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New Practices: Promoting the Role of ICT in the Shared Space of Transition

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Abstract Making the transition from class to class, primary to secondary education, high school to college, two-year to four-year college, college to graduate school, and from higher education to employment can be challenging for all students, but is particularly challenging for students with disabilities who face additional challenges such as accessing physical environments, technology, learning and employment procedures and services. Not adequately addressing these issues can lead to slower academic progress, poorer academic attainment and problems securing employment. Information and Communication Technologies (ICTs) may have the

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potential to improve the situation and also to introduce further risks of exclusion. This chapter considers elements for effective transitions for disabled students by examining examples from Canada, Germany, Israel and USA and the particular role of ICT in transitions.

Keywords ICT • Disability • School • College • Higher education • Employment • Transition

WHAT MAKES A SUCCESSFUL TRANSITION PROGRAM?

Successful transition programs appear to have some common components. Because teachers and parents are less involved in day-to-day decisions as a student transitions to higher education (HE), self-determination and self-advocacy are considered essential skills (Asselin, 2014). A systematic review of 18 studies to understand the best practices and components of HE transition programs found that all of them reported an improvement in at least one of the following: college enrollment, self-determination, self-confidence, social and vocational self-efficacy, autonomy, social support, career exploration, and transition skills. The higher transition programs themselves varied in duration, number of sessions and delivery format, including curriculum-based, online, residential experience and mentoring (Lindsay et al., 2018).

Although transition strategies originate in the secondary school system, often as a component of government mandated individualized educational plans, it appears that the responsibility for supporting the transition once a student leaves secondary school rests with the HE institution, often with the office for students with disabilities taking the lead. Some institutions may offer transition support because they understand that students with disabilities face a variety of challenges upon entering HE and are concerned both with the well-being of their students and their retention rates. Some institutions, however, offer minimal transition support because they do not consider it to be within their responsibility. One drawback of having transition support within the disability services office is that upon leaving secondary education, it has been estimated that 50% or less of students with disabilities choose to disclose their disabilities to the HE institution (Fichten et al., 2016, 2018). Thus, they do not participate in any transition

activities offered by the disability services office at their institution. Based on their findings, Garrison-Wade and Lehmann (2009) concluded that what was needed for effective transition was high quality preparation in HE planning before entering college as well as ongoing communication between the secondary school and HE institution. Such communication between secondary and HE institutions is uncommon, at least in the USA and Canada, and probably elsewhere (NEADS, 2012).

The Role of ICT in Successful Transition

Information and communication technology (ICT) can be the modality through which a transition program is delivered. However, such ICT-delivered transitions programs are not always designed to be accessible to individuals with disabilities. This can create barriers for certain students without prerequisite computer skills or access to assistive technology (AT). Although some college students with disabilities may require specific AT to access mainstream technology, general use computer technology is omnipresent in the educational environment and in today's digital society. For these very reasons, mastery of both AT and broader computer skills should be integrated into a transition program (Madaus, Banerjee, & Merchant, 2011).

Accessibility to ICT provided to all students is clearly a responsibility of the institutions. AT can be owned by institutions, individuals or third parties. The fact that so many levels are involved in the implementation of ICT and AT (e.g., institutions are responsible for their ICT infrastructure, departments for the setup of educational ICT platforms, services for disabled students for AT, educators for content) can make the transfer to a new setting particularly difficult. It may even be necessary to adapt existing ICT/AT or to purchase new AT. User and institutional experience from the previous setting should be taken into consideration, requirements for the new phase must be identified, measures including ICT infrastructure and AT have to be defined, and funding must be secured. It is obvious that time plays an important role in this context: if a transition is not well coordinated to allow for timely provision of the necessary adaptations and updates a student may fall behind in class, and in a worst-case scenario may need to redo one or more trimesters or semesters. To avoid such a situation gives all the more reason for campuses to design their ICT to be accessible to students with disabilities and to have commonly used AT and support staff readily on hand.

INTERNATIONAL EXAMPLES OF TRANSITION PRACTICE INVOLVING ICT

The following cases from four countries highlight different aspects of transitions with a particular emphasis on ICT. Each case reflects practice from the respective country and elaborates on critical issues. Although the contexts and legal situations in the countries are different, cases have been chosen which have the potential for representing good practice for transfer to other contexts.

Evidence-Based and Skills-Building Transition Programs: A US Case Study

For individuals with disabilities in the US key transitions include those from high school to college; two-year to four-year college, college to graduate school, HE to career. Individuals with disabilities face challenges, including those related to ICT, that are common to others but also some that are unique to this group. The root of some specific challenges faced by K-12 (Kindergarten to 12th Grade), HE and employment lies in differences in legislation that apply to each domain. In K-12 settings, every child is assured a free, appropriate education in as integrated setting as possible that includes needed academic adjustments (The Individuals with Disabilities Education Act, IDEA; Section 504 of the Rehabilitation Act of 1973; The Americans with Disabilities Act of 1990 and its 2008 Amendments, ADAA). However, in higher studies and careers, students and employees with disabilities must meet relevant institution, program, and course entrance, graduation, and employment requirements with or without reasonable accommodations that they must request (Section 504; ADAA). Responses to legislation that apply to various levels lead to transition challenges for individuals with disabilities that include diminished support systems after high school; little access to successful role models; inadequate self-advocacy skills; lack of or ineffective accommodations, including access to ICT; and low expectations on the part of people with whom they interact.

Particularly troubling is inadequate access to ICT, both mainstream and AT, because of the important role ICT has to play in supporting independence and productivity with respect to participation in education, careers, family life, community and recreation. One challenge for students at all educational levels is that ICT a student uses at school typically cannot be taken home. Also, the availability of ICT and support varies greatly

from one institution to another. Exemplary practices can be found, but no nationwide or even statewide coordinated programs fully address transition issues with respect to ICT. For example, ICT a student uses at an institution at one level rarely transitions with them to the next. Most efforts for students with disabilities are for securing AT for individuals. Broader efforts toward the procurement, development and use of mainstream ICT that is accessible to individuals with disabilities are increasing nationwide, in part because of lawsuits and civil rights complaints against schools with inaccessible websites, videos, documents and applications software (EDUCAUSE, 2015). Challenges reported by educational entities and employers to make improvements to the accessibility of their ICTs include inadequate expertise of ICT personnel, training and support for stakeholders, and funding. Students with disabilities complain that their schools do not provide AT; they cannot use the school's AT at home; AT prices are high; often AT does not integrate well with mainstream ICT at school; and the design of many websites, videos, online documents; and online courses erect barriers to them. Strategies that hold promise for supporting successful transitions for individuals with disabilities between educational levels and employment include those that undertake efforts that are student-centered and promote self-advocacy skills, engage multiple stakeholders, promote accessible technology design, build on an inclusive culture; use bottom-up and top-down approaches; and address transition issues in ICT policies and practices.

AccessSTEM is a project that aims to increase the participation of people with disabilities in science, technology, engineering and mathematics (STEM). It uses technology as an empowering tool in supporting the success of individuals with disabilities as they succeed in and transition to various educational levels (high school, two-year and four-year college, graduate school) and employment. AccessSTEM began with funding from the US National Science Foundation (NSF) and continues to be hosted by the DO-IT Center at the University of Washington in Seattle, where DO-IT stands for Disabilities, Opportunities, Internetnetworking, and Technology (DO-IT, n.d.-a). AccessSTEM practices are supported by a review of the literature on evidence-based transition support practices for various underrepresented groups in STEM (DO-IT, n.d.-b); ongoing formative evaluation of DO-IT activities; suggestions from practitioners; and input from students with disabilities, parents and other allies. From these sources the following evidence-based practices for AccessSTEM emerged: summer academic enrichment programs; mentor, peer support; academic,

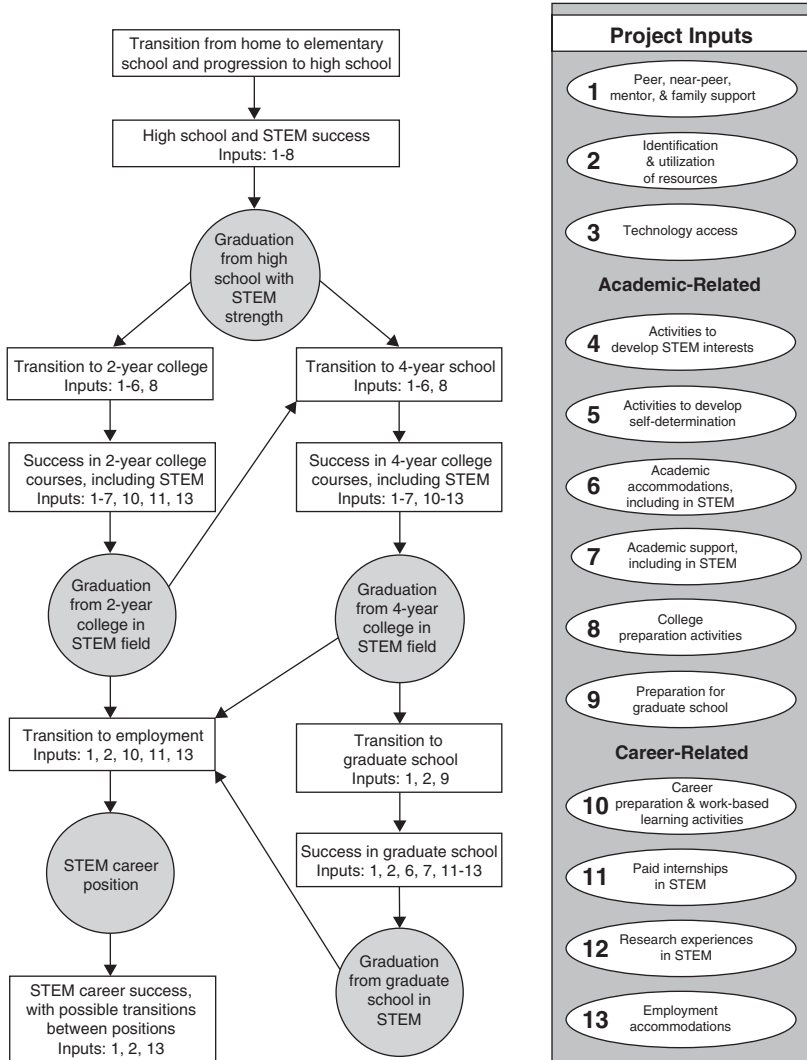
career awareness/advising and networking (e.g., conference attendance); skills-building programs (e.g., ICT use, study skills); work-based learning (e.g., internships) and research experiences. One example of research that informed AccessSTEM is the work of Test et al. (2009) that identified a range of predictors for positive academic and employment transition including: inclusion in general education; paid employment/work experience; independent living skills; student support; career awareness; interagency collaboration; occupational courses; self-advocacy/self-determination; social skills; and community experiences. Arguably, ICT can play a role in all of these areas; online communication can contribute to provide student support, increase career awareness, support interagency collaborations, deliver occupational courses.

One specific program that began under AccessSTEM and was later institutionalized within the DO-IT center with funding from Washington State, is the DO-IT Scholars program. In this program, participants who represent a wide range of disabilities, begin as high school sophomores and continue through college, employment and beyond. They are loaned computers and AT that they may use throughout their engagement in education and employment; for online mentoring and peer support, internships, and so on. AccessSTEM's model for applying evidence-based interventions at critical junctures is presented in Fig. 6.1.

During two summer study programs on the University of Washington (UW) campus, DO-IT Scholars learn independent living, self-determination/advocacy and social skills as they engage in website design, searches for career information, and other computer activities, academic labs and lectures, college and career preparation activities, and field trips. In their third year of engagement, they can participate as interns to assist with the summer study for younger participants. Year round, they engage online with mentor and peer support, which evolves into mostly mentoring for the older participants. They can also participate in on-site meetings for networking and support, engage in individual advising and consultation with staff, participate in leadership opportunities, as well as internships that involve the use of ICT. DO-IT also sponsors a parent support group that engages on-site and online. Long-term, participants in the DO-IT Scholars program advocate for and mentor others, and make efforts to ensure that other programs and employment opportunities are more welcoming and accessible to people with all types of disabilities wherever they may be.

AccessSTEM: Progress of Teens with Disabilities Toward STEM Careers

Project Inputs Leading Students to Critical Junctures



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Fig. 6.1 The AccessSTEM model for applying evidence-based interventions. (Copyright © 2011, Sheryl Burgstahler, University of Washington)

Other examples of promising ICT-related practices DO-IT employs include:

- **Faculty Interaction:** Participants learn strategies for interacting with faculty and then in small groups they introduce themselves to a faculty member (including their disability in functional terms); tell about something they do to make themselves successful, including technology use; and request an accommodation and describe who will do what, including the campus office of disability services;
- **Website Design Training:** Participants receive technical training and develop self-advocacy and employment skills; some are offered part-time employment to practice their skills in making websites of non-profit organizations more accessible;
- **Internships:** Participants engage in summer internships with high tech companies such as Microsoft;
- **ICT Accessibility Reviews:** Participants use a checklist developed by DO-IT (DO-IT, 2019) to review the accessibility of informal STEM museums (e.g., the Microsoft Museum) or other programs and make recommendations for improvements, including for the ICT used to deliver content and activities.

Using multiple evaluation strategies and instruments, students have reported that DO-IT participation helped them prepare for college, employment and independent living; develop ICT, self-advocacy and social skills; experience higher self-esteem; and persevere. They reported that facilitated online communication helps them stay close to friends and family; get answers to specific questions; meet people from around the world; communicate quickly, easily, with many people at one time, and independently without disclosing their disabilities; and further their academic and career interests. Students who participated in work-based learning opportunities reported increased motivation to work toward a career; knowledge about careers and the workplace; job-related skills; ability to work with supervisors and coworkers; and skills in self-advocating for accommodations. In a 2009 external evaluation of DO-IT, SRI International found that the most important things that participants gained from the program are a sense of belonging (both academic and social integration), involvement (in academic and social life), a sense of purpose (through internships, workshops, networking and mentoring) and self-determination skills (development and practice). Other relevant

outcome data has been collected through the AccessSTEM/DO-IT Longitudinal Transition Study (ALTS) that began in 1993. As a group, the 472 participants enrolled in the study are more successful than other students with disabilities. When ALTS data is compared to college-bound respondents in the National Longitudinal Transition Study (NLTS), 96% in ALTS enrolled in college, 31% of NLTS and ALTS respondents are achieving higher levels of high school and college graduation (DO-IT, 2016). Although the precise role of ICT in contributing to their success cannot be measured in this study, ALTS respondents reported that their access to AT increased from 31% to 64% and access to mentors, where most communications occur over the Internet, increased from 55% to 92% as a result of the program. ALTS respondents also rated access to computer technology to be the most valuable intervention, with 74% of the respondents reporting that intervention to be very valuable. Internships and other work-based learning were rated the next most valuable intervention (and for that category ICT use was generally required), followed by college transition workshops/camps, mentoring and career transition workshops/camps.

Transition-Related Skills-Building Delivered Through ICT: A Canadian Case Study

The following section describes issues that impact on the transitions of Canadian students with disabilities, along with a case study describing one province's response through the implementation of online transition programs.

In Canada, it is difficult to consider the context in which individuals with disabilities transition between different levels of education from a national perspective as education is under provincial authority. Additionally, although the Canadian government put forth a bill in July 2018, "The Accessible Canada Act" (Government of Canada, 2018), it has yet to become legislation. Apart from three provinces that have implemented their own disability legislation, all other provinces and territories only have human rights legislation which necessitates that those who believe they have been discriminated against in an educational or work setting prove, on a case-by-case basis, that their rights have been denied. As well, there are the Canadian Human Rights Act (Government of Canada, 1985) and federal employment equity legislation (Government of Canada, 1995) that protect individuals who are employed by the federal government or

private companies that are regulated by the federal government such as banks, transportation and telecommunications companies. These make up only a small percentage of the workforce and undoubtedly, the lack of widely encompassing legislation impacts negatively on the transition from HE to employment.

Compulsory education falls under a different ministry than HE and this can present certain challenges with regards to transition. An example in Quebec is the Ministry of Education's notion of the "at-risk" student. The intent was to ensure that all students experiencing difficulties would be given support, without necessarily being labeled as having "learning difficulties" (Ministère de l'Éducation, du Loisir et du Sport, 2007). Consequently, many of these students arrive at a HE institution without the required documentation for eligibility to services and accommodations, including AT, to which they have been accustomed. The greatest burden falls on students with undiagnosed learning disabilities (LDs), as costly psycho-educational assessments are not covered by government health plans.

Usually students in compulsory education use technology that belongs to the school board, but when starting HE, they must provide their own computers. They can, however, borrow software and apps from their HE institution, which sometimes employs Assistive Technologists who provide guidance and technological training. In some cases, the rehabilitation institutions provide specialized equipment and training for their clientele. For example, the Canadian National Institute for the Blind (2019) offers an intensive summer program designed to provide blind and visually impaired students with skills needed for transition to college or university, including training on technological aids. Unfortunately, the AT provided by rehabilitation centers does not always match the needs of the student as they transition into more advanced levels of education (e.g., specific apps for mobile devices).

With regards to transition from HE to employment, government programs exist that provide incentives for employers to hire persons with disabilities and offer tax deductions for those who modify their workplace and purchase specialized equipment. Despite such initiatives, a study by Zarifa, Walters and Seward (2015) noted that young Canadians with disabilities continue to face barriers related to employer attitudes around disability. This may be due in part to the fact that only recently have large numbers of these graduates with disabilities been seeking employment. While enhancing government programs and strengthening legislation is

essential, graduates with disabilities will still face challenges. Participants of a study examining the employment experiences of recent graduates (Gillies, 2012) mentioned that while accessibility center staff gave them informal advice, they felt their institutions could have provided more formal transitional support to address specific issues regarding disclosure and accommodations. Recently many HE institutions have been preoccupied with arranging accommodations, including AT, in order for students to complete required internships and work-study programs. Hopefully, some of the advances made will be transferrable to regular employment.

As significant geographical disparities exist with respect to institutional and government policies and practices around accessibility and inclusion in education and employment, it is difficult to make generalized comments about the strengths and weaknesses of transition approaches in Canada. The primary objective of the report entitled “Landscape of Accessibility and Accommodation in Post-Secondary Education for Students with Disabilities” was to inform the government on the development of a new federal disability act (NEADS, 2018). Some conclusions from this document can readily be applied to transition issues. It was noted that legislation, policies, practices and guidelines need to recognize the interaction over time among disability, technology, and the learning and workplace environments. It was also stated that accessibility and inclusion in the HE environment are lagging behind technological advances because the focus remains on specialized assistive solutions, as opposed to mainstream technological solutions. In other words, transition programs at all levels should place a greater emphasis on mainstream technology.

Ontario has addressed some of the challenges for students transitioning to HE institutions by developing two primarily, web-based transition programs: On-Line to Success (OLTS) and Successful Transition Online and Mentoring Program (STOMP) (Queen’s University, n.d.). OLTS is for students diagnosed with learning disabilities (LD), attention deficit hyperactivity disorder (ADHD) or autism spectrum disorder (ASD), whereas STOMP is for students with diagnosed or self-identified mental health disorders. OLTS was developed based on recommendations made by Ontario’s five-year pilot project, Learning Opportunities Task Force (LOFT), which concluded that students must have training in the best AT available for their specific disability (Nichols, Harrison, McCloskey, & Weintraub, 2002).

To participate, students must have an email address and daily access to a computer and the internet because the major component of either program consists of a web-based, eight-week course completed online over

several months. Students are also required to attend in-person opening and final day sessions. The OLTS program was initially offered in-person during the summer time but it was difficult to recruit students as those with LD often find school challenging and may be reluctant to spend their summer in an academic setting. For some students, including those with neurological and mental health disorders, the online platform allows more readily for self-disclosure. In addition, since HE institutions are offering more online courses, completing these programs helps students prepare for this approach to course delivery.

One goal for the opening day is to teach students how to access the online course, submit assignments, post to the discussion board and contact the moderator when they need assistance. Each student receives feedback online and learns how to read and respond to it. Students in the OLTS program take part in an AT workshop to learn about programs such as Microsoft OneNote and Livescribe, as well as various apps such as Google Keep. STOMP students take part in a different workshop regarding various organizational and wellness apps. In both online programs, students are introduced to Google Read and Write which they can then use to complete their transition program assignments.

The blended online and in-person delivery of the OLTS and STOMP programs is noteworthy as the online aspect can be convenient and flexible for students (Heiman, Olenik-Shemesh, Kaspi-Tsahor, & Regev-Nevo, 2018) and may be less costly for all involved. In turn, the in-person component provides a better environment for fostering social support. A potential economic barrier may be the purchase of computer and internet services if these are not already available to the student.

Law-Based, Third-Party Support: A German Case Study

The case study from Germany concentrates on the transition from education to work. As labor is considered a very crucial element for participation, the German law provides instruments, players and financing for the transition to the labor market. This includes technical and financial support for workplace adaptations including ICT.

In the German context, a complex legally based set of instruments supports people with disabilities with regards to education and employment. Further assistance is implemented in the social legislation (Code of social law—SGB) for medical support, care, livelihood and so on. Most of the individual AT is paid by the statutory health insurance (SGB V) and

workplace-related technology via SGB IX. In this context, money is not the predominant problem although economic efficiency is always required. Instead, a big issue is the readiness of institutions and members of faculty and staff to address the requirements of people with disabilities. Access to infrastructures such as buildings, facilities, digital networks, ICT and so on is an issue which is still not proactively addressed through barrier free access and universal design. New educational ICT services are seldom fully accessible. Institutions tend to purchase the most recent high-end solutions without consideration of accessibility issues. This can lead to ICT infrastructures providing a lot of inaccessible elements. Unfortunately, necessary post hoc improvements are often not possible or are ineffective and expensive. Even if the ICT infrastructure is basically accessible, educational procedures, tools and materials still need to be adapted. Administrators, teachers and staff need to be informed and trained appropriately. Here, working time seems to provide a narrow bottleneck.

When it comes to the labor market the readiness of companies to hire people with disabilities needs to increase along with barrier free accessibility of company ICT and built infrastructures. For individuals with disabilities it can become difficult to find out who is responsible to support them in the transition processes. Here, the website “Einfach Teilhaben” with the sections on education and labor provides a good starting point.¹

It is important to initiate and prepare transition early, because it can take much time until the necessary decisions are made and measures are implemented in practice. Otherwise, starting the job without having the necessary ICT, AT and workplace adaptation ready and operational can be a consequence. A certain danger exists that parents, advisors, educational institutions and companies take decisions (on behalf of the person with a disability) and the self-determination of the individual becomes limited. To this end, peer initiatives of people with disabilities and disability organizations play a vital role for empowering people. Good case examples, experience of similar situations, judicial support, peer groups (PGs) are important elements.

In Germany, third-party agencies play an important role in supporting transition to work. Transitions can be supported by the organization a person is leaving (LO) or heading to (TO). For university students the LOs and TOs provide support in student services, for example, 57 “Studentenwerke” at German universities or departments of disability and studies of universities.² But third-party organizations which are independent in the process also provide counseling, placements, advice, technical and financial support.

In Germany, social legislation (SGB) plays a strong role in connection to disability and education/labor. Funding for additional demands are provided according to SGB by various schemes (health related, disability related, study related). The statutory health insurance (SGB V) takes care of most of the individual AT during education and employment but is complemented by other schemes. SGB III deals with labor and SGB IX with rehabilitation and disability including workplace adaptation. SGB II and XII address social security issues.³

Two organizations have a legal assignment to support individuals with disabilities (I) on their way to and through the labor market. The “Agentur für Arbeit” (Labour Agency—AA) has to support companies and individuals in the job placement by various services including specific support instruments for the placement of persons with disabilities. “Integrationsämter” (inclusion offices—IOs) have by law the mission to support people with disabilities during their work life (e.g., by workplace accommodation, saving job opportunities). Both institutions also have a mandate and instruments to support the educational institutions or companies. Here, it becomes obvious that the support starts not only at the entrance to the labor market but during previous phases, for example, apprenticeship as skilled worker or university studies. A third organization “Deutsches Studentenwerk” (DSW) supports students during their lives at University. DSW runs services specifically targeting students with disabilities. AA, IO, DSW and universities have regional and local offices for the individual advice and support of individuals, institutions and companies. This is very important as individual solutions can jointly be discussed and elaborated—including financial subsidies. Further support is provided by disability organizations and similar initiatives (peer groups)^{4,5} which is important but not further elaborated in this case presentation. Figure 6.2 shows the service and advice network around the individual. Main support from all parties target the individual with disabilities, but institutions and companies also receive advice and support.

The AA provides several advisory services for people between school, secondary and higher education, the transition to the labor market and development during work life. For people with disabilities, special services complement the general services.⁶ Rehab/disability advisors of the AA provide counseling and assistance for students with disabilities and their schools preparing the transition to next steps in education, practical education (dual system) and the labor market.⁷ For the transition of university graduates to the labor market the ZAV of AA (Zentrale Arbeits- und

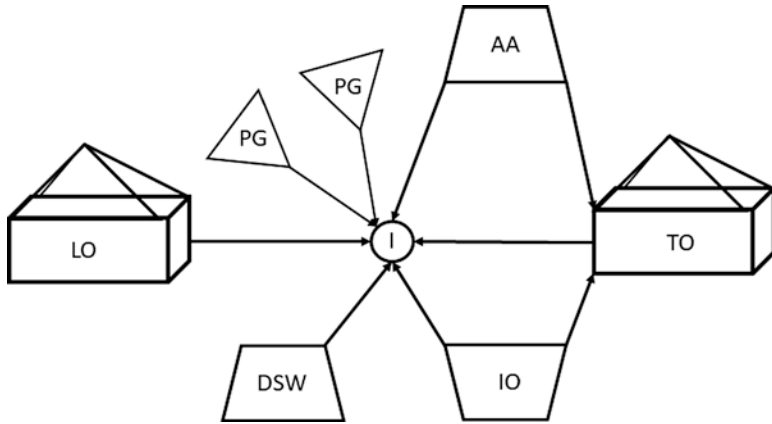


Fig. 6.2 Transition service and advice network in Germany. (Copyright © 2019, Christian Bühler, TU-Dortmund University)

Fachvermittlung der Bundesagentur für Arbeit) runs a central support service. Besides the service for employers, important emphasis is put into the support of the future academic employees. It comprises an overview of the labor market, hints for the application strategy, tips for designing application materials, information on support options and information on open positions.⁸

DSW runs a competence center on studying and disability (IBS), which provides information for (prospective) students and advisors.⁹ One important source of information is the handbook on studies and disability (“Studium und Behinderung”) which presents concentrated information about different support measures.¹⁰

The IO closely supports the final step into the labor market as well as staying in the labor market. The IO provides support instruments including awareness raising, advice, counseling, financing and protection against dismissal. Much of the available finances are gained by a fine which has to be paid by companies which do not employ persons with disabilities. An important element of the IO is the technical advisory service (Technischer Beratungsdienst—TB).¹¹ The advisors of TB support employers, individuals with severe disabilities and local inclusion teams on-site the respective company workplace. They help to identify appropriate workplaces and adapt them according to disability requirements. This includes technical solutions, ICT, AT and necessary training. In case of potential dismissal,

TB also assesses the options for keeping the employment. The primary goal is to allow people with disabilities to do their job independently with the help of all sorts of AT. ICT is playing an increasing role in this context. Employers need to provide accessibility to the company software and networks. The TB gives advice and complements it by individualized suitable sets of ATs. The AT (e.g., screen reader, input devices, communication devices, wheelchairs) and devices based on the individual disability-related requirements (larger displays, mobile computers, air conditioning, adjustable seats and work tables, robots, etc.) are financed by the service. If necessary, work processes are analyzed and organizational measures, assistance or job-related measures can be recommended.¹² A second important element of IO is the Inclusion Service (Integrationsfachdienst—IFD).¹³ It provides assessments, support for career orientation, job search and placements, accompany people with severe disabilities at the workplace (if needed), intervention in case of crisis and psycho-social support and so on. IFD comprises a network throughout Germany with representatives available as local contacts. Concerning ICT, it cooperates closely with TB and has a responsibility to support the transition of persons with disability from school to work.

Providing Support for Different Transition Pathways: An Israeli Case Study

Students with disabilities in Israel face the same social and technical barriers as their peers worldwide, but their transition from high school to employment includes an extra stage: transition to and from mandatory military service:

1. Transition from high school to mandatory military service.
2. Transition from military service to HE.
3. Transition from HE to careers.

With some exceptions (e.g., Psychometric Entrance Test (PET) for HE—see next section) during transitions, students with disabilities may use personal ATs (usually purchased by the National Insurance Institute (NII) as part of their funding) or those provided by the institutions as required by law. Accessibility of construction and services was first regulated in Israel in the “Equal rights act for people with disabilities” law in 1998. In 2005, The “Equal Rights For Persons With Disabilities Law

Amendment No 2” defined accessibility as “the ability to get to a place, move and find one’s way in it, enjoy and make use of the service and information provided in it, use the facilities or participate in the activities there, in an egalitarian, respectful, independent and safe way”. “Accessibility Regulations” were enacted to interpret and add detailed instructions to the law (2013). HE institutions were required to comply with “the Student Rights Law” (2008), creating a revolution by recognizing the right of students with learning disabilities to accommodations in matriculation examinations. In 2015, website accessibility regulations were enacted. Legislation for HE was finally completed in 2016 with the “Regulation of Higher Education Institutions” which required full accessibility starting November 2017.

The continuum of transition from education to HE or employment ceases for Israeli students due to two to three years of compulsory mandatory service, a civil obligation that calls all men and women over the age of 18 to enlist, with few exceptions, including being disabled. Service in the Israel Defense Force (IDF) is considered an important setting for participation and equality and many adolescents with disabilities volunteer to the service that allows them to deal with developmental tasks of forming self-identity, independence and separation from parents (Werner, Katz, Ayalon, Merrick, & Tenenbaum, 2018). The “Intelligence Classification Test” is conducted to determine a military profile and accommodations for people with disabilities include: extra time on tests, exemption from some tests, breaks between tests and more (Shani, 2005). During service, soldiers with disabilities make use of special software or ICTs (e.g., accessibility solutions for the visually impaired such as Right Hear, Zoom Text, screen reader, artificial vision and computer vision technologies, assistive listening devices). These are all provided by the army or by the NII.

Transition to HE in most academic programs requires high achievements in the matriculation exams (Bagrut) and in the Psychometric Entrance Test that covers three areas: mathematics, verbal reasoning and the English language (the PET is equivalent to the SAT in USA). Accommodations throughout high school and in matriculation examinations (Bagrut) include: extra time, ignoring spelling errors, text enlargement, using an electronic dictionary, testing by listening to a recorded examination (via MP, disc or the computer) or typing answers (via the computer). However, for the matriculation examinations, ICT use is subject to special approval of professional Ministry of Education committees.

Accommodations in the Psychometric Entrance Test are authorized by the Israeli National Institute for Testing and Evaluation (NITE) and may not be the same as in matriculation exams.¹⁴ The Special Test Accommodations Unit at the NITE provide, “to as great an extent as possible, test conditions that will allow examinees to overcome difficulties stemming from their disabilities without jeopardizing the test’s validity”. Accommodations are given to people with: general medical or physical disabilities or issues; visual impairment; hearing impairment; mental health issues; severe learning disability during their early years of school and severe attention deficit during early years of school. Accommodations are not given to examinees with test anxiety or any problem related to their environment, such as a lack of schooling. Since unlike the Bagrut, the PET is assessing different aspects related to the efficiency of cognitive processing, allotting extra time is not approved for applicants whose main issue is slowness in processing information. Accommodations are given separately for each part, and do not enable the use of custom technologies of the examinee or ICTs provided by the examination center in most parts.

PET scores are heavily weighed for university admissions and therefore constitute a major barrier for young people with disabilities. This problem does not exist in some of the colleges that accept students based on matriculation grades only. Those who are accepted, may use ICTs during their exams (with prior approval of the Dean of Students), online course materials (as web links and course notes), online tools (collaborative work online and videos), communication tools (chat room and email), social networking (blogs and Twitter), computer technologies used in class (simulations and presentation software—grammar/spelling checkers, dictionaries and English text-to-speech (TTS) software). Some of the ICTs are provided to students by the institutions, in libraries, on course sites and some for individual use during lectures or throughout the semester.

With regard to transition from HE to employment, in Israel, the Prohibition of Discrimination in Employment law (2016) states that “An employer shall not discriminate between his employees or persons seeking employment including among others in hiring (and hiring tests) and training, by reason of their disabilities, provided that they are qualified for the position”. The law mandates that the State shall participate in the cost of all adjustments made by an employer for each employee with disabilities for the following services: initial training for the employer; physical adjustments and accommodation; required equipment (e.g., Braille keyboard, accessible workstation, Zoom Text, screen reader, stand-alone on-screen

virtual mouse); translation and transcription services and compatibility tests & adjustment of job requirements. Understanding the importance of entering the workplace and the joint liability for that transition, higher education institutions expand their collaboration with NITE and together with their “Professional Career Unit” offer job placement and career counseling services that are provided free of charge to students with disabilities from all universities.

IMPLICATIONS FOR FUTURE RESEARCH AND PRACTICE

In this chapter we have considered elements for effective transitions for disabled students by examining examples from Canada, Germany, Israel and USA and the particular role of information and communication technology in transitions. These examples suggest that good transition practices are evidence based, include ICT skills-building programs which can be delivered face-to-face or online and involve third-party agencies that have a specific role in advising on ICT solutions to transition and support all possible transition pathways. In this section, we will discuss the implications for practice by looking at the similarities and differences in the transition processes and support structures of the different countries. We will also discuss the implications for research by examining the role research might play in evaluating the outcomes of ICT-related transition programs.

In examining the four case studies, it is apparent that similarities and differences exist in the transition process from compulsory education to HE and from HE to employment across the countries. These can provide meaningful direction for future practice. In certain countries, such as Canada, the mainstream and specialist technologies used by students do not belong to them but to their educational institutions. In other countries most AT is the property of the individual, but mainstream technologies and particular AT is provided and owned by the institution. Therefore, some but not all equipment can be taken along when transitioning. Frequently, this results in a long delay in the funding and purchasing of the needed personal equipment and software. Furthermore, different AT is often needed after transition to a new ICT environment for education or work. Regardless of how the new technology is acquired, most students need a period of training and adjustment. Any resulting delay can cause a student to fall behind in their studies or on the job. An example of an effective practice to solve the above challenges is the DO-IT Scholars program which lends computers and AT that students may use throughout

education and employment as participants in their program (DO-IT, undated). One concrete suggestion is to consider the benefits of a case management approach in which the ICT needs of individuals with disabilities, regardless of their level of schooling or employment, are coordinated by one single agency. If the equipment is provided based on a long-term loan, and if changing needs are anticipated far enough in advance, timely upgrading of ICTs should be feasible. In conjunction with the case management approach, educational institutions and companies would still need to buy accessible products, provide accessible ICT platforms, develop accessible websites and keep their staff up to date on accessibility matters. A second concrete suggestion is to establish the position of an “accessibility agent” as has been done in Israel.

The role of legislation took a primary place in the case discussions of Germany and Israel, and to a lesser extent in those of USA and Canada. This may be because laws provide the framework for what must be done to achieve full inclusion of individuals with disabilities in all aspects of life. Difficulties arise when existing legislation is specific to one educational level or to employment. In Germany social legislation plays a strong role in connecting disability, education and labor, resulting in a comprehensive model of transition support. Strong national disability legislation, including fines for non-compliance, covering all sectors of education and employment under one law, would serve to mitigate certain transition barriers within other countries. Without doubt, the legislation would need to address ICT accessibility requirements.

The case studies of USA and Canada focused on two models of a transition program and some lessons can be learned from reviewing these. Essential ingredients appear to be the development of self-advocacy and self-determination skills, along with the acquisition of strong skills in the use of ICTs. Not all students have access to such programs and not all programs that exist follow through to transition from HE to employment. More programs, based on sound research findings (Test et al., 2009) should be developed and the means to fund them must be acquired to allow greater numbers to participate. A blended delivery of in-person and online transition activities, along with online peer and mentorship support, should be considered as one option.

Transition constitutes a shared space between institutions, employers, third-party services and individuals. The transition process has three main challenges: identifying and defining the necessary tasks to be completed, managing the myriad of tasks and determining what level is best placed to

complete which tasks. Once these challenges have been addressed by means of a transition program there needs to be some agreement on measurable outcomes rather than merely anecdotal feedback. To assess efficacy, variables such as the following need to be examined:

- Duration of program (At what point in the student's educational path should the transition plan be implemented?)
- Delivery of program (Should it be in-person, residential, online, blended, asynchronous, other?)
- Description of participants (Who is the program reaching and how many? What about those who opt not to participate?)
- Engagement of stakeholders (How are secondary school staff, parents, rehabilitation centers, government employment agencies, mentors, etc. engaged? Can/should their involvement be expanded?)
- Cost of program (How much does it cost per participant? Who is funding the program? What other sources of funding might be available? Could a similar, but less costly, program be offered that would achieve the same results?)
- Measurable outcomes regarding efficacy of obtaining employment (Does participation in a transition program from education to work increase employment rates, duration the job is maintained, job satisfaction, relationship between education completed and job obtained?).

As the focus of the Disabled students, ICT, post-compulsory education & employment: in search of new solutions International network is to explore the role that ICTs play—or could play—in possibly removing some of the disadvantages that students with disabilities in HE experience, it would be remiss not to explore the place that ICTs have in transition programs. Particularly, the following question could be asked: Do transition programs need to address solely the skills related to the use of AT, the development of mainstream technology skills required by all higher students, or both?

The transition from education to labor is an important step and movement between these sectors can create challenges for many students. Much effort is spent providing good starting positions when one begins a new job. However, employers who have job opportunities and make job offers do not often consider the unique needs of persons with disabilities. Research is needed to find out how employers can be convinced to be more open to employing individuals with disabilities. Can technology sup-

port awareness and matching processes? Negative and positive incentives are among the instruments in the labor market but it remains unclear whether they serve their purpose. In this context, the role of ICT needs to be investigated more closely. In particular the question is: Is a thoroughly prepared transfer of ICT from the educational setting and dedicated adaptation to the new labor setting achievable?

Finally, although Universal Design (UD) (covered in detail in Chap. 4 of this book) provides a foundational framework for many accessibility-related models in HE, it is not clear if this approach has influenced transition practices to date. Reviewing existing transition practices to identify the application of any UD principles could inform future practice. Another avenue of research could be to explore if transition programs offered to all students could be of benefit to students with disabilities, particularly with the addition of disability-specific modules.

CONCLUSIONS

Students with disabilities in many countries face similar, but not identical, conditions that may impede their success. Particular problems arise in the context of transitions, where adequate and timely solutions need to be coordinated. When comparing students with and without disabilities for academic achievement and experiences, differences relate to time constraints, insufficient use of computers and technology, and barriers to social participation of students with disabilities. HE institutions should invest more resources in AT, accessible ICT and training for students with disabilities. It is equally important to qualify and train faculty members in the various uses of ICT and encourage them to help students who have trouble using them. Making computer workstations accessible to students with disabilities is of great importance, as AT can help reduce the barriers they face in the promotion of equal opportunities in HE as well as in employment. To support transition processes and maximize students' success: (1) employees and students at all levels should have access to the AT and the support they need and (2) all ICTs should be accessible to people with disabilities. Legal obligations, government funding and programs like AccessSTEM have the potential to increase the success of individuals with disabilities in HE and careers, using technology as an empowering tool.

NOTES

1. http://www.einfach-teilhabe.de/DE/StdS/Home/stds_node.html
2. <http://www.zhb.tu-dortmund.de/zhb/dobus/de/home/>
3. <https://www.sozialgesetzbuch-sgb.de/>
4. <http://www.behinderung-und-studium.de>
5. <http://www.kombabb-internetportal-nrw.de>
6. <https://www.arbeitsagentur.de/menschen-mit-behinderungen>
7. https://con.arbeitsagentur.de/prod/apok/ct/dam/download/documents/handicap-na-und_ba015353.pdf
8. <https://www3.arbeitsagentur.de/web/content/DE/service/Ueberuns/WeitereDienststellen/ZentraleAuslandsundFachvermittlung/Ueberuns/SchwerbehinderteAkademiker/UnserService/Detail/index.htm?dfContentId=EGOV-CONTENT488317>
9. <https://www.studentenwerke.de/behinderung>
10. <https://www.studentenwerke.de/de/handbuch-studium-behinderung>
11. <https://www.integrationsaemter.de/Technischer-Beratungsdienst/500c221/index.html>
12. https://www.integrationsaemter.de/files/11/TBD_Positionspapier_2017.pdf
13. <https://www.integrationsaemter.de/Integrationsfachdienst/501c/index.html>
14. <https://www.nite.org.il/special-test-accommodations/?lang=en>

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