggest that more awareness needs to be made to students with disabilities as to which assistive technologies could be useful for them and set the base for universities to adopt specific practices to enable students in this area. Therefore, by providing students with appropriate ATs during their university years can contribute greatly to providing these students employment opportunities after they graduate. This happens because many ATs used in universities, such as screen readers, speech recognition software and alternative input devices can enhance students' abilities to perform tasks and access information. By continuing to use these ATs after graduation, students can apply for a wider range of employment opportunities and effectively navigate the digital aspects of the workplace. Post-graduate students can also access

and engage with information independently since ATs can continue to play a vital role in their lives by facilitating communication, accessing online resources and staying connected with peers and professional networks.

Another benefit for post-graduate students is that they can develop their independence and self-efficacy as they can use mobility aids such as wheelchairs, prosthetics or wearable devices to help them navigate physical environments confidently; wheelchairs, and adapted vehicles can help them get around independently, built-up handles on eating utensils can help them take care of themselves) (Scherer et al., 2005).

Similarly, smart home systems and environmental control devices can assist with tasks like controlling lights, appliances or security features, promoting greater autonomy in daily living. ATs can also facilitate social inclusion for individuals with disabilities by breaking down communication barriers**.** Communication devices, augmentative and alternative communication tools (AAC) and video conferencing software enable students to participate in social activities, maintain relationships and collaborate with others. Such tools are usually divided in two main headings; Telecommunication services and person-to-person interactions. Telecommunication services can include physical and virtual keyboards, touch screens, voice-recognition, whereas person-to-person AAC can be keyboards, touch screens, and display panels among others (European Parliamentary Research Service 2018). Another important benefit is that graduates who have utilized Ats during their university years can become advocates for accessibility and inclusivity in society. They can share their experiences, educate others about the benefits of ATs and advocate for the implementation of accessible solutions in various environments such as workplaces, public spaces and digital platforms.
By leveraging the skills and independence gained through the use of ATs in universities, students with disabilities can confidently participate in society after graduation. These technologies empower them to overcome barriers, access information, communicate effectively and contribute their talents and skills to various spheres of life, promoting inclusivity and equal opportunities.

Companies or organisations can support people with disabilities through the use of assistive technologies, in a similar way they can be used in universities. The first and common step is to identify the individual's needs in order to determine the most appropriate AT which could improve their everyday life in their job and any job-related activities. This process can be quite complex since it requires to match a person to technology where that person's physical, sensory and cognitive abilities need to be taken into account (Scherer, et al., 2005).

The next step is to make sure that the required AT is installed, set up and is ready to use by the individual. For this step, training is required to the employee and other staff. The accessibility and safety of the physical environment should be ensured and the possibility of modifying job tasks and activities to accommodate different abilities should be kept open (Sulaiman, 2022). Another important step is collaboration with experts; organisations should seek input from experts or stakeholders in the field of ATs and accessibility in order to provide partnership support, effective management and stay up to date with emerging trends and innovations (Sulaiman, 2022). The last two and important steps are to monitor and evaluate the effectiveness of the AT and provide support and ongoing training. This may involve providing regular check-ins and troubleshooting support, as well as offering opportunities to the employee and other staff of how to use and integrate AT into their job-related practices.

By following these steps, companies and organisations can provide effective and appropriate assistive technologies to individuals with disabilities, helping to ensure that they have equal access to job-related opportunities and can reach their full potential in the workplace.

Self-test questions

1. **List the steps that companies or organisations can follow in order to support people with disabilities through the use of ATs.**
2. **What benefits will the use of ATs at University have for post-graduate students?**

References

Aoife McNicholl, Hannah Casey, Deirdre Desmond & Pamela Gallagher (2019): The impact of assistive technology use for students with disabilities in higher education: a systematic review, Disability and Rehabilitation: Assistive Technology, DOI: 10.1080/17483107.2019.1642395.

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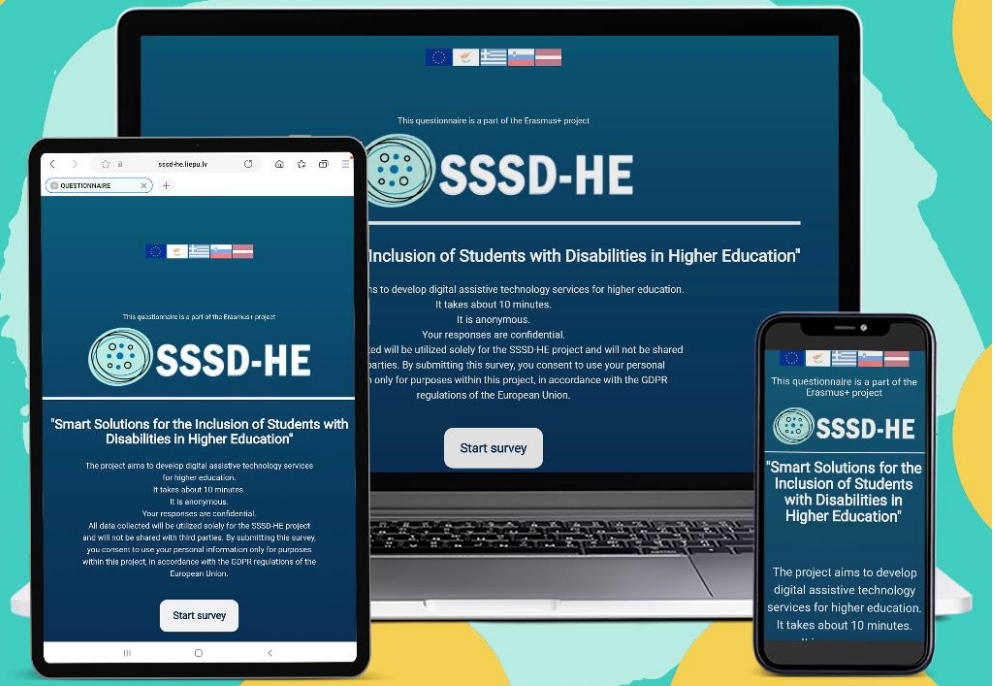
Sulaiman, Surajo. (2022). How can we promote access to assistive technology for individuals with disabilities in Low-and Middle-Income Settings?. 10.13140/RG.2.2.33943.65445.

European Parliamentary Research Service (2018). Assistive technologies for people with disabilities. Part II: Current and emerging technologies. Available at https://www.europarl.europa.eu/RegData/etudes/IDAN/2018/603218/EPRS_IDA(2018)603218(ANN2)_EN.pdf.

Online course

Scan and Learn

Digital Assessment Tool for the Requirements of Disabled Students in Higher Education



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LIEPAJA UNIVERSITY

Center for Social Innovation

UNIVERSITY OF PATRAS

Module 3

Assistive technologies for the inclusion of students with disabilities in education

Module Outlines

Author: University of Maribor & University of Patras

Module Aim(-s):

- Understanding the various aspects of the use of ICT for students with disabilities and their teachers.
- Critically evaluating documents, guidelines, research, ideas, solutions, and pedagogical methods for the successful education of students with disabilities.

Expected Learning Outcomes/Skills:

- Competence to use of appropriate assistive technologies in education.
- Competence to recognize and define inappropriate assistive technology.
- Competence to prepare analysis of needed assistive technologies.
- Communication skills: manner at expression in discussion and seminar works, oral and written work defence.
- Use of ICT: use of collaborative tools and videoconference tools.
- Analytical & problem-solving skills: evaluation of current assistive technologies for educational purposes.

Description of the unit (Methods/techniques used; unit outlines):

- self-directed learning, perceiving the content of the sub-course topic on the conditions and basic principles of assistive technologies;
- transformative learning, improving competence on the assistive technologies;
- instrumental learning, seeing the implementation of assistive technologies, potential problems and possible solutions;
- theoretical materials, presentations, seminars, work in virtual groups, tasks, literature, reflection.

Essential Reading:

1. **World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), 2022.** Assistive Technology for Children with Disabilities: Creating Opportunities for Education, Inclusion and Participation. A discussion paper. (Source)
2. **World Health Organization (WHO), 2016.** Priority Assistive Products List (Source)

Recommended Reading:

1. **United Nations Children's Fund (UNICEF), 2022.** Educators' Digital Competence Framework. (Source)
2. **World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), 2022.** Global report on assistive technology. (Source)
3. **World Wide Web Consortium (W3C), 2022.** Introduction to Web Accessibility. (Source)

Topic 1 Students with disabilities

Assistive technology is used as an umbrella term for both assistive products and related services. Assistive products are also known as assistive devices.

1. The International Classification of Functioning, Disability and Health (ICF) defines assistive products and technology as any product, instrument, equipment or technology adapted or specially designed for improving the functioning of a person with a disability (WHO, 2014).
2. The International Organization for Standardization (ISO) defines assistive products more broadly as any product, especially produced or generally available, that is used by or for persons with disability: for participation; to protect, support, train, measure or substitute for body functions/structures and activities; or to prevent impairments, activity limitations or participation restrictions. This includes devices, equipment, instruments and software (ISO, 2011).

WHO NEEDS ASSISTIVE TECHNOLOGIES (WHO, 2014)?

The people who most need assistive technology include:

1. Older people
2. People with disability
3. People with noncommunicable diseases
4. People with mental health conditions including dementia and autism
5. People with gradual functional decline

Assistive products are essential tools to:

1. Compensate for a loss of intrinsic capacity.
2. Reduce the consequences of gradual functional decline.
3. Help minimize the need for caregivers.
4. Prevent primary and secondary health conditions.
5. Lower health and welfare costs.

Assistive products are often the first step towards:

1. Getting out of bed and out of one's house.
2. Accessing education, work and employment.
3. Escaping from poverty and hunger.
4. Greater mobility, freedom and independence.
5. Inclusion and participation leading a dignified life.

Strategies for providing assistive technology need to consider the principles of 5A&Q (WHO, 2011):

1. availability
2. accessibility
3. affordability
4. adaptability
5. acceptability
6. and quality.

Self-test questions:

1. **Search for national acts, standards, and recommendations for students with disabilities.**
2. **Point out the main aims, characteristics and specific approaches if available.**
3. **Compare them to globally accepted documents.**

References

ISO. ISO 9999:2011 Assistive products for persons with disability – Classification and terminology Geneva: International Organization for Standardization; 2011.

WHO. ICF Browser. Chapter 1 Products and technology: World Health Organization; [June 9, 2014]. Available from: http://apps.who.int/classifications/icfbrowser

WHO. Joint position paper on the provision of mobility devices in less -resourced settings: a step towards implementation of the Convention on the Rights of Persons with Disabilities (CRPD) related to personal mobility. Geneva: World Health Organization; 2011

Topic 2 Students with hearing disabilities

Key facts:

- By 2050 nearly 2.5 billion people are projected to have some degree of hearing loss and at least 700 million will require hearing rehabilitation.
- Over 1 billion young adults are at risk of permanent, avoidable hearing loss due to unsafe listening practices.
- An annual additional investment of less than US$ 1.40 per person is needed to scale up ear and hearing care services globally.
- Over a 10-year period, this promises a return of nearly US$ 16 for every US dollar invested (WHO, 2023).

Definition of Hearing loss and deafness from medical perspective:

- A person who is not able to hear as well as someone with normal hearing – hearing thresholds of 20 dB or better in both ears – is said to have hearing loss. Hearing loss may be mild, moderate, severe, or profound. It can affect one ear or both ears and leads to difficulty in hearing conversational speech or loud sounds.
- 'Hard of hearing' refers to people with hearing loss ranging from mild to severe. People who are hard of hearing usually communicate through spoken language and can benefit from hearing aids, cochlear implants, and other assistive devices as well as captioning.
- 'Deaf' people mostly have profound hearing loss, which implies very little or no hearing. They often use sign language for communication (WHO, 2023).

Definition of Hearing loss and deafness from cultural perspective:

- In contrast to the medical model, the cultural-linguistic model regards deafness not as a disability, but rather as a cultural identity.
- This model denies that the degree of hearing loss is decisive for cultural membership.
- Deaf people have their own culture and its essential element is sign language.
- They use the term “Deaf World” which combines Deaf community and Deaf culture. Deaf community is “visible and social part of the Deaf world” (World Federation of the Deaf, 2013), whereas Deaf culture pertains to “customs, values, world view, habits, and rules of behaviour related to their own world” (World Federation of the Deaf, 2013).

Upgrading the organisational structure of the higher education institution

When helping deaf or hard of hearing students you need to be aware of their specific areas of needs:

- Acquisition of language (poorer vocabulary).
- Development of communication systems.

Consequently:

- Possible difficulties with learning (at the same rate as hearing students).
- Possible difficulties with reading (coping with textbooks written for their age).
- Possible difficulties moving from concrete to abstract.
- Possible low confidence and/or self-esteem.

Therefore:

- May have difficulties with memory and expressing ideas.
- May have difficulties with writing.
- May have difficulties with keeping track of what someone says in classroom discussion.
- May have difficulties socialising with hearing peers.

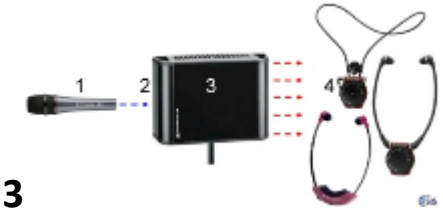
Provide them with extra support and extra time spent on a topic (Slideplayer, n.d.).

Assistive technologies for d/Deaf od hard of hearing students and their teachers

In Classroom

- Classroom Audio Distribution Systems (1)
- Interactive white boards
- Hearing loop (2)
- Digital cameras
- Infrared systems (3)
- Videophones, videoconferencing
- Microphones (table) (4)
- Text messaging, email
- Internet Laptops, portable writing devices

1



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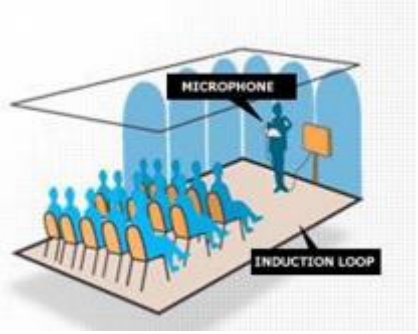


2

4

Examples of assistive technologies (d/Deaf or hard of hearing persons)

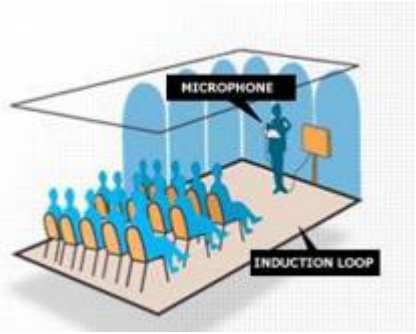
Classroom Audio Distribution Systems (CADS) and Soundfield Systems

Sound systems enable with through one or more strategically positioned loudspeakers, amplifying the speech of the person wearing the microphone for everyone present in the learning space and give an added boost to those who use cochlear implants and hearing aids.

On picture: Classroom Audio Distribution System (by MimioClarity)

Hearing loop

A hearing loop (sometimes called an audio induction loop) provides a magnetic, wireless signal that is picked up by the hearing aid when it is set to 'T' (Telecoil) setting. The hearing loop consists of a microphone; an amplifier which sent the signal through the loop cable, a wire placed around the perimeter of a specific area.



On picture: Hearing loop

Infrared systems

The sound source signal is sent on an infrared bandwidth. Line of sight is important for this technology to work, and it cannot be used outdoors. The transmitter with remote microphone uses an emitter to broadcast the infrared signal in the room. The receivers use either headphones or neckloop listening options. Can be used with or without hearing aid.

On picture: Infrared Systems

Table microphone

Table microphone utilises multiple microphones with beams created in six directions to cover 360°. This helps to provide good understanding of speech in group conversations such as in noisy restaurants or on school meetings.

On picture: Table microphone (by Phonak)

For personal use (students)

- Speech-to-Text software (1)
- Personal hearing loops (2)
- Bluetooth streamer (3)
- Personal listener / amplifier (4)
- Wi-Fi Audio Transmitter (5)
- Microphone (remote)
- FM System
- Sound loudness measurement
- Sound amplifier
- Notetaking

1

3

2

4

5

Examples of assistive technologies (d/Deaf or hard of hearing persons)

FM System

A FM system is a wireless device that helps people hear better audio devices, in noisy listening situations or to voice on distance. FM stands for frequency modulation and uses radio waves to transmit audio signals to the listener. The device is typically used in conjunction with hearing aids or cochlear implants.

Picture: FM Systems

Personal hearing loop

Powered personal neck loop can connect to any external audio devices, like Smartphone, iPhone, MP3, Kindle and other, that has a 3.5mm headset socket.

Picture: Personal hearing loop / Audio loop (by surdotehnika.lv)

Speech-to-Text-Software

Speech-To-Text software notifications provides real-time transcriptions of conversations and sends notifications based on surrounding sounds. The notifications make aware of important situations at home, such as a fire alarm or doorbell ringing.

Picture: Google Live Transcribe & Notification (Android)

Further options: Hugo.lv (English, Latvian, Russian)

Bluetooth streamer

A streamer provides a communication link between the wireless technology in the hearing aids and any Bluetooth-enabled device. Usually, the streamer is worn around the neck or placed in a pocket for hands-free operation.

Picture: Hearing Aid Streamers

Remote microphone

Remote microphone is a small microphone designed for hearing aid users for one-to-one conversations. Featuring a directional microphone, the user can focus on a conversation with their partner. It can also transmit the sound of multimedia devices e.g. TV.

Picture: Remote microphone (by Phonak) / Mini microphone (by surdotehnika.lv)

Wi-Fi Audio Transmitter

Wi-Fi Audio Transmitter can be connected to any audio device and connect a sound receiver to the same Wi-Fi network or directly without router. A sound receiver is further connected to hearing aid or cochlear implant using usual cable or wireless connections for audio devices.

Picture: WiFi audio transmission (by CloviTek)

Personal listener / amplifier

Device for amplifying conversations and audio devices using with or without hearing aid.

Picture: Personal listener

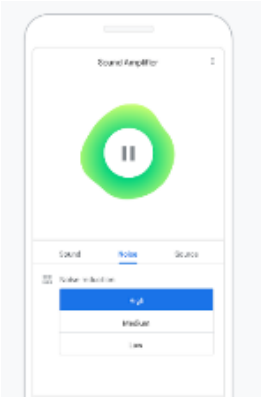
Sound loudness measurement

These apps can be used to measure the loudness of sounds around a user, for example in restaurants, bars, or similar venues. Another possible use is for practicing voice control in cases of hearing loss where the user can no longer reliably judge the loudness of his own speaking voice.

Picture: Sound Meter

Sound amplifier

Sound amplifier enhances audio from user's mobile device to improve listening clarity. Sound amplifier can filter, augment, and amplify sounds around the user and on device. Sound amplifier increases important sounds, like conversations, without over-boosting distracting noises.



Picture: Sound Amplifier (Android)

Notetaking

Big or large text on the display is an app for communicating with other people in times when it is not possible to speak. With notetaking app on the display, the user can show large text on his smartphone which will resize itself automatically based on the amount of big text being entered.

Picture: Notes / Make it Big

Self-test questions:

Try to identify key players at various levels (governmental, civil society, education) in the field of deaf/hard-of-hearing persons:

- What are their main goals?
- Identify their main projects?
- What is their global integration?

Choose technologies (all together 3) for:

- teachers (1 example)
- and their students (2 examples) with hearing disabilities:

And do some research:

- Discover the labels which manufactures assistive technologies.
- What are their technical characteristics?
- Are they compatible?
- Where can you make a purchase?
- What is the price?

References:

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Topic 3 Students with developmental and learning disabilities

Key facts

- Individuals with disabilities are less likely to complete tertiary education with a 12,2% gap between individuals with and without disability. Students with learning disabilities are also more likely to drop-out of school earlier than peers (Grammenos, 2020).

- Learning and attention issues are brain-based difficulties in reading, writing, math, organization, focus, listening comprehension, social skills, motor skills or a combination of these. The issues are not the result of low intelligence, poor vision or hearing, or lack of access to quality instruction (Horowitz, 2017).

- Specific learning disabilities were the most common type of disability in the USA, accounting for 33% of cases (NCES, n. d.).

Definitions and examples of developmental and learning disabilities

- **Developmental disabilities**: conditions due to an impairment in physical, learning, language, or behavior areas (CDC, n.d.).

- **Learning disabilities**: a disorder in one or more of the basic psychological processes involved in understanding or using spoken or written language. It is manifested by imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations (IDEA, n.d.).

- Common types of **specific learning disabilities**: dyslexia, dyscalculia, dysgraphia (NCLD, n.d.).

- **Associated disorders**: Auditory Processing Disorder, Visual Processing Disorder, Non-Verbal Learning Disabilities, Attention Deficit/Hyperactivity Disorder (IDEA, n.d.).

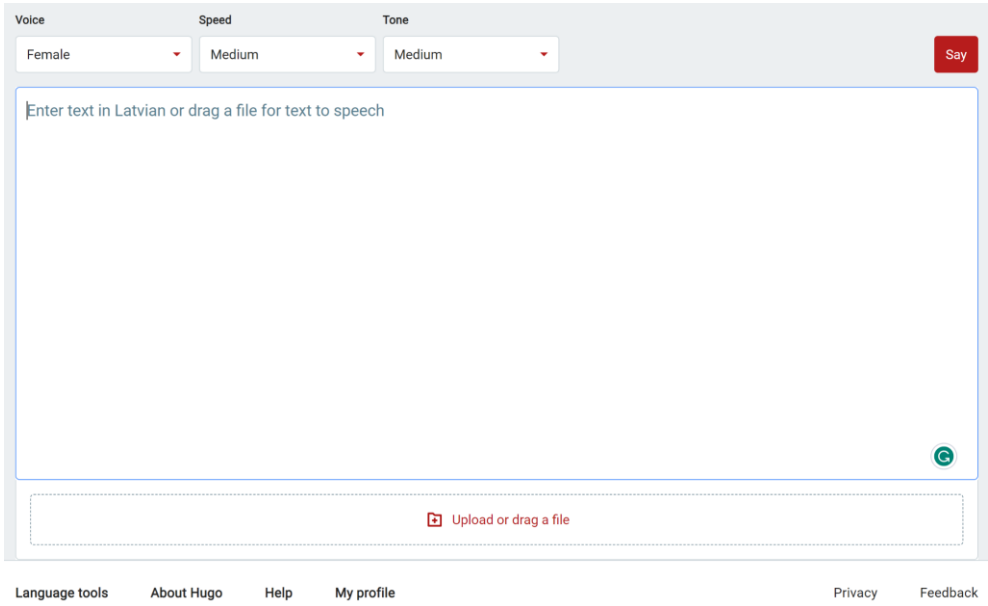
Assistive technologies for students with developmental and learning disabilities and their teachers

- Public platform HUGO.LV
- Kurzweil 3000 – Windows
- Read and Write Gold
- Readiris
- OmniPage Ultimate
- SimpleOCR Freeware
- FreeOCR
- Typ-O HD
- Dragon Home (Windows)
- Google Docs Voice Typing
- Go Talk 9+
- Go Talk 20+
- Go Talk Express 32
- SMART/128
- The Zuvo 12 HD
- Proloquo4Text
- Proloquo2Go
- Attainment VoiceCue
- MindView AT

Examples of assistive technologies (developmental and learning disabilities)

Public platform HUGO.LV

Public platform Hugo.lv is customized to the Latvian language and state administration documents. Speech synthesis supports document and input text synthesis and reproduction. The user can choose the text pronunciation speed, voice type, and timbre.



On picture: Public platform HUGO.LV

Kurzweil 3000 – Windows

Software Kurzweil 3000 - Windows is designed to assist individuals who have difficulty reading, writing, organizing thoughts, and concentrating. It has text-to-speech capabilities for digital text in seven languages and highlights the words while they are read aloud.

On picture: Kurzweil 3000 - Windows

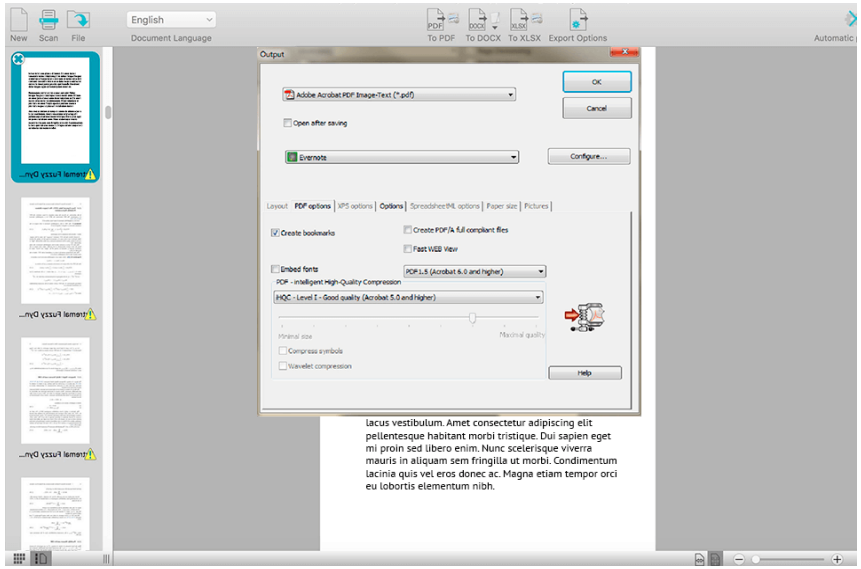
Read and Write Gold

The software Read and Write Gold has word prediction, a picture dictionary that obtains words from images displayed, a word distinguisher for similar words, and a word wizard that searches for synonyms of words used. Read and Write Gold works within Windows applications, such as Microsoft Word and Excel, and reads PDF documents with a simple toolbar located on top of any open application. It also has text-to-speech capabilities and will highlight each word while it is read aloud.

On picture: Read and Write Gold

Readiris

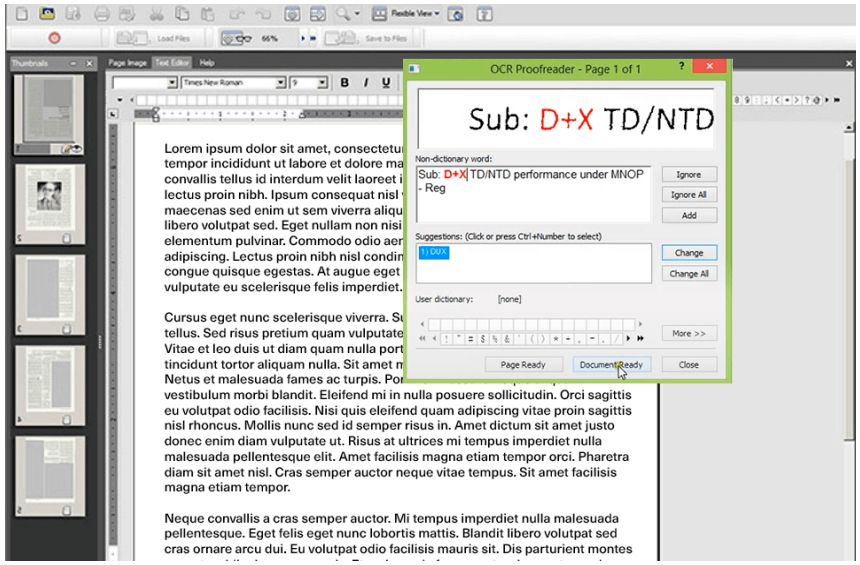
Readiris is software for converting scanned documents, digital camera photos, and images into editable file formats. The program can save converted documents in a wide variety of formats, the most important of which are PDF, Microsoft Word electronic documents, and Microsoft Excel spreadsheets. Readiris can recognize texts in 137 world languages. The converted documents can be saved by the user on a computer or sent directly from the program to the cloud storages Dropbox, Box, OneDrive, Evernote and Google Drive, Microsoft SharePoint, Therefore and IRISNext services, as well as to any FTP servers.



On picture: Readiris

OmniPage Ultimate

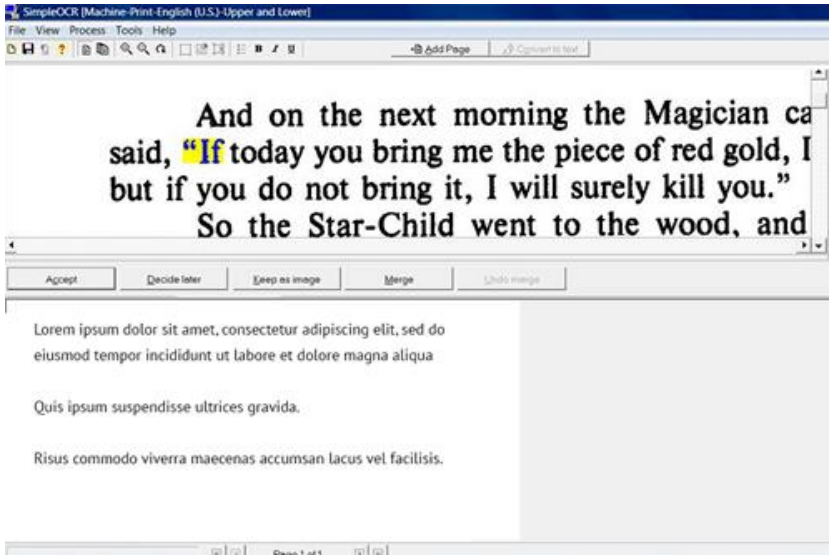
OmniPage Ultimate OCR software for Windows 10 is a tool to help to digitize any kind of document. It allows users to scan and upload documents to have them transcribed into a digital format. The software transforms words on paper and in images to accurate text for conversion and archiving and converts any photo into a readable format for mobile devices and electronic book readers. It allows the creation of PDF files from scanned documents so that they can be used for any purpose. The software supports output formats including PDF, Microsoft® Word, Excel®, PowerPoint® 2007, Corel® WordPerfect®, HTML, and more. Software converts scanned text from pdf text (e.g. Word) format or images so that it can be read by voice synthesis program.



On picture: OmniPage Ultimate

SimpleOCR Freeware

SimpleOCR is an OCR software for Windows 10 which can be used in many different ways. This software is designed to help with the process of converting any type of text file into a Word document. The OCR software works by taking a file and scanning it so that any errors that are in the data can be identified easily, it also checks spelling. Software converts scanned text from pdf text (e.g. Word) format so that it can be read by voice synthesis program.

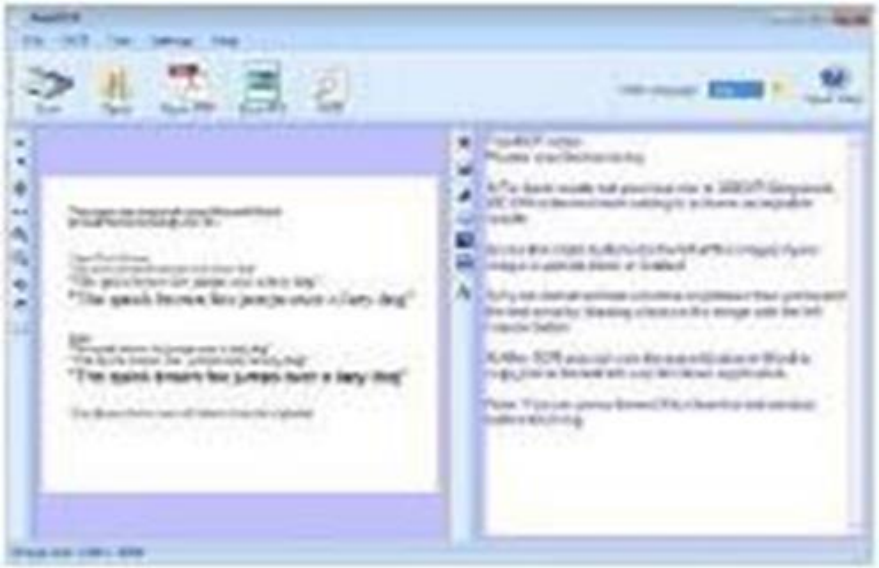


On picture: SimpleOCR Freeware

FreeOCR

FreeOCR is a free Optical Character Recognition Software for Windows and supports scanning from most Twain scanners and can also open most scanned PDFs and multi-page Tiff images as well as popular image file formats. FreeOCR outputs plain text and can export directly to Microsoft Word format. Free OCR uses the latest Tesseract (v3.01) OCR engine. It includes a Windows installer and It is very simple to use and supports opening multi-page tiff documents, Adobe PDF and fax documents as well as most image types including compressed Tiff's which the Tesseract engine on its own cannot read. It now can scan using Twain and WIA scanning drivers.

Software converts scanned text from pdf text (e.g. Word) format or images so that it can be read by voice synthesis program.



On picture: FreeOCR

Typ-O HD

Typ-O HD is an easy-to-use dyslexia app for iOS that helps to write without spelling errors. Typ-O HD uses a powerful word prediction engine and a sophisticated spelling error model to help to write, even if someone's spelling isn't perfect. The integrated synthetic voice allows one to hear the word prediction suggestions before selecting and checking text before emailing or pasting it into other applications.

On picture: Typ-O HD

Dragon Home (Windows)

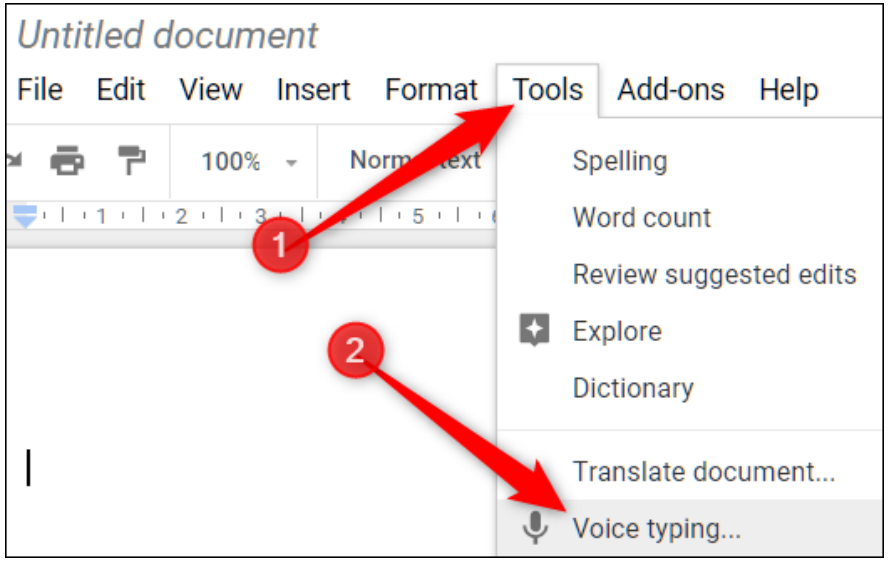
Dragon® Home v15 speech recognition helps to get more done on PC by voice. Dictate documents, send an email, search the Web, and more. Designed using Nuance Deep Learning™ technology, it delivers up to 99% recognition accuracy, adapts to different accents, and even works in noisy environments. The software provides to work hands-free and to speak commands to launch applications and control computers by voice.

On picture: Dragon Home (Windows)

Google Docs Voice Typing

The Google Docs voice typing feature turns spoken words into written text. Google Docs allows using voice typing to dictate using the computer's microphone.

Voice Typing is only available for use in Google Docs and the speaker notes of Google Slides, and only if Google Chrome is used.



On picture: Google Docs Voice Typing

Go Talk 9+

The AAC device is intended for persons with speech and language disorders, as well as persons with movement and coordination disorders to engage in communication. The device provides the opportunity to record short informative audio materials, which are enhanced with visual support in the form of images, pictograms, or photographs, as well as allow individuals to integrate into society, daily activities, academia, and professional activities.

On picture: Go Talk 9+, Go Talk 9+ for LV

Go Talk 20+

The AAC device is designed for people with speech and language impairments to engage in communication. The device provides the ability to record short, informative audio that is enhanced with visual aids in the form of images.

On picture: Go Talk 20+, Go Talk 20+ for LV

Go Talk Express 32

The AAC device is designed for people with speech and language impairments to engage in communication. The device provides the ability to record short, informative audio that is enhanced with visual aids in the form of images.

On picture: Go Talk Express 32, Go Talk Express 32 for LV

SMART/128

The device provides an opportunity to create a semantically high-quality speech for people with speech and language disorders. Thanks to the fast operation of the device, it is possible to create sentences, small strings of sentences without long pauses between words.

On picture: SMART/128, SMART/128 for LV

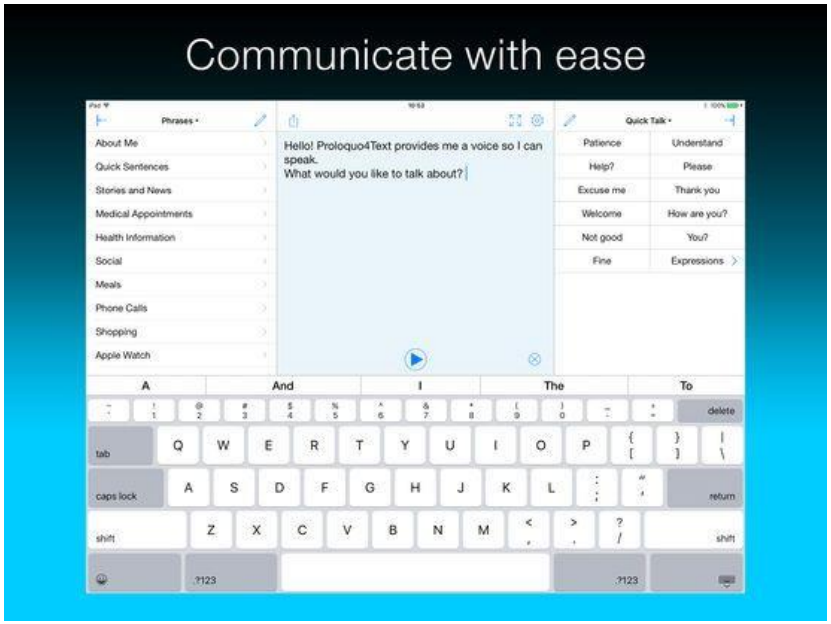
The Zuvo 12 HD

The device can be a communication solution for children and adults with significant communication difficulties resulting from autism, cerebral palsy, ALS, down syndrome, or anyone needing a lightweight, portable communication device. Communication options range from very simple, symbol-based vocabulary sets to more advanced keyboards, incorporating word and phrase prediction, as well as core word and phrase-based pages.

On picture: The Zuvo 12 HD

Proloquo4Text

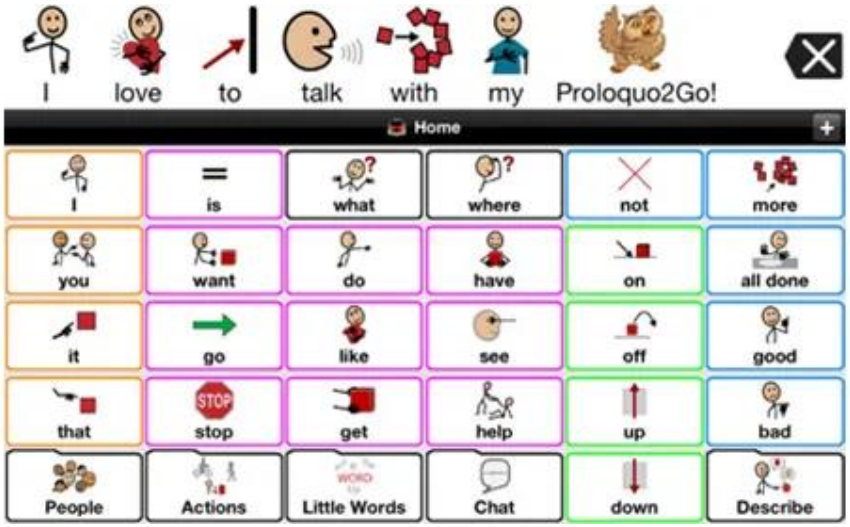
Proloquo4Text's intuitive word and sentence prediction use what someone types to anticipate what he/she might say next – helping save time and effort. Software (iSO, macOS) allows one to type less and to react quickly to the conversation at hand with smart features and a handy layout.



On picture: Proloquo4Text

Proloquo2Go

This symbol-based app for iSO and macOS helps users learn how to express themselves. Proloquo2Go puts the user's development first, with innovative features based on clinical knowledge and user research. It's also one of the few AAC apps designed to support all users, from beginning to advanced. Users can develop from single words to full grammatical sentences in the same comprehensive app. Works on iPhone, iPad, and Apple Watch.



On picture: Proloquo2Go

Attainment VoiceCue

A discreet auditory cueing device provides daily or timed messages. Ideal for reminders, especially for transitions between activities. Record up to five messages and set the clock to play them back at pre-set times. Each message can be assigned two playback times, such as 7 a.m. and again at 6 p.m.

Requires a pen tip to record, so messages will not easily be erased or misrecorded. Digital clock and calendar, volume control (including off), and messages remain when batteries are removed. 2-1/2" x 4-3/8" x 5/8".

On picture: Attainment VoiceCue

MindView AT

MindView AT software has been designed to help visual thinkers create impressive written assignments and presentations. The smooth transition from a Mind-Map to Word and PowerPoint means students can make powerful, formatted documents ready for assessment.

The added assistive technology software functionality, including text-to-speech, Dragon integration, predictive text, and audio notes make MindView AT the industry leader in mind mapping for assistive purposes.

The software helps to organize ideas, to plan work visually, removes anxiety associated with reproducing information over and over.

On picture: MindView AT

Self-test questions:

Try to identify key players at various levels (governmental, civil society, education) in the field of developmental and learning disabilities:

1. What are their main goals?

2. Identify their main projects?

3. What is their global integration?

Choose technologies (all together 3) for:

- teachers (1 example)
- and their students (2 examples) with hearing disabilities:

And do some research:

1. Discover the labels which manufactures assistive technologies.

2. What are their technical characteristics?

3. Are they compatible?

4. Where can you make a purchase?

5. What is the price?

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Topic 4 Students with visual disabilities

Key facts

- Visual disorders refer to any condition that affects a person's ability to see clearly, including nearsightedness, farsightedness and color blindness
- According to the World Health Organization, approximately 285 million people worldwide have visual impairments, with 39 million of them being blind
- Students with visual disorders may face challenges in accessing information, participating in activities and navigating their surroundings
- Specialized educational tools and technologies, such as screen readers and Braille displays can help students with visual disorders to access and interact with educational materials
- Educators and schools can also make accommodations such as providing large- print materials, audio recordings and assistive technology to support students with visual disorders in their learning

Definition of visual disorders from medical perspective-Examples

- refer to a variety of conditions that impair the normal functioning of the eyes
- may result from genetic defects, injuries, diseases, aging or refractive errors
- they can affect different parts of the eye, such as the retina, lens cornea or optic nerve
- can manifest in a wide range of symptoms from minor discomfort, temporary vision loss to sever, irreversible blindness
- common visual disorders include: **Refractive errors** like myopia (nearsightedness), hyperopia (farsightedness), astigmatism, and presbyopia, which occur when the eye cannot clearly focus the light. **Glaucoma**, a group of diseases that damage the optic nerve, often due to high pressure in the eye, and can result in vision loss. **Age-related macular degeneration,** a disease that blurs the sharp, central vision needed for activities

like reading and driving. **Cataract** characterized by the clouding of the eye's lens, leading to impaired vision or blindness. Diabetic **retinopathy**, a diabetes complication that affects the eyes and is caused by damage to the blood vessels of the retina. **Retinitis pigmentosa** a rare genetic disorder that causes loss of vision due to the breakdown and loss of cells in the retina. **Strabismus (crossed eyes)** a condition in which the eyes do not align properly, affecting depth perception and potentially leading to amblyopia (lazy eye).

Definition and examples of students with visual disorders

- have impairments that affect their visual acuity, field of vision, color discrimination, or other aspects of vision even after correction (which may include glasses or contact lens)
- can affect their ability to perform academically and socially at school
- might need special accommodations or educational strategies to succeed in school
- examples of visual disorders that can affect students include Myopia (Nearsightedness), Hyperopia (Farsightedness), Astigmatism, Color Blindness, Strabismus (Crossed Eyes) and Amblyopia (Lazy Eye), Cortical Visual Impairment (CVI), Low Vision or Legal Blindness

Palīgtehnoloģijas studentu ar redzes traucējumiem iekļaušanai izglītībā

Šīs tehnoloģijas (Independent Learner Platform, OCR Systems, EMA, Electronic Notetaker, Interaktīvās viedās mācību ierīces, Accessible Scientific Calculator) atbalsta lasīšanu un studentu vizuālās funkcionēšanas līmeņa "ņemšanu vērā", viņu lasītprasmes attīstību, kā arī vides un uzdevuma prasības. Nodrošina studentus ar resursiem, lai viņi varētu mācīties patstāvīgi, kas ir īpaši svarīgi vājredzīgiem studentiem, kuriem var būt nepieciešami īpaši instrumenti. Platforma varētu ietvert e-grāmatas Braila rakstā, audiogrāmatas vai teksta pārvēršanas runā funkcionalitāti. Citi resursi varētu ietvert interaktīvas pamācības, tiešsaistes forumus jautājumu uzdošanai un uz MI balstītas sistēmas personalizētai apmācībai.

(OCR) sistēmas var pārveidot dažāda veida dokumentus, piem., skenētus papīra dokumentus, PDF failus vai attēlus, kas uzņemti ar digitālo kameru, rediģējamos un meklējamos datos, kas ļauj pārvērst drukātos materiālus formātā, ko var nolasīt skaļi, izmantojot teksta pārvēršanu runā programmatūru.

Elektroniskie palielināšanas līdzekļi var palīdzēt studentiem ar redzes traucējumiem droši un efektīvi pārvietoties pa universitātes pilsētiņām. Tie izmanto sensorus un citas tehnoloģijas, lai noteiktu šķēršļus un nodrošinātu lietotājam audio vai haptisko atgriezenisko saiti, kas var palīdzēt uzlabot pārliecību un neatkarību.

Turklāt tādas ierīces kā Braila piezīmju rīki ļauj studentiem ar redzes traucējumiem veikt piezīmes Braila rakstā, pārvērst tās tekstā un lasīt, izmantojot Braila displeju vai teksta pārvēršanu runā. Tas ir ļoti svarīgi klasē, kur piezīmes tiek veiktas.

Interaktīvas viedās mācību ierīces var nodrošināt interaktīvu un saistošu mācību pieredzi. Tās var ietvert virkni funkciju, piem., teksta pārveidošanu runā, skārienjutīgas saskarnes un pat haptisko atgriezenisko saiti, lai izveidotu taustāmāku mijiedarbību ar mācību materiālu. Tos var arī integrēt ar tiešsaistes resursiem, lai paplašinātu pieejamā satura klāstu.

Studenti ar redzes traucējumiem var izmantot arī zinātniskos kalkulatorus, domātus tieši viņiem, lai veiktu sarežģītus matemātiskos un zinātniskos aprēķinus. Šiem kalkulatoriem var būt tādas funkcijas kā Braila displejs, balss izvade un taustes pogas. Šādas funkcijas ļauj studentiem ar redzes traucējumiem iesaistīties sarežģītā matemātiskā darbā, kas citādi nevarētu būt iespējams.

Examples of assistive technologies for students with visual disorders

Independent Learner platform

Software provides literacy support for those who struggle with literacy in the classroom, at home, or in the workplace. Features for reading, writing and study skills helps students to become independent learners, active participants within inclusion classrooms or sheltered instruction programs.

Kurzweil 3000

Optical Character Recognition (OCR) Systems

Optical character recognition (OCR) systems provide persons who are blind or visually impaired with the capacity to scan printed text and then have it spoken in synthetic speech or saved to a computer file. There are three essential elements to OCR technology—scanning, recognition, and reading text.

Voice Dream Scanner

Electronic Magnification Aids (EMA)

Electronic magnifiers allow individuals with low-vision to experience greater ease when reading, writing, and viewing content.

SightcareClover 5

Electronic Notetaker

Electronic notetakers are small, portable devices for storing information with the use of voice, braille, or typewriter keyboards. The stored information may be accessed through a built-in speech synthesizer, a braille display, or both.

BrailleNote Apex

Interactive smart learning devices

Interactive smart learning devices operate with a combination of tactile and audio information. By touching parts of an object (for example the continent, country, body of water, or mountain range of a map or globe) with a smart pen or fingers, the user can learn related information.

Oregon Scientific Smart Globes

Accessible Scientific Calculator

Large button, big display scientific calculator designed specifically for users with low vision. Performs scientific, statistical, and trigonometric calculations, and fractions. It has the ability to evaluate functions and enables you to evaluate mathematical expressions. Includes speech output via earbuds which are included.

SciPlus-3300

Topic 5 Students with mobility disabilities

Accessible GPS systems provide auditory directions and descriptions of surroundings, rather than or in addition to visual maps. Provide information about nearby points of interest, street names, and directions. Map browsing technologies, on the other hand, can convert traditional map data into a format that can be understood by visually impaired users. This might be through tactile maps or auditory descriptions of map data. Combined, these technologies can greatly enhance the ability of visually impaired students to navigate independently.

Digital Canes, also known as smart canes, build upon the traditional white cane used by many visually impaired individuals. In addition to the tactile feedback provided by a traditional cane, digital canes can use sensors and other technologies to detect obstacles in the path of the user. Provide feedback through vibrations or auditory signals, giving the user more information about their surroundings and potential hazards. This can help visually impaired students navigate school campuses and other environments more safely and efficiently.

Accessible GPS navigator and map browsing

The Victor Reader Trek combines a GPS navigator and map browsing with an audio player, so you roam the city or enjoy your favourite book while riding the train. At the touch of a button, you can plan your trip, hear the nearest address, the direction you're heading and nearby points of interest. Mobility that remains easy and enjoyable.

Victor Reader Trek

Digital Cane

The I-Cane Mobilo is a white cane that expands the functionality of the traditional white cane with features such as personal navigation, obstacle avoidance, and orientation. The I-Cane Mobilo has to be connected via Blue Tooth with a phone and the special designed I-Cane GoApp.

i-cane.nl

Support for room customization

Room, Scenes and Object Identification: Vision Artificial Intelligence (AI) technology can be used to analyze a space and identify objects, people, and other details about the surroundings. Apps like Microsoft's Seeing AI or Google's Lookout provide this functionality. They can describe the scene or object to the user through audio feedback. For a visually impaired student, this can be helpful in understanding the layout of a room, finding specific objects, or recognizing friends and teachers.

Bluetooth Beacons and Companion App: Bluetooth beacons can be used to provide indoor navigation. These small devices broadcast signals that can be picked up by smartphones or other Bluetooth-enabled devices. A companion app can interpret these signals and provide audio feedback to guide the user to specific locations. For a student, this could mean navigating a school building or finding a specific classroom more easily. Apple's indoor positioning system (IPS) is one such example Audio Map for Surroundings Awareness, allows users to understand their surroundings using sound. Apps like Soundscape from Microsoft use 3D audio technology to help users build a mental map of their surroundings. This can help a visually impaired student become aware of their environment and navigate it independently.

Room, scenes, and object identification

Using Artificial Intelligence, it enhances the accessibility of the visually impaired and low vision users and informs users who need visual aids about information perceived via the smartphone camera such as objects, rooms, scenes.

Sullivan+

Bluetooth beacons and companion app

Bluetooth Beacons can be installed in an indoor environment such as a school and help users navigate the building and rooms inside. Wayfinding with FAR's dynamic digitally accessible directories gives all users the freedom to find what they need and the confidence to get there using an app on their mobile.

Foresight Augmented Reality

Audio map for surroundings awareness

Microsoft Soundscape enables people to build a richer awareness of their surroundings, thus becoming more confident and empowered to get around. Unlike step-by-step navigation apps, Soundscape uses 3D audio cues to enrich ambient awareness and provide a new way to relate to the environment. It allows you to build a mental map and make personal route choices while being more comfortable within unfamiliar spaces. Soundscape is designed to be used by everyone and live in the background, so it allows learning activities such as in a classroom to take place at the same time.

Microsoft Soundscape

Self-test questions:

Try to identify key players at various levels (governmental, civil society, education) in the field visual disabilities:

1. What are their main goals?
2. Identify their main projects?
3. What is their global integration?

Choose technologies (all together 3) for:

- teachers (1 example)
- and their students (2 examples) with visual disabilities:

And do some research:

1. Discover the labels which manufacture assistive technologies.
2. What are their technical characteristics?
3. Are they compatible?
4. Where can you make a purchase?
5. What is the price?

References

1. CDC. Facts About Developmental Disabilities. https://www.cdc.gov/ncbddd/developmentaldisabilities/facts.html
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Online course

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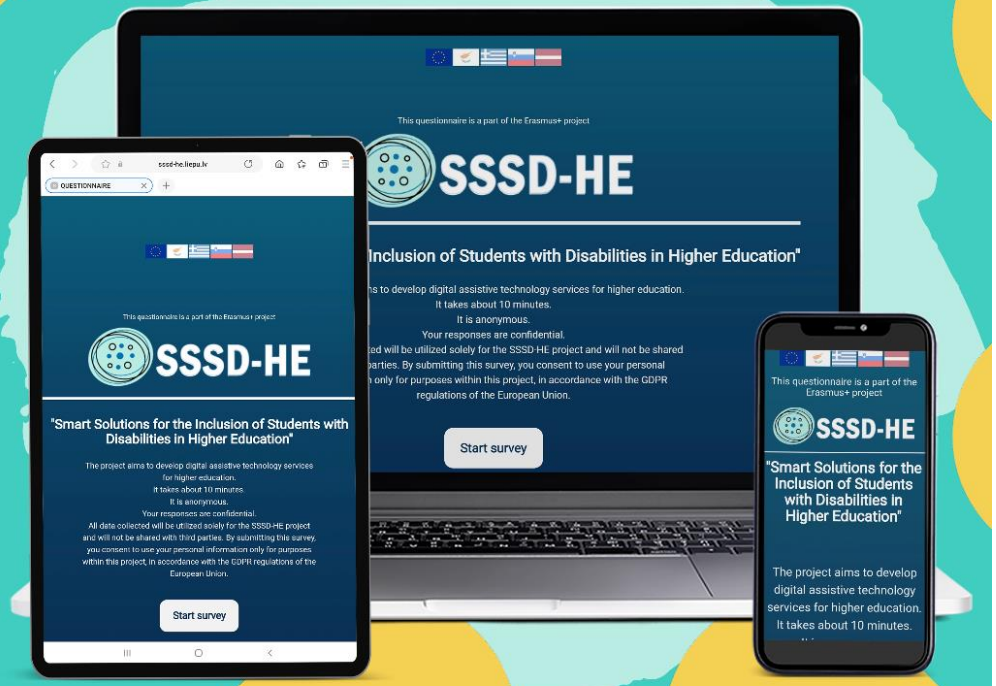
Digital Assessment Tool for the Requirements of Disabled Students in Higher Education



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