Electronics and Employability Advancement for Adults with Down Syndrome

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WP3.1 NATIONAL DESK RESEARCH

This report lays the foundation for developing the training format and digital tools through conducting national-level research with 1) Key information about the educational needs of adults with Down Syndrome in technology-related learning; and 2) Best practice examples of existing methodologies, tools or materials already used to educate adults with intellectual disabilities (especially in electronics, coding, tinkering or general digital training).

Country: BULGARIA

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National Desk Research

Introduction

In order to guide the development of Work Package 3 (WP3) of the FEAT-DS project, "Electronics and Employability Advancement for Adults with Down Syndrome," this national report provides the results of research done in Bulgaria. WP3's main goal is to co-design training programs for individuals with Down syndrome (DS) that are inclusive, accessible, and interesting in the fields of digital skills and basic electronics.

Each project partner conducted national-level research to make sure the training addresses practical needs and expands upon tried-and-true methods. Understanding the educational needs, available resources, inclusive teaching methods, and policy environment pertinent to adult learners with DS was the main goal of this study.

Report Objectives:

- Identify the cognitive, social, and communication barriers that adults with DS face when learning, particularly in technical fields such as electronics and coding.
- Explore learning preferences and accessibility requirements, drawing from both national practice and international literature.
- Document and analyze best practices in inclusive technology education currently used in Bulgaria.
- Extract key insights to guide the co-design of WP3 training modules.
- Map relevant policy frameworks and institutional responsibilities in adult education, digital inclusion, and disability support.

1. Educational Needs Overview

In Bulgaria, a number of obstacles prevent adults with Down syndrome (DS) from pursuing formal education and career training, especially in areas like technology, electronics, and digital skills. These obstacles fall into four general categories: structural, social, communicative, and cognitive.

Cognitively speaking, modest to severe intellectual difficulties are typical for people with Down syndrome. These have an impact on abstract reasoning, processing speed, memory recall, and attention span—skills essential for success in technical fields like programming and electronics. As a result, educational programs must be designed to minimize cognitive overload. This entails use repetition to enhance memory and skill retention as well as segmenting difficult activities into smaller, more manageable parts.

Communication problems make getting an education even more challenging. Both receptive (understanding) and expressive (speaking or writing) language deficits are common among persons with DS in Bulgaria. Without modification, standard training materials—which are frequently dense in technical jargon—may not be accessible. Simplified Bulgarian (лесен български език), which consists of brief sentences, well-known terms, and visual components, is becoming more widely acknowledged as an essential inclusion tool. In this situation, visual aids like gestures, demonstrations, and pictograms are essential for improving student engagement and bridging communication barriers.

Social barriers also play a significant role. Although Bulgaria has made progress in inclusive education during childhood, adults with DS often face a lack of opportunities once they leave the school system. Many enter day care centers or sheltered social environments where continued education—especially in technology-related fields—is minimal or absent. This disconnection leads to social isolation and missed chances for developing skills that support independent living and employment.

According to their preferred methods of learning, persons with DS usually gain the most from experiential, hands-on training and robust visual aids. Direct-interaction activities, including putting together electronic parts or utilizing simplified coding tools, are frequently more successful than conventional, abstract instruction. Clear instructions, structured routines, and sensory feedback—such as lights, noises, or vibrations—can all support learning and help people stay focused.

In Bulgaria, some initiatives are beginning to address digital accessibility for adults with intellectual disabilities, although they are still emerging and fragmented. For instance:

- A1 Bulgaria, in partnership with chitalishta (community cultural centers), runs the "Internet for All 55+" program, offering free digital literacy training in over 30 towns. While primarily aimed at older adults, the program includes components applicable to people with intellectual disabilities.
- The Bulgarian Academy of Sciences (BAS) is developing a Digital Accessibility Project that includes training methodologies and accessible content for people with special needs, including robotics and ICT education.
- The Global Libraries – Bulgaria Foundation has piloted media and digital literacy training through public libraries, focusing on inclusive teaching and instructor training.
- Under the EU Recovery and Resilience Plan, the Bulgarian Ministry of Labour and Social Policy is establishing “digital clubs” across the country—many hosted in public libraries or chitalishta—which aim to provide digital access and basic training to marginalized groups.

Despite these promising efforts, Bulgaria still lacks a nationally coordinated, systemic approach to digital education for adults with DS. Several challenges remain:

- **Lack of specialized curricula**: Few adult education programs offer materials tailored to the needs of learners with intellectual disabilities, especially in technology-related areas. Existing curricula often assume literacy and cognitive skills that many adults with DS do not possess.
- **Insufficient educator training**: Many adult educators and social workers lack the expertise to adapt teaching methods to suit the learning styles of people with DS.
- **Limited policy implementation**: Although Bulgaria has ratified the UN Convention on the Rights of Persons with Disabilities (UN CRPD) and participates in European inclusion frameworks, concrete policy actions focused on adults with DS in the digital sphere are minimal.
- **Fragmented governance**: Responsibilities for education, social services, and employment fall under different ministries and municipal structures, making it difficult to coordinate integrated programs.
- **Unstable funding**: Most inclusive digital education initiatives are funded through temporary projects, such as EU or NGO grants, with little long-term sustainability.

However, a good place to start is Bulgaria's increasing interest in digital inclusion, which is bolstered by EU regulations and civil society initiatives. Projects like the promotion of simplified language, digital literacy via chitalishta and libraries, and the accessibility research conducted by BAS offer useful models for expanding inclusive technology education.

Designing and implementing learning initiatives that are socially inclusive, cognitively accessible, and sustainably integrated is essential going forward. These ought to incorporate visual scaffolding, multisensory, hands-on forms, and professional development for teachers. To create a comprehensive digital learning system that addresses the special needs of individuals with Down

syndrome in Bulgaria, cross-sector cooperation between government ministries, local government agencies, libraries, non-governmental organizations, and adult education providers will be crucial.

2. Best Practice

2.1. Tinus – Educational Microcontroller Kit

The Tinus microcontroller kit is one of the best educational resources available in Bulgaria for persons with intellectual challenges, including Down syndrome. This Bulgarian-designed kit, created for inclusive education, allows students to experiment with fundamental programming using a visual, block-based interface like MakeCode or Open Roberta. With its color-coded blocks, big tactile buttons, LEDs, and sensors, the gadget offers instantaneous visual and aural feedback. Adults with Down syndrome benefit from interactive and captivating activities, and its hands-on and sensory-rich design fits their learning preferences well. Tinus has been effectively incorporated into community centers and inclusive training programs, increasing engagement and skill development in mixed-ability learning settings. Through the integration of accessible coding and practical learning, the tool advances the goals of the FEAT-DS project.

2.2. EduKit Bulgaria – Inclusive STEM Learning Kit

EduKit Bulgaria, an inclusive STEM training kit that teaches the fundamentals of electricity and circuits in an approachable and simple manner, is another worthwhile project in Bulgaria. It is particularly appropriate for those with intellectual disabilities and weak reading skills since it has tactile elements, vivid color coding, and step-by-step work cards that use pictograms and plain Bulgarian language. Building basic circuits, using switches, and experimenting with sensors are some of the activities that assist students develop their technical knowledge, coordination, and logical thinking. The kit, which was tested in special education institutions in Bulgaria and backed by non-governmental organizations like the Center for Inclusive Education and the National Network for Children, has been praised for increasing students' self-assurance and ability to finish assignments. *EduKit Bulgaria* provides a flexible yet structured approach that aligns with the FEAT-DS objectives for inclusive adult training.

2.3. Ucha.se – Accessible Learning Platform

Last but not least, Ucha.se is the top educational portal in Bulgaria with expanding accessibility features. Although Ucha.se was not created with individuals with Down syndrome in mind, it has added features including mobile-friendly navigation, subtitles, audio explanations, and simplified Bulgarian language. For students with cognitive and sensory difficulties, these qualities facilitate autonomous access to educational materials. The platform's potential for adaption in vocational and life skills training has been demonstrated by its use by Bulgarian schools and adult education

providers. Ucha.se, as a digital environment, provides FEAT-DS with a solid model for developing a fully online or mixed learning format that caters to the various needs of adults with Down syndrome.

3. Insights for WP3 Co-Design

These insights show that training in electronics and digital skills is possible — and meaningful — for adults with Down Syndrome. But it needs to be designed with their learning needs in mind: hands-on, visual, simple, and supportive.

3.1. Focus on step-by-step, practical learning

Individuals with Down syndrome frequently struggle with intellectual thought, memory, and concentration. Small, doable activities that are presented in logical sequences should therefore be the main focus of the training format. Learning by doing is especially successful. To see and comprehend the results of their activities, learners should engage directly with tangible objects like buttons, sensors, or basic electronic components. Reinforcing what they have learnt also requires routine and repetition.

3.2. Use visual communication wherever possible

Written instructions are insufficient on their own. It is crucial to employ illustrations, symbols, color coding, and demonstrations. These components support students in staying focused, remembering steps, and following directions. Because they integrate tactile features with clear visual instruction, materials like IncluKIT or comparable adapted kits that are available or developed locally in Bulgaria (for example, through cooperation with technical universities or NGOs) have proven useful. Every task in training should be accompanied by pictures, pictograms, and diagrams. To prevent misunderstandings, this should be the same for all modules.

3.3. Use easy-to-understand language

Instructions should be short, simple, and positive. In Bulgaria, using Лесен български език (Easy Bulgarian) is essential. Learners benefit from hearing direct, friendly messages like “Натисни бутона” (“Press the button”) or “Опитай пак” (“Try again”). Long or technical explanations should be avoided. Instead of describing theory, it’s better to show the learner what to do through action and example.

3.4. Choose tools that give instant feedback

When they can see or hear the results of their work, learners are more involved. They can stay motivated and determine whether they finished a task correctly with the aid of tools that use lights,

music, or movement. Additionally, this enhances focus and memory. When a circuit functions and a light turns on, for instance, it enables the student to make the connection between cause and effect without the need for an abstract explanation.

3.5. Keep interfaces and tasks simple and clear

Platforms for training must be simple to use. Avoid interfaces that are too confusing with lots of buttons, scrolling, or pop-ups. Every job or screen should have a single primary objective. Students will feel less stressed and be better able to concentrate if the arrangement is clear and consistent. This also holds true for actual worksheets or task cards, which should have clear icons, big fonts, and a clean layout.

3.6. Support the educators

Many adult trainers and educators in Bulgaria have little expertise working with individuals who have intellectual challenges. For the training to be successful, teachers must have easy-to-follow instructions and readily available resources. This provides detailed instructions, illustrations, and recommendations for how to modify tasks. Teachers should be urged to employ adaptable teaching strategies and concentrate on establishing a welcoming, encouraging classroom atmosphere.

References and Links

A1 Bulgaria – "Internet for All 55+" Programme

https://dfbulgaria.org/2022/startira-tretoto-izdanie-na-internet-za-vsichki/

https://dfbulgaria.org/2022/startira-tretoto-izdanie-na-internet-za-vsichki/

Bulgarian Academy of Sciences (BAS) – Digital Accessibility Project

https://www.math.bas.bg/vt/ab/paper.php?paperID=5353en

https://www.igi-global.com/chapter/digital-literacy-for-students-with-intellectual-disabilities/318731

Global Libraries – Bulgaria Foundation

https://glbulgaria.bg/en/2024/10/01/conference-media-digital-literacy-for-adults/

Ministry of Labour and Social Policy – Digital Clubs Initiative

https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility/country-pages/bulgarias-recovery-and-resilience-plan_en

National Strategy – "Digital Bulgaria 2025"

https://digital-skills-jobs.europa.eu/en/actions/national-initiatives/national-strategies/bulgaria-digital-bulgaria-2025-national-programme

DESI (Digital Economy and Society Index) Reports

https://digital-strategy.ec.europa.eu/en/policies/desi-bulgaria

Tinus – Educational Microcontroller Kit

https://tinusaur.com/

EduKit Bulgaria – Inclusive STEM Learning Kit

https://www.edukitinc.com/

Ucha.se – Accessible Learning Platform

https://ucha.se/

Elli App
https://learn-with-elli.com/main-page-en

Calliope mini
https://calliope.cc/en/school/fortbildungen/experts

Kids & Co. – Digital Accessibility Project
https://kids-und-co.de/bildung/berufsbildung/digital-accessibility-en

Down Syndrome International – Education Guidelines
https://ds-int.org/education-guidelines

MDPI Systematic Review (2022) – *Assistive Technologies and Down Syndrome*

https://www.mdpi.com/2071-1050/14/8/4630

TBox – ICT Integration for Children with Down Syndrome

https://info.tboxplanet.com/en/integration-of-ict-for-down-syndrome-children

ArXiv – Co-Designing Assistive Tech with Disabled Learners

https://arxiv.org/abs/2403.12263

IncluEdu – Inclusive Tablet Education Platform

https://www.incluedu.com