Barriers and opportunities for increased workplace inclusion of people with visual impairments – focusing on digital tools

Till Halbach

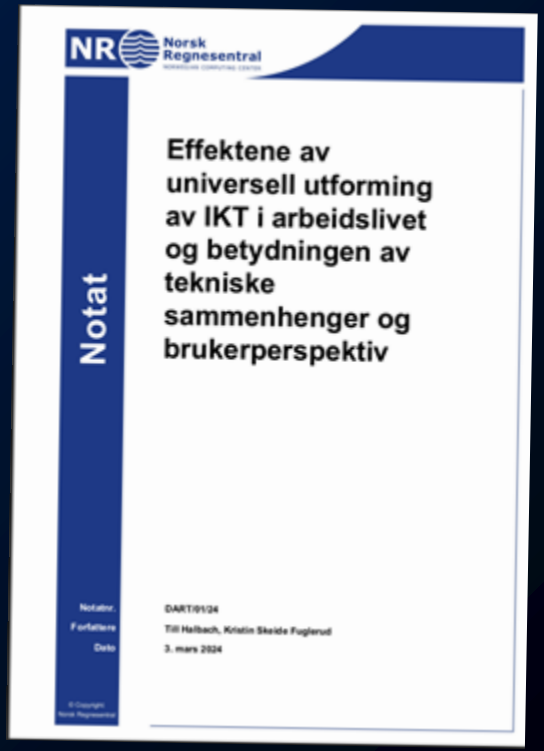
Norsk Regnesentral
Sep. 2025

Norsk Regnesentral / Norwegian Computing Center

- Technical-industrial research institute
  - Independent non-profit foundation
- Offices in Oslo Science City, Norway
- Applied research, innovation, development
  - ICT, mathematics / statistics
- Digital Inclusion Research Group with nearly 20 years of experience

Sources

- A number of own studies with diverse user groups since 2006
- Most recent: *State of Vision Equity 2023* of the Norwegian Association of the Blind and Partially Sighted
  - Phone survey with 700 vision-impaired respondents
- Outlook: Currently working on *State of Vision Equity 2025*
- Regarding workforce: 2020 study
  - Phone survey with 300 vision-impaired respondents



General workplace inclusion in Norway

- Mandatory workplace accommodation
  - Equality and Anti-Discrimination Act
- Universal design of digital workplace tools not mandatory
- Assistant schemes
  - General (“Funksjonsassistanse”), secretary (“lese- og sekretærhjelp”)
  - Provided through Labor and Welfare Administration
  - The more universally designed a solution, the less assistant schemes are needed

Barriers and opportunities for increased workplace inclusion of people with visual impairments – focusing on digital tools

Digital tools @work

- Operating systems
- Office suites
  - Calendar, address book, mail, text processing, spreadsheets, slides, etc.
- Administration tools
  - Time management, task planning and tracking, accounting, human resources
- Communication and cooperation applications
  - Video meetings, chat, etc.
- Journal systems, databases, intranet
- Thin client systems, terminal applications
- Assistive technology
- Accessibility settings

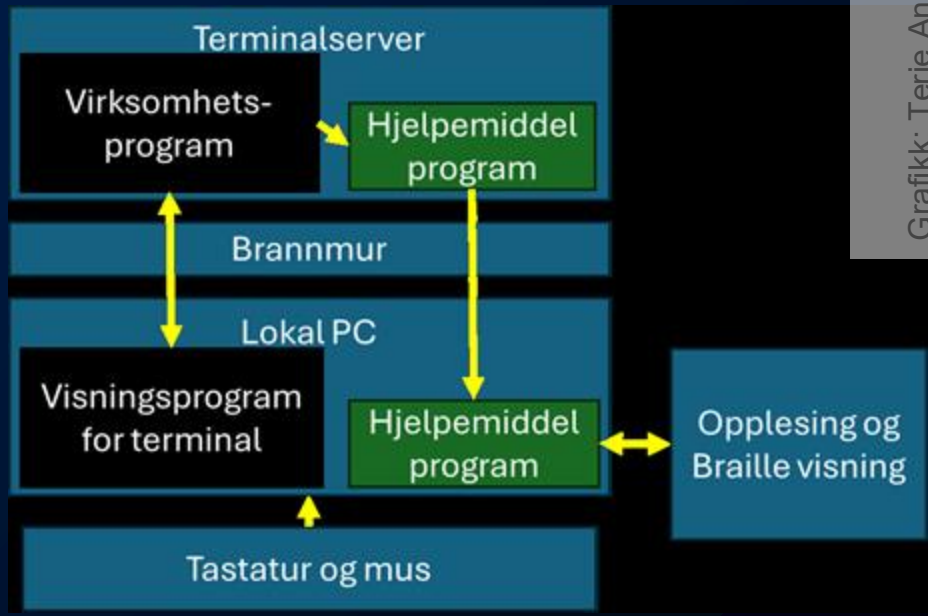
Assistive technology (AT)

Examples:

- Screen readers
- Magnifiers
- Braille readers
- Hearing aids
- Hearing loops
- Writing software
- Voice recognition software
- Switches

AT-related factors

- Knowledge / advice
  - What is possible? What am I entitled to?
- Procurement / applying
  - Bureaucracy, licenses, ..
- Installation, configuration, maintenance, upgrades
  - Integration with mainstream tech
- Educational training
  - Often not covering AT and its integration
  - Often not universally designed
- Technical support
  - Often no suitable competency about AT
- Security and privacy concerns



Grafikk: Terje André Olsen

Digital tools @work

- Operating systems
- Office suites
  - Calendar, address book, mail, text processing, spreadsheets, slides, etc.
- Administrative tools
  - Time management, task planning and tracking, accounting, human resources
- Communication and collaboration applications
  - Video meetings, chat, etc.
- Journal systems, databases, intranet
- Thin-client systems, terminal applications
- Assistive technology
- Accessibility settings

Opportunities

Barriers

Inclusion

Benefits

Savings

Works

Tech

Malfunctions

Exclusion

Costs

Key findings from 2020 survey

- 2 out of 3 encounter digital barriers / difficulties at workplace at least once a month
  - 3 out of 10 at least once a day
- Number of digital barriers is increasing
- 6 out of 10 use their own ATs, including telephone
- 9 out of 10 barrier encounters result in longer task solving
  - 3 out of 4 need help with task solving
  - 4 out of 10 result in unsolved tasks
- 1 out of 3 consider quitting or has already done so
- 1 out of 3 consider to work part-time or has already done so
- 1 out of 6 did not get a job due to technical barriers

Consequences of barriers

- Reduced productivity, unsolved tasks
  - Cost for employer
- Negative feelings, impact on individuals' mental health
  - Cost for individuals and health sector
- Part-time work, sick leave, quitting
  - Cost for individuals and society
  - 1 out of 2 VIPs participate in working force (as opposed to 8 out of 10 in society)
  - 7 out of 10 unemployed VIPs want to work
  - 1 out of 3 employed VIPs are open for higher degree of part-time work
- Less social participation and more exclusion, loneliness
  - Cost for individuals and society
- Discrimination cases, regulatory compliance checks
  - Cost for individuals and public administration

Trends

- Work situation for VIP has not changed much during last 20 - 25 years
  - Lack of universally designed solutions
  - Compatibility deficits between ATs and mainstream tech
  - E.g., universal design / quality of educational training
  - Competency deficiencies of technical support

Photo: Lukas / Pexels

Take-aways

Photo: Darina Belonogova / Pexels

- ATs adds considerable complexity for people with impairments
- Vision-impaired people (VIPs) need to manage their ATs and compensate for various technical problems
- VIPs have a great need for digital skills (and thus educational training)
  - Mainstream tech, settings / configuration, ATs
- VIPs are highly dependent on universal design of educational training and the proper content
- Fewer VIPs are part of the workforce
  - Reasons are multi-dimensional and compound

Bilde: Karolina Grabowska / Pexels

- Research project «Inclusive Digital Application» (IDA)
  - Studying the effects of universal design of ICT
- 2023 - 2026
- Funding from Research Council of Norway
  - No. 336573

DIPS

Norges Blindeforbund
Synshemmedes organisasjon

nav

NR

Contact

Till Halbach (dr.-ing.), senior research scientist
Norsk Regnesentral
nr.no, LinkedIn

Newsletter of our research group

Please save your questions for the QA part

Additional material

Factors to consider

Accommodation

- Primarily cost for employers (general, e.g. through technical support and colleagues), labor administration / county municipality (assistive tech / AT), and municipality (training)
- Advice, procurement, installation, configuration, upgrades, educational training
- Varies between minutes and (several) days
- Technical problems likely lead to employees unable to work
- No overview of used resources as of today

Factors, cont’d

Time on task / productivity

- Primarily cost for employer
- Have some numbers, e.g. blind employees may need up to five times as long (Griffith et al., 2023), but no complete picture

Unsolved tasks

- Primarily cost for employer
- Have some numbers, e.g. 37% of blind employees report that technical barriers may result in unsolved tasks (Halbach & Tunold, 2020)

Factors, cont'd

Part time work

- Primarily cost for employers (hiring need / limited productivity) and society (less taxes)
- Have some numbers, e.g. 22% of blind employees have reduced part time fraction (Halbach & Tunold, 2020)

Sick leave

- Primarily cost for employers (substitutes) and society
- Lack of knowledge reg. leave due to lack of UD

Quitting

- Cost for employers (hiring need / limited productivity), society (less taxes), and individuals (lack of income)
- Have a few indicative numbers, e.g., 26% of impaired and previously employed individuals report to have quite due to digital barriers (Walday et al., 2016)

Factors, cont'd

Negative feelings / experiences

- Limited coping, frustration, exhaustion, depression, etc.
- Secondary effect from employees' extra effort, struggling with public administration / employer / tech barriers, and from other primary effects
- Cost for employees and their environments
- Have some indication of the effect, e.g. (Andersen & Skarholt, 2014)

Mental health

- Positive effect of work participation on mental health and occurrence of mental illnesses
- Cost for individuals and society (health expenses)
- Have studies showing a weak indication (Legard et al., 2023)

Factors, cont’d

Social participation and exclusion, loneliness

- Secondary effect
- Cost for individuals and civic-society organizations
- Some numbers exist, such as 50% of unemployed individuals report about limited social networks and social exclusion (Brunes et al., 2019)

Photo: cottonbro studio / Pexels

Factors, cont’d

Discrimination cases

- Discrimination accusations at the Discrimination Board
- Primarily cost for public administration
- Have number of cases as of today, but no number reg. public spending and how many fewer cases to expect

Regulatory compliance checks

- Checks by the Authority for Universal Design of ICT
- Primarily cost for public administration
- Have number of checks as of today, but no number reg. public spending and how many fewer checks to expect

Factors, cont’d

Positive feelings / experiences

- Degree of independence, quality of life, feeling of belonging, social isolation
- Primarily benefit for individuals
- No estimates available linked to UD

Societal effects

- Equity and equal possibilities for all, social sustainability, societal trust, social friction, discrimination, prejudices / attitudes, stigmatization, public debate, democratic participation, organizational and political participation, social networks
- Primarily benefit for individuals
- No estimates available linked to UD

Factors, cont’d

Dark figures

- 75% of blind employees need help from co-workers to solve work tasks (Halbach & Tunold, 2020)
- Many with a vision or hearing impairment experience inaccessible information and ticketing systems and feel limited in their freedom to travel (Halbach & Fuglerud, 2023)
- Assistants in spare time may release energi for work (Skogseth, 2022)
- ..