

***Application of work simulators in
assessing work aptitude
in career counseling for young people
with disabilities or special needs–
research outcomes***

Erika Jókai PhD

jokaierika@gmail.com

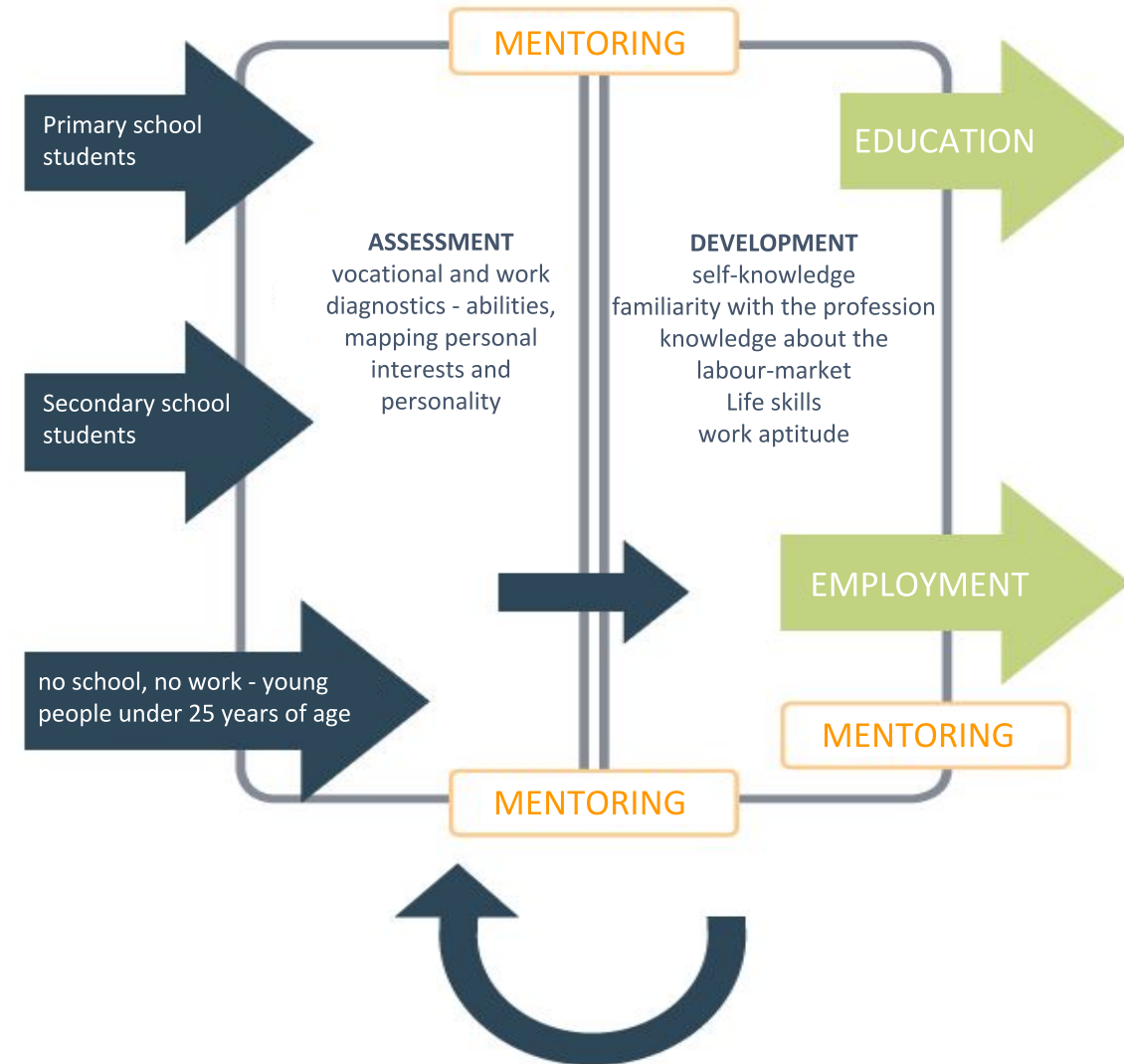
jokai.erika@bgk.uni-obuda.hu



„KILÁTÓ” model

- Assessment
 - Skills assessment to facilitate orientation
 - Skills to be developed, depends on goals
- Development
 - Required competences of chosen professions with simulators and other assessment tools
 - Monitoring the development of other skills (school, training, self-development)

Work Orientation and Labour Market Piarist Development Center

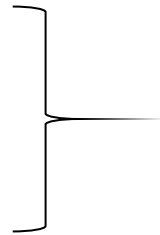


Research project - 2018

- Research team: occupational physicians, occupational psychologists, conductive education specialists, ergotherapists, data analysts
- Training of 30 persons for making work simulation assessments, giving feedback, their participation in data gathering
- Assessment of 100 persons with disabilities (randomized) ErgoScope work simulator
- Comprehensive assessment of 50 persons with disabilities with portable work-skill assessment tools
- Data processing, data analysis, feedback
- Elaboration of a methodological manual with instruction guidelines and new assessment protocols

General aspects of recruitment

- Knowledge, skills, abilities
- Motivation, interests
- Personality



Pre-Definition of success

Sampling tools:

- Interview (+questionnaire)
- Occupational health tests (compulsory)
- Work psychological aptitude tests (not compulsory) Psychological assessment tests (tests, tools, work trials): objective, **standardized**, precise, valid, **normalized**
- Work trials, work sample tests
- AC (Assessment center): activities measuring the required work competences
- Employee references

Occupational diagnostics laboratory

- Assessment tools: 9 desktop skill assessment tools
 - Attention test (order of numbers)
 - Complex sensomotor tester and conflict meter– reaction time, combination skills
 - Tachistoscope (memory)
 - Stabilometer (balance)
 - Labyrinth test (evaluation of learning ability and memory)
 - Evaluation of depth perception
 - Logical cylinders test
 - Evaluation of finger dexterity
 - Work probation (needs assessment)

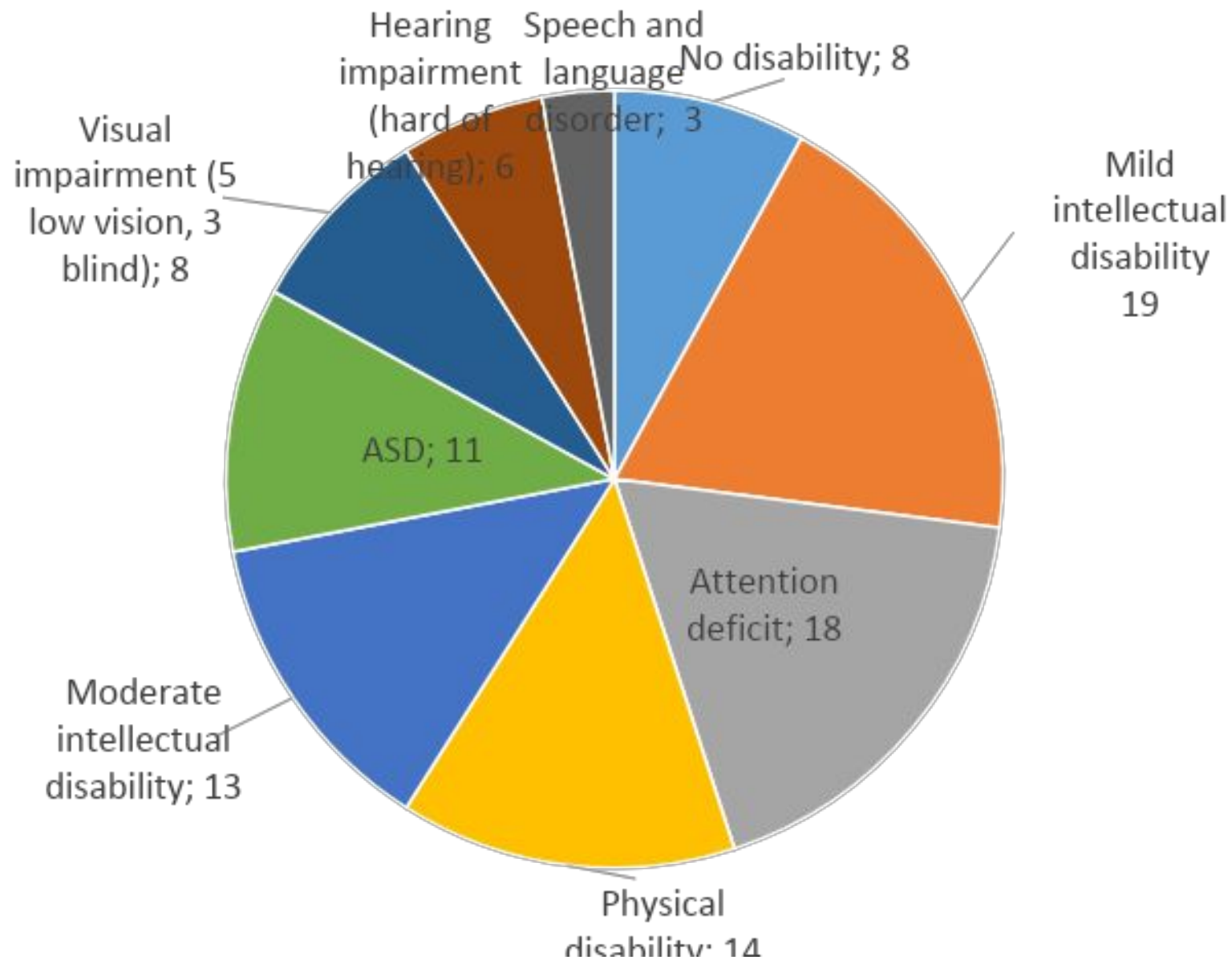
Planned tools:

Ergoscope work simulator with 3 panels, 8 desktop assessment tools, Psychocomb complex analyzer



Activity simulator
Micromanipulation tremormeter
Galvanic skin resistance and pulse frequency meter
Hand dexterity perception meter
Bogen-Lipmann cage
Moede's thread board
Biofeedback machine

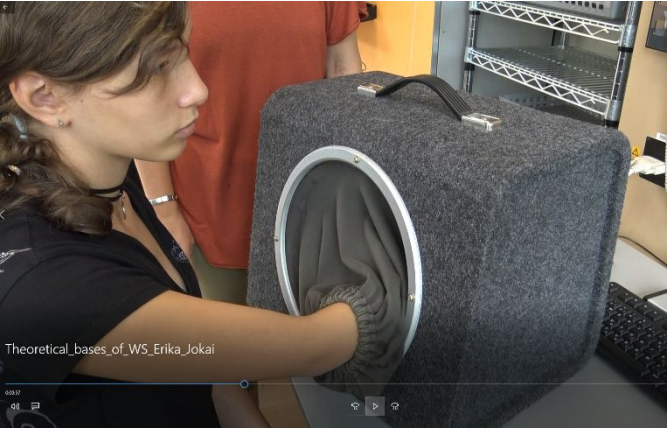
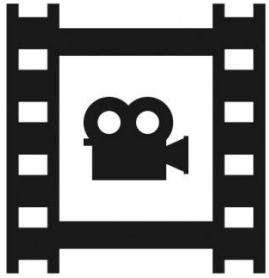
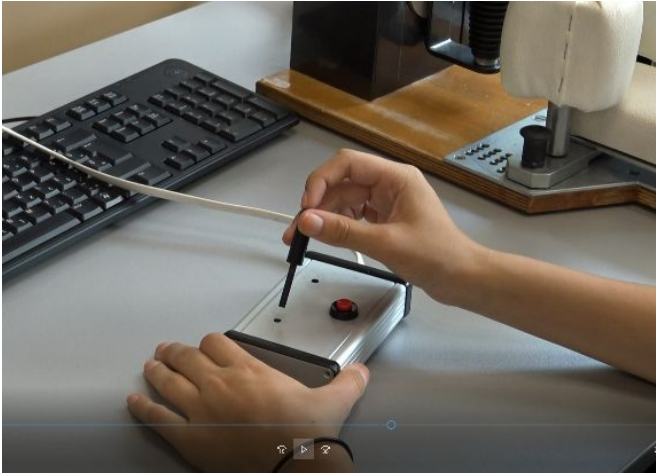
ErgoScope assessment - sample



- Purpose: **complex** (randomized) work aptitude assessment + data gathering
- 13-30 of age (primary and secondary school, segregated and mainstream institutions, Young people with disabilities or special needs, seeking for career orientation), Budapest, region of Vác
- 100 participants: 46 students, 16 job seekers, 30 active persons with disabilities, 8 persons without disabilities (3 students, 5 in employment)

Laboratory of work aptitude diagnostics

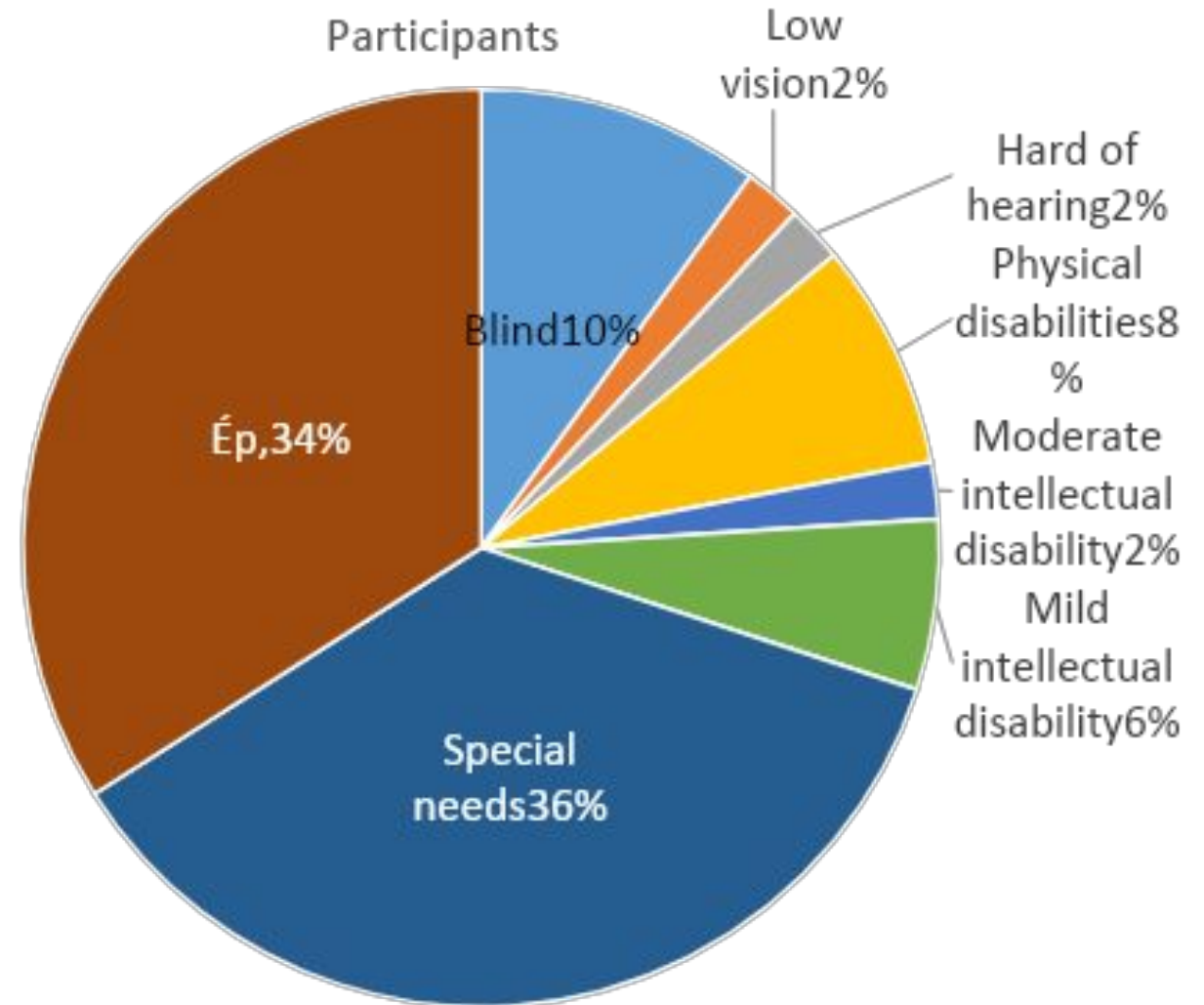
- ErgoScope work simulators with 3 panels



Aptitude tests - sample

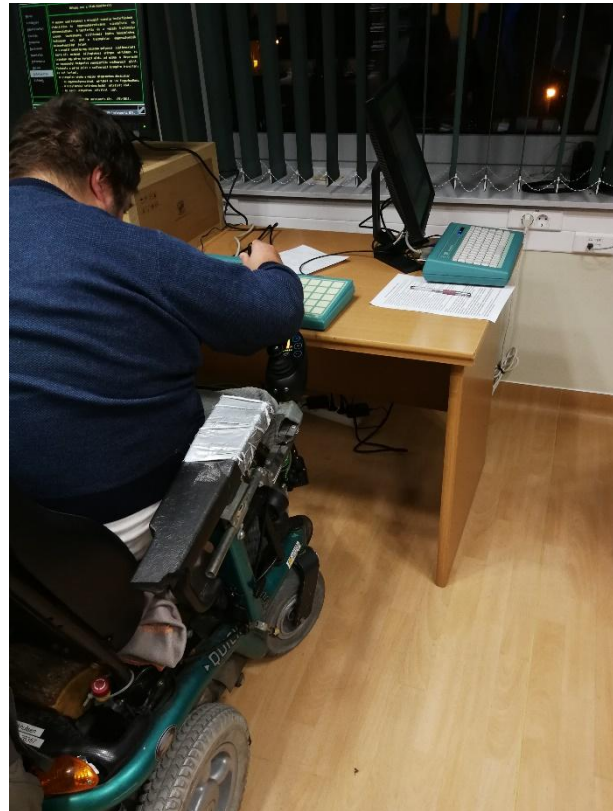
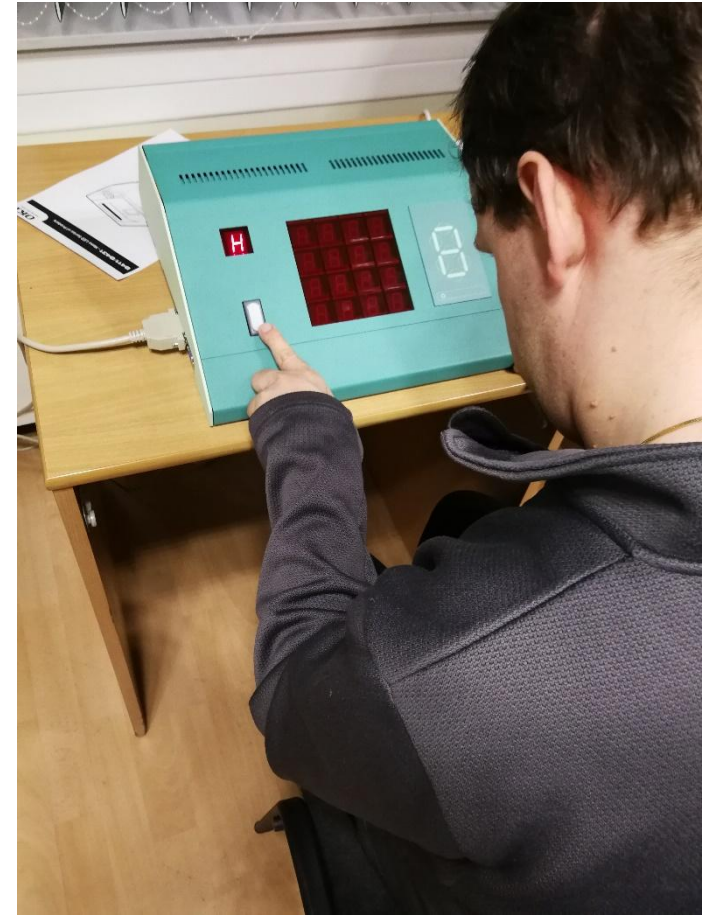
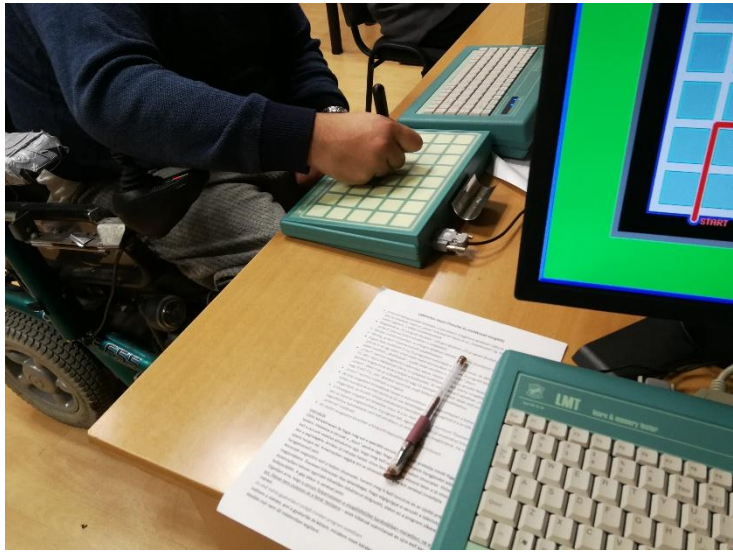
5 blind,
1 low-vision,
1 hard of hearing,
4 physical disabilities
(CP),
1 severe mental disability
3 mild intellectual disab.,
18 special needs,
17 no disabilities

**Preparatory year in the
Vocational School of
Göd**





1. Assessment goals	1. Assessment tools
Assessment of cognitive abilities (attention, memory, reasoning, learning ability)	Attention test (order of numbers) Complex sensomotor tester (reaction time, combination skills) Tachistoscope (testing memory) Testing learning skills and memory
Evaluation of psychomotor skills (finger and manual dexterity, balance, standing stability)	Ricossay's finger and manual dexterity Bonnardel's finger and manual dexterity Crawford's work probation (needs assessment)
Sensory modalities, near and distance objects	Assessment of depth perception



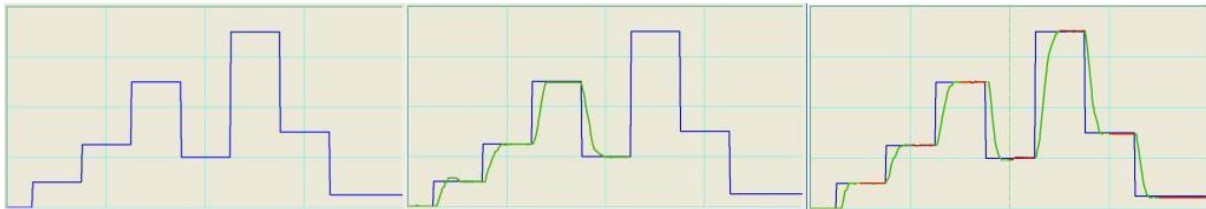
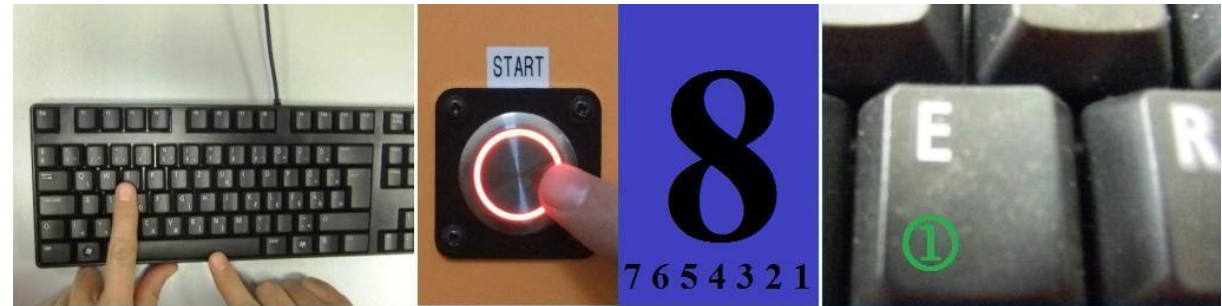
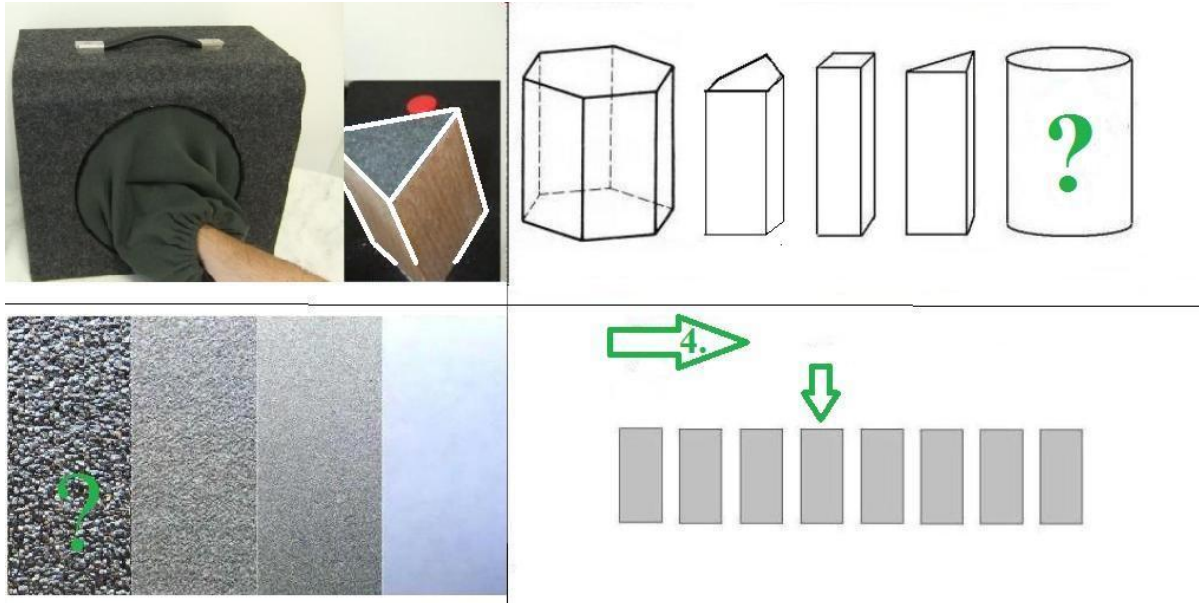
Data analysis

Data processing with SPSS Statistics 23)

a) **Statistical analysis of sample** (N=92):

- a Kruskal-Wallis test showed if there are significant discrepancies within the different subsamples of individuals with different disabilities
- If yes, Mann-Whitney test was used to identify different parameters and analyze them in pairs. As analyzing pairs may result in the first type mistake, Bonferroni correction was used to measure significance (instead of nominal $P=0,05$ criterion, the stricter $p=0,05/n$ criterion was used, where n stands for the number of pairs within the subsamples of different disabilities).

b) **Comparative statistical analysis of working-age individuals with and without disabilities or special needs** (297/92 individuals): Are abilities different from those of employees without disabilities, working in the open labour market?



Some results

1. best results given by young people with ADHD, ASD and with hearing impairment.
2. Young people with physical or visual disabilities
3. Young people with intellectual disabilities

Others: due to the small sample size, no statistically meaningful data was gathered.

Some results

Task*	No disab.	Visual impairm.	ADHD	Mild intellectual disab.	Down syndr.	Challenges
Touch (JK, 20, no mistakes, db)↑	19,7	<u>13,86</u>	13,33	7,55	<u>4,86</u>	familiarity with concepts of mathematics, manipulation with hands not seen
Manipulation in rotation in chest high, With dominant hand, discrepancies monitored (absolute error)↓	25,69	81	<u>35</u>	173	<u>187</u>	attention, eye-hand coordination ability, motivation
Typing with two hands, Left signal + space, 100 times (average typing time)↓	21,87	<u>14,63</u>	26,65	40,87	<u>54,96</u>	attention, eye-hand coordination, motivation

*ErgoScope tasks

Significant group differences, [surprising results](#)

Comparison of subsamples of persons without disabilities and higher numbers of individuals with disabilities within the subsamples, search for significant discrepancies

Activity	Significant discrepancy	No significant discrepancy
Typing	Severe intellectual disability, visual impairment	ADHD, physical disab.
Rotation (men)	Mild and moderate intellectual disab.	ADHD, physical disab., ASD, hearing impairment
Rotation (women)	Severe intellectual disab.	ADHD, physical disab., ASD, hearing impairment, mild intellectual disab.
Use of buttons	Mild and moderate intellectual disab.	ADHD, physical disab., ASD, hearing impairment
Right hand grib strength (men)	ASD	ADHD, physical disab.
Right hand grib strength (women)	-	ADHD, physical disab., mild intellectual disab.
Work capacity	All subcategories with disabilities	-
Pushing buttons facing them (men)	-	ADHD, physical disab., mild intellectual disab., ASD
Pushing buttons facing them (women)	Mild and moderate intellectual disab.	ADHD, physical disab.
Pencil use with right hand	ADHD, ASD, physical disab., visual impairment, mild and moderate intellectual disab.	-
Static strength, horizontal pulling	-	ADHD
Touch with right hand (men)	ADHD, mild and moderate intellectual disab.	

Discussion

- Currently, the 9 work psychology assessment tools provide full or partial information on 32 out of the 58 factors, which our team has investigated.
- The implementation of an ErgoScope work simulator gives information on 14 new (and 25 in part complementary) skills.
- Other skills are observed by physicians, psychologists and SEN teachers, working in the team.
Many of these skills can be objectively assessed by purchasing further work simulators.

Research experience, further goals

- All these assessment tools give us objective data concerning employability, skills, work resistance of individuals with disabilities (vocational psychology)
- Knowing subtasks of a profession, it is possible to decide to what extent these tasks (work medicine) suit the individual.
- Growing need for tool-based analysis.
- Useful in work aptitudes (ICD)
- Automatic digitalisation of assessment results, developing new tools
- Elaboration of reference data bases and work mirrors (general professional, work-specific)
- Longitudinal research in work suitability

Future plans

Research tasks:

- **Broadening reference data base**, references for defining professional aptitudes validation of references (need for further assessment, greater numbers, comparison with work mirrors (involvement of companies))
- **Job Database for the prediction of job suitability** (monitoring research participants, (research task))
- Validation of assessment processes by related professions (work psychology, work health, work protection, vocational rehabilitation services, etc.) – professional forums, conferences, publications
- Areas to improve:
- Methodological improvements: synchronisation of soft and tool-based data analysis processes
- Improvement of usability of tools
- Synchronisation of data networks (ErgoScope, desktop tools, survey and other client data)