Digitalisation and digital transformation in Luxemburg

Implications for persons with disabilities

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1 Executive summary

The Government-led digital strategies in Luxembourg are driven by the high importance attributed to digitalisation in the economy. The Luxembourg Government has a clear intention to promote digitalisation and information and communication technologies (ICT) due to their impact on improving economic productivity.[1] The National Ministry of Digitalisation[2] was created in 2018 to steer the digitalisation process and to promote digitalisation in areas that are important for the national economy.[3] The national roadmap for a Strategic Vision for Artificial Intelligence in Luxembourg (2019)[4] supports the goal of becoming one of the most advanced digital societies, establishing a sustainable, data-driven economy and developing digitalisation and artificial intelligence with a human-centred approach.

To achieve digital government goals, the Ministry for Digitalisation has set out four high-priority strategic themes. The objective of the third theme of the strategy, promoting digital inclusion, is to make digital technologies an opportunity for everybody, including people with disabilities.[5]

The strategic importance of an inclusive approach focusing on end-users – citizens with or without specific needs – is also mentioned in the synthesis document of the Ministry of Digitalisation (2019), with reference to the OECD proposals on digital governance.

The Act of 28 May 2019[6] on the accessibility of websites and mobile applications should be emphasised here. The Act obliges public sector bodies to ensure that their websites and mobile applications meet the defined accessibility criteria.

However, hardly any aspects of the inclusion of persons with disabilities or measures to prevent discrimination against persons with disabilities can be identified in supplementary programmes such as the multidisciplinary government initiative called Digital Luxembourg.[7] The latter, for example, does not specifically focus on preventing discrimination against persons with disabilities and hardly any audio-visual or

1 Government of the Grand Duchy of Luxembourg (2019), Intelligence artificielle: une vision stratégique pour le Luxembourg, https://gouvernement.lu/dam-assets/fr/publications/rapport-etude-analyse/minist-digitalisation/Intelligence-artificielle-une-vision-strategique-pour-le-Luxembourg.pdf.

2 Government of the Grand Duchy of Luxembourg, Ministry of Digitalisation (2019), 'La transformation digitale du Luxembourg. Document de synthèse' (The digital transformation of Luxembourg), https://digital.gouvernement.lu/dam-assets/actualites/articles/2019/06-juin/17062019-02-Debat-de-consultation-la-transformation-digitale-du-Luxembourg.pdf.

3 Government of the Grand Duchy of Luxembourg (2019), *The Data-Driven Innovation Strategy for the Development of a Trusted and Sustainable Economy in Luxembourg*, https://gouvernement.lu/fr/publications/rapport-etude-analyse/minist-economie/intelligence-artificielle/data-driven-innovation.html.

4 Government of the Grand Duchy of Luxembourg (2019), AI Luxembourg Strategy, *The Data-Driven Innovation Strategy for the Development of a Trusted and Sustainable Economy in Luxembourg*, https://gouvernement.lu/fr/publications/rapport-etude-analyse/minist-economie/intelligence-artificielle/data-driven-innovation.html.

5 Ministry of Digitalisation, 'Four strategic axes for a common goal', https://digital.gouvernement.lu/en/axes.html.

6 Act of 28 May 2019 on the accessibility of websites and mobile applications of public sector bodies (*Loi du 28 mai 2019 relative à l'accessibilité des sites internet et des applications mobiles des organismes du secteur public*), http://legilux.public.lu/eli/etat/leg/loi/2019/05/28/a373/jo. This Act is a transposition of the European 2016/2012 Directive, https://eur-lex.europa.eu/eli/dir/2016/2102/oj.

7 Digital Luxembourg: see https://digital.gouvernement.lu/en/dossiers.gouvernement%2Ben%2Bdossiers%2B2014%2Bdigital-letzebuerg.html.

telecommunications includes any special measure – beyond what is related to the accessibility of websites and mobile applications; the focus is primarily on economic aspects.

A plan was formulated in 1997 to enable equal living conditions and to allow people with disabilities to participate in social systems on an equal basis with others.[8] From today's perspective, this would include digital services. The first National Action Plan (2012)[9] explicitly aims to ensure universal accessibility, including through broadcast, information, and communication tools, and provides a mechanism for sending alarm signals. In addition, the Government states that an online contact point should be set up for any questions or complaints regarding accessibility.

The second National Action Plan (2019)[10] addresses aspects of digitalisation by urging private bodies to provide (digital) information and services in formats that are accessible to and usable by persons with disabilities. It requires the mass media, including providers of information through the internet, should make their services accessible to persons with disabilities. Awareness should be raised in the media of the need to use information and communication technologies that are accessible to all. Print media and television should be accessible to all persons with disabilities, regardless of the type of disability.

Hardly any information could be found on this, aside from a few anecdotal statements. There are complaints that, in adult education, computer training courses are too difficult and do not use 'easy language', and therefore only a few people with disabilities take part in these courses; however, no figures were cited. No information on accessibility was found here, and accessibility, while a general requirement for websites and mobile applications in Luxembourg, cannot compensate face-to-face education for people with disabilities as it tends to reinforce educational differences.

Currently, the online procedures to register for a coronavirus vaccination appointment are described as inaccessible.[11]

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8 The Minister for the Disabled and the Injured (1997), *Plan d' action en faveur des personnes handicapées* (Action plan for people with disabilities).

9 Government of the Grand Duchy of Luxembourg, Ministry of Family and Integration (2012), *Plan d'Action de mise en œuvre de la CRDPH du Gouvernement luxembourgeois* (First National Action Plan for implementing the CRPD in Luxembourg), http://www.mfi.public.lu/publications/Handicap/PlanActionFR.pdf and http://www.mfi.public.lu/publications/Handicap/AktionsplanDE.pdf. Although these pages are no longer accessible, an abridged version is available at: https://gouvernement.lu/dam-assets/fr/actualites/articles/2016/06-juin/03-cahen-handicap/Plan-d_Action-FR-new.pdf. The full version can be provided by the author on request.

10 Ministry of Family and Integration (2019), *Plan d'action national de mise en oeuvre de la Convention relative aux droits des personnes handicapées 2019-2024* (Second National Action Plan for implementing the CRPD in Luxembourg 2019-2024), https://mfamigr.gouvernement.lu/fr/publications/plan-strategie/handicap.html.

11 The Luxembourg Guichet public asks the 'security question': 'What is the sum of 10 and 8?' before granting access. See https://www.services-publics.lu/login/TAMLoginServlet?TAM_OP=login&USERNAME=unauthenticated&ERROR_CODE=0x00000000&ERROR_TEXT=HPDBA0521I%20%20%20Successful%20completion&METHOD=GET&URL=%2Ffpgsa-fo%2Fjsp%2Factivate_service%3FserviceType%3DMS_RDV_VAC_COVID_GSA%26lang%3DEN&REFERER=https%3A%2F%2Fguichet.public.lu%2Fen%2Fcitoyens%2Fsante-social%2Fcoronavirus%2Fvaccination%2Fvaccination-covid-19.html&HOSTNAME=demarches.services-publics.lu&AUTHNLEVEL=&FAILREASON=&PROTOCOL=https.

Good practices

Many municipalities offer inclusive computer courses for beginners, whether for children, adults, or people with special needs. These range from an introduction to the PC, handling new technologies and using the internet to digital photography and learning basic Windows programs. These low-threshold courses have the potential to reach people with learning disabilities.[12] Neither the announcement of the course offer nor the registration form include any reference to accessibility, however. No indication is given here as to whether the specified room is barrier-free, for example.

There are some programmes on raising awareness of ICT, including concrete recommendations and tips for using digital media in a thoughtful and positive way. These recommendations for parents include guidelines that can be used for children with disabilities.[13] Regarding funding used for digitalisation used for disability inclusiveness or accessibility, it is stated that the courses are subsidised by the Ministry of Education, without clarifying to what extent the subsidies are particularly targeted at accessibility or inclusion of people with disabilities.

The non-profit organisation Digital Inclusion[14] seeks to help everybody in Luxembourg get access to information technology by offering basic courses in the use of digital media and computers in different languages. Even though the programme focuses on refugees and people who have recently arrived in Luxembourg, it offers a specific opportunity for people with disabilities to participate in the online courses.

Recommendations

- Students with (cognitive) disabilities should be taken out of digitalised distance education imposed due to COVID-19 and should be offered face-to-face instruction for as long as possible. Students with cognitive disabilities are more vulnerable to the disadvantages of distance education than students without disabilities.[15]

- With the introduction of computer courses and media instruction, potential dangers and undesirable side effects should be highlighted in a way that can be understood by persons with disabilities.

- With the introduction of digitalised services, an alternative based on human contact should also always be maintained, so that there is freedom of choice between digital and non-digital service offerings.

- Forcing people to use automated services, as can be observed more and more, should be prevented, as these depersonalised services remove the immediate responsive assistance that has sometimes made it possible for persons with

[12] Dudelange: see https://www.dudelange.lu/fr/résidents/enseignement-et-formation-continue/cours-informatiques.

[13] Government of the Grand Duchy of Luxembourg, Ministry of National Education, Childhood and Youth (2020), 'Sensibiliser à l'usage des écrans en famille' (Raising awareness of screen use in the family), https://men.public.lu/lb/grands-dossiers/systeme-educatif/digital-ecran-famille.html.

[14] Digital Inclusion: see http://digital-inclusion.lu.

[15] Students with physical disabilities may suffer as well from a digital learning environment but are not equally vulnerable to the loss of immediate and direct address in a face-to-face learning situation as students with cognitive impairment are. Inclusion in direct and non-digitally restricted instruction should apply to all pupils (with and without disabilities) as a matter of course.

disabilities to use such services. For example, automated voice-activated telephone services are not accessible.

- The introduction and enforcement of a global digital tax, as recently proposed by the new US Administration and endorsed by the G20 2021 summit in Rome, including Luxembourg could usefully fund many disability-related initiatives on inclusion and full participation in society, including in relation to digitalisation.

2 Are government strategies and plans on digitalisation and digital transformation disability-inclusive?

2.1 Disability inclusion in generic strategies on digitalisation and digital transformation

An overview on developments in digitising Luxembourg can be found in the *Monitoring Report on Progress in National Initiatives on Digitising Industry* (2019).[16] However, no statements on the inclusion of persons with disabilities can be found in this report.

In 2013, Luxembourg launched the Digital Luxembourg Initiative,[17] a multidisciplinary Government initiative working with public, private and academic players to harness digitalisation for positive transformation, with the objective of using digital technology as a lever for transformation and modernisation, both for the state and for citizens and businesses. To achieve this goal, the Digital Luxembourg Initiative approaches digitalisation holistically, focusing on five key areas: skills, policy, infrastructure, eco-system and government. In implementing the Luxembourg Government's digitalisation strategy, the Digital Luxembourg Initiative enables new projects, supports existing ones and boosts the visibility of nationwide efforts. The Digital Luxembourg Initiative supports the digitalisation of the national economy and the creation of digital public services, towards a digital government. In 2018 the National Ministry of Digitalisation was created to coordinate the digitalisation of society and to promote digitalisation in areas that are important for the national economy, including artificial intelligence, big data, the blockchain, and the internet of things.[18]

On 24 May 2019, the roadmap for a 'Strategic vision for artificial intelligence in Luxembourg',[19] a data-driven innovation strategy to support the emergence of a trusted and sustainable economy,[20] was presented by the Ministry of State and the Ministry of the Economy, covering the main directions of digitalisation in Luxembourg. Although the roadmap does not explicitly mention disability, it does emphasise inclusiveness and the benefits of digital health in addressing the demographic challenges associated with the ageing of the population and enabling a high quality of life, well-being and personalised care for all citizens.[21]
Overall, Luxembourg's overarching strategies related to digitalisation and digital transformation have continuously evolved, based on the overarching perception that

[16] Valdani Vicari & Associati and Wik Consult (2019), *Monitoring Progress in National Initiatives on Digitising Industry: Country Report: Luxembourg*, https://ec.europa.eu/information_society/newsroom/image/document/2019-32/country_report_-_luxembourg_-_final_2019_0D313894-D5E2-2A2A-9885E6A433245CF5_61215.pdf.

[17] Digital Lëtzebuerg: see https://digital.gouvernement.lu/en/dossiers.gouvernement%2Ben%2Bdossiers%2B2014%2Bdigital-letzebuerg.html.

[18] Ministry of Digitalisation (2019), 'La transformation digitale du Luxembourg', https://digital.gouvernement.lu/dam-assets/actualites/articles/2019/06-juin/17062019-02-Debat-de-consultation-la-transformation-digitale-du-Luxembourg.pdf.

[19] Government of the Grand Duchy of Luxembourg (2019), *Intelligence artificielle*, https://gouvernement.lu/dam-assets/fr/publications/rapport-etude-analyse/minist-digitalisation/Intelligence-artificielle-une-vision-strategique-pour-le-Luxembourg.pdf.

[20] Government of the Grand Duchy of Luxembourg (2019). AI Luxembourg Strategy, https://gouvernement.lu/fr/publications/rapport-etude-analyse/minist-economie/intelligence-artificielle/data-driven-innovation.html.

[21] Government of the Grand Duchy of Luxembourg (2019), *The Data-Driven Innovation Strategy for the Development of a Trusted and Sustainable Economy in Luxembourg*, https://gouvernement.lu/fr/publications/rapport-etude-analyse/minist-economie/intelligence-artificielle/data-driven-innovation.html.

the ICT sector is a priority for Luxembourg's economy. Therefore, successive Governments have decided to continuously invest in the development of IT infrastructure in order for the country to become an internationally leading ICT centre. Aspects of inclusion of persons with disabilities and of provisioning measures regarding discrimination against persons with disabilities can be identified in corresponding programmes in a number of cases.[22]

The inclusion of people with disabilities is mentioned in the Ministry of Digitalisation synthesis document,[23] which specifies a list of objectives with reference to the OECD's Digital Governance proposals.[24] This includes adopting an inclusive approach focused on end-users, i.e. citizens (with or without specific needs) or companies. Furthermore, the need for a strong legal and ethical underpinning for the application of new technologies is emphasised, which can also be interpreted in terms of non-discrimination and equity for people with disabilities. Thus, the Government[25] emphasised, as an objective of promoting digitalisation, that 'it must be ensured that certain population groups (older people, people with disabilities, people without the necessary qualifications or people with limited financial resources) do not become victims of a digital divide in the context of the digitalisation of both public (e.g. in the area of social insurance) and private (e.g. banking) administrative procedures or the digitalisation of their living and working environments'.[26]

Pursuant to the Act of 28 May 2019 on the accessibility of websites and mobile applications, public sector bodies must ensure that their websites and mobile applications meet the four criteria defined by the act, namely: perceivability, operability, understandability and robustness. The law thus aims to improve and facilitate access to the information contained on websites and mobile applications without this being hindered by complex structuring or navigation, language barriers (i.e. support for

[22] Digital Luxembourg: see https://digital.gouvernement.lu/en/dossiers.gouvernement%2Ben%2Bdossiers%2B2014%2Bdigital-letzebuerg.html.

[23] Government of the Grand Duchy of Luxembourg (2019), 'Débat de consultation: La transformation digitale du Luxembourg' (Consultation debate in the Chamber of Deputies: The digital transformation of Luxembourg), https://digital.gouvernement.lu/fr/actualites/article/2019/juin/03-debat-consultation.html.

[24] OECD (2020), *The OECD Digital Government Policy Framework*, https://www.oecd.org/gov/the-oecd-digital-government-policy-framework-f64fed2a-en.htm.

[25] Government of the Grand Duchy of Luxembourg (2019), 'Débat de consultation: La transformation digitale du Luxembourg', p. 36: 'Il s'agit de s'assurer que certaines populations (personnes âgées, personnes ayant un handicap, personnes n'ayant pas les compétences requises ou personnes à ressources financières limitées) ne deviennent pas victimes d'une cassure digitale dans le cadre de la numérisation des démarches administratives publiques (p.ex. dématérialisation dans le domaine de la sécurité sociale) et privées (p.ex. opérations bancaires), ainsi que de la digitalisation de notre monde du travail et de la société en général.' (It should be ensured that certain populations (elderly people, people with a disability, people without the necessary skills and people with limited financial resources) do not become victims of a digital divide in the context of the digitisation of public (e.g. dematerialisation in the field of social security) and private (e.g. banking) administrative procedures, as well as the digitalisation of our world of work and of society in general), https://digital.gouvernement.lu/fr/actualites/article/2019/juin/03-debat-consultation.html.

[26] 'Luxembourg's grand plan for an advanced digital society, *Financial Times Online*, 16 February 2021, https://www.ft.com/content/40f1eb0e-6de7-4f46-a423-5fe6facf8282.

multiple national languages),[27] hearing or sight loss or other physical or mental disabilities.[28]

The Government offers state aid schemes, initiatives and programmes including national funding to support digital innovations, as desired by Luxembourg companies. Some examples are set out below.

- *Fit4Digital* aims to stimulate and strengthen the country's position in ICT by helping SMEs to benefit more from digital technologies through combining and offering public support and IT/business expertise;[29]
- *Fit4Innovation* is a programme subsidised by the Ministry of the Economy that helps small to medium-sized businesses to identify opportunities for innovation and increase customer satisfaction;[30]
- *E-Handwierk* supports the digital transition and development of enterprises affiliated to the Chamber of Crafts (Chambre des métiers) and consists of four main axes: awareness, information, guidance and advice/guidance;[31]
- *GoDigital* promotes and supports the digital transition among SMEs and enables them to make the best use of the opportunities offered by digital technolog;[32]
- *FutureSkills* aims at strengthening the digital (and other) skills of unemployed persons;[33]

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[27] The aspect of language barriers is mentioned in comments and interpretations of the act (Act of 28.05.2019) but has not been included *expessis verbis* in the act. See https://www.cc.lu/uploads/tx_userccavis/5142_PL_Organismes_publics_-_accessibilite_des_sites_internet_et_des_applications_mobiles__PL_5142CCL.pdf; Government of the Grand Duchy of Luxembourg (2019), 'Débat de consultation: La transformation digitale du Luxembourg', p. 22: 'Par la loi du 28 mai 2019 relative à l'accessibilité des sites internet et des applications mobiles des organismes du secteur public, les organismes du secteur public doivent veiller à ce que leurs sites Internet et applications mobiles répondent aux quatre critères définis par la loi, à savoir : perceptibilité, opérabilité, compréhensibilité et solidité. La loi vise ainsi à améliorer et faciliter l'accès aux informations contenues sur les sites Internet et dans les applications mobiles sans qu'une structuration ou navigation trop complexe, une barrière de langue, une perte d'audition ou de vue ainsi que d'autres incapacités physiques ou morales n'entravent cette accessibilité. La directive a donc un caractère universel avec des répercussions positives pour chaque utilisateur, surtout, mais non exclusivement, pour les personnes en situation d'handicap.' (Under the Act of 28 May 2019 on the accessibility of websites and mobile applications of public sector bodies, public sector bodies must ensure that their websites and mobile applications meet the four criteria defined by the Act, namely: *perceptibility*, *operability*, *comprehensibility* and *robustness.* The law thus aims to improve and facilitate access to the information contained on websites and mobile applications without this being hindered by complex structuring or navigation, *language barriers*, hearing or sight loss or other physical or mental disabilities. The directive is therefore universal in character with positive implications for every user, especially, but not exclusively, for people with disabilities.) Emphases added by the author. See https://digital.gouvernement.lu/dam-assets/actualites/articles/2019/06-juin/17062019-02-Debat-de-consultation-la-transformation-digitale-du-Luxembourg.pdf.

[28] Act of 28 May 2019 on the accessibility of websites and mobile applications of public sector bodies, http://legilux.public.lu/eli/etat/leg/loi/2019/05/28/a373/jo.

[29] Luxinnonvation (2022), Fit 4 Digital: Programmes to support the digitalisation of Luxembourg companies, https://www.luxinnovation.lu/innovate-in-luxembourg/performance-programmes/fit-4-digital/.

[30] Luxinnonvation (2022) Fit 4 Innovation, https://www.luxinnovation.lu/innovate-in-luxembourg/performance-programmes/fit-4-innovation/.

[31] Chamber of Crafts (2022), eHandwierk, https://www.cdm.lu/news/fiche/newsnew/news/nouveau-service-ehandwierk.

[32] Government of the Grand Duchy of Luxembourg (2022), Go-digital, https://digital-luxembourg.public.lu/initiatives/go-digital.

[33] Agency for the development of employment (ADEM 2020): see https://www.digitalcoalition.lu/index.php/2020/10/07/adem-launches-the-futureskills-initiative/.

- *Formation Start & Cod;.*[34]
- as instruments to implement the above-mentioned strategies, including aspects such as accessibility, these programmes present an explicit aspect of disability inclusion. The effectiveness of these programmes on the inclusion of people with disabilities has yet to be assessed, however;
- in none of the above-mentioned references could any evidence of the direct involvement of persons with disabilities in the development and implementation of the strategy be found. However, the Ministry of Digitalisation synthesis document,[35] which contains a section on accessibility for people with disabilities, has been subject to a consultation with the Parliament.

2.2 Disability inclusion in focused or sector-specific strategies on digitalisation and digital transformation

Since the introduction of the UN Convention on the Rights of Persons with Disabilities (CRPD)[36] in Luxembourg made inclusion a general guiding principle, hardly any measures are explicitly formulated in terms of disability. However, terms such as 'for all' or 'accessible' and similar formulations do not always make evident whether people with various disabilities are also considered here. The current goal of education is seen as the creation of 'a school for all'. In certain individual cases, however, education in a special school is seen as an appropriate alternative to promote the development of the pupil.[37] It seems sometimes to be a matter of inclusion rhetoric that, on closer analysis, is not really inclusive after all.[38]

Education

The Luxembourg education system already embraces strategies on digitalisation and digital transformation in relation to online learning and ICT, especially in the context of the recent COVID-19 pandemic, but hardly any particular focus on pupils with disabilities could be identified.[39] [40]

[34] These programmes are mentioned in the report without going into more detail about their contents. Government of the Grand Duchy of Luxembourg (2019), 'Débat de consultation: La transformation digitale du Luxembourg', p. 41, https://digital.gouvernement.lu/fr/actualites/article/2019/juin/03-debat-consultation.html; OECD (2020), *The OECD Digital Government Policy Framework*, https://www.oecd.org/gov/the-oecd-digital-government-policy-framework-f64fed2a-en.htm.

[35] Government of the Grand Duchy of Luxembourg (2019), 'Débat de consultation: La transformation digitale du Luxembourg', https://digital.gouvernement.lu/fr/actualites/article/2019/juin/03-debat-consultation.html.

[36] Convention on the Rights of Persons with Disabilities, New York, 13 December 2006, http://legilux.public.lu/eli/etat/leg/div/2016/08/08/n6/jo.

[37] Une école pour tous (A School for all): see https://men.public.lu/fr/publications/dossiers-presse/2016-2017/une-ecole-pour-tous.html.

[38] Limbach-Reich, A. (2021), 'Social work caught in the inclusion trap. Terminological indeterminacy, ethical claim and neoliberal turn' in: Bütow, B., Holztrattner, M., and Raithelhuber, E. (eds.), *(Dis-) Organization and (De-)Institutionalization in Social Work and Social Pedagogy*, Weinheim, Budrich, pp. 125-149.

[39] Digital Luxembourg, 'education gets a boost from digital learning resources', https://digital-luxembourg.public.lu/stories/education-gets-boost-digital-learning-resources.

[40] Ministry of Digitalisation (2019), 'Débat de Consultation: La transformation digitale du Luxembourg', https://digital.gouvernement.lu/dam-assets/actualites/articles/2019/06-juin/17062019-02-Debat-de-consultation-la-transformation-digitale-du-Luxembourg.pdf.

The national framework plan on non-formal education (2018)[41] stipulates that digital media should be pedagogically treated as an integral part of children's everyday life in the form of media offer that is appropriate for individuals.[42] Furthermore, since non-formal education institutions (*Maisons Relais*, or 'relay houses') are obliged to offer inclusive pedagogy at the same time, the design of inclusive learning arrangements and pedagogical offers in the context of digitalisation and digital media is required. However, no information is available on what this looks like in practice.

The 'Bee creative for kids – a maker's approach to science'[43] programme uses a non-formal education toolset to promote the creative and scientific use of ICT tools and the development of digital and scientific skills among children aged 6 to 12. The project is run by the National Youth Service (SNJ)[44] and the Service de Coordination de la Recherche et de *l'Innovation Pédagogiques et Technologiques* (SCRIPT),[45] and is supported by the Luxembourg Institute for Science and Technology (LIST).[46] This programme does not have a disability inclusiveness aspect.

With the transformation of the former special school system (*éducation différenciée*) into a system of centres of competence in 2018, the aim now is to develop an inclusive school system, so that the following approaches to digitalisation also cover pupils with special educational needs. The 2011 school legislation on special needs accommodations provides for the use of assistive technologies (*des aides technologiques*) without going into more detail about digital accessibility and technologies.[47]

As part of the national digitalisation strategy, schools in general are supposed to prepare children for a future in which digitalisation plays a central role (particularly in employment and the labour market) through a series of measures such as:

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41 Nationaler Rahmenplan zur non-formalen Bildung im Kindes- und Jugendalter, https://www.enfancejeunesse.lu/wp-content/uploads/2018/02/Rahmenplan_DE_Web.pdf.

42 'Pädagoginnen und Pädagogen sind sensibel für die Bedeutung (digitaler) Medien im Leben von Schulkindern und verfügen selbst über Medienkompetenz. Sie reflektieren ihre eigene Haltung gegenüber neuen Medien und dem Medienverhalten der Kinder, beziehen Position und sind bereit, die Interessen der Kinder aufzugreifen und für Bildungsprozesse zu nutzen.' (Educators are sensitive to the importance of (digital) media in the everyday life of pupils and are skilled in media competence. They reflect on their own attitude towards new media and the children's media behaviour, take a stand and are prepared to take up the children's interests and use this for educational processes.), Nationaler Rahmenplan zur non-formalen Bildung im Kindes- und Jugendalter (2018, 57), https://www.enfancejeunesse.lu/fr/wp-content/uploads/2018/02/Rahmenplan_DE_Web.
This statement refers to a publication by Marci-Boehcke, Gudrun (2011), *Medienkompetente Erzieherinnen. Kindergarten heute*, 2/11, 41, 8-15, and to the research-project of Rainer Strätz, Claudia Hermes, Ragnhild Fuchs, Karin Kleinen, Gabriele Nordt and Petra Wiedemann (2008), *Qualität für Schulkinder in Tageseinrichtungen und Offenen Ganztagesgrundschulen (QUAST) – ein nationaler Kriterienkatalog*, Mannheim, Cornelsen.

43 Bee creative for Kids: see https://www.bee-creative.lu.

44 National Youth Service-SNJ (Service national de la jeunesse): see https://www.snj.public.lu.

45 SCRIPT, the Department for the Coordination of Educational and Technological Research and Innovation: see https://www.script.lu/fr.

46 The Luxembourg Institute of Science and Technology (LIST Homepage) 2022: see https://www.list.lu.

47 Act of 15 July 2011 on access to educational and professional qualifications for pupils with special educational needs (*Loi du 15 juillet 2011 visant l'accès aux qualifications scolaires et professionnelles des élèves à besoins éducatifs particuliers*), http://legilux.public.lu/eli/etat/leg/loi/2011/07/15/n1/jo.

- Education in and through the media: the *Medienkompass*;[48]
- An introduction to coding: understanding how machines 'think' and how they react, how to program them and how to communicate with them (all classes in basic education and in secondary education computer sciences will gradually be incorporated into the timetables of all classes);[49]
- Raising awareness of screen use: to use screens sensibly (smartphone, computer, tablet, TV, video games, etc.). A guide for parents with concrete recommendations and tips for organising their own and their children's use of digital media in a thoughtful and positive way;[50]

The proposed digital skills education programme contains various training courses for children and young people, such as:[51]

- *Code Club*: a voluntary initiative, founded in 2012 for children aged 9 to 13 to develop coding skills through free after-school clubs;
- *KidsLifeSkills*: a programme on teaching these skills to children in a fun and engaging way to help prepare them for the challenges and opportunities in their future;
- *CodeStart*: a two-week programme for adolescents and young adults aged 18 to 29 on developing webpages and digitalisation skills with a view to later employment;
- *Future Hub*: a label of excellence that values and highlights a high school's efforts to embrace technologies and innovative science learning, particularly in computer science.

No explicit reference to children and youth with disabilities is highlighted. However, the current trend in Luxembourg is characterised by a progressive shift from institutionalised special education towards mainstream education for children with disabilities. This trend is boosted by the Law of 20 July 2018 on the creation of public competence centres for specialised psycho-pedagogy to favour school inclusion. Therefore, it can still be assumed that the programmes are appropriate for students with disabilities. They cover not only technological skills but also human and cognitive skills, which will enable future adults to evolve in a hyper-digitalised environment successfully and safely.[52]

Health

Luxembourg made the strategic choice in 2008, through its Science & Health Technologies Action Plan, to build on the considerable potential offered by

[48] 'Un cadre général pour l'éducation aux et par les médias : le Medienkompass' (A general framework for media education: Medienkompass), https://men.public.lu/lb/grands-dossiers/systeme-educatif/digital-medienkompass.html.

[49] 'L'introduction du coding à l'école' (The introduction of coding in schools), https://men.public.lu/lb/grands-dossiers/systeme-educatif/digital-coding.html.

[50] 'Sensibiliser à l'usage des écrans en famille' (Raising awareness of screen use in the family), https://men.public.lu/lb/grands-dossiers/systeme-educatif/digital-ecran-famille.html.

[51] DigitalCoalition: see https://www.digitalcoalition.lu/index.php/digital-skills-in-education/.

[52] The 'Einfach digital – Zukunftskompetenze fir staark Kanner' project (simply digital - future skills for strong children), which was officially launched on 6 February 2020, aims to strengthen 21st century skills in schools and childcare facilities. See https://men.public.lu/lb/grands-dossiers/systeme-educatif/digital.html.

biotechnologies and biomedicine in terms of industrial development to diversify its economy.[53] [54] [55]

The data-driven innovation strategy to support the emergence of a trusted and sustainable economy, launched on 24 May 2019, emphasises the benefits of digital health for addressing the demographic challenges associated with the ageing of the population and enabling high quality of life, well-being and personalised care for all citizens. The Government has prioritised investments over the last 10 years in biomedical public research to set up the research foundations needed for the implementation of personalised medicine in Luxembourg, including in areas relevant to people with disabilities, such as the National Centre for Excellence in Research on Parkinson's Disease (NCER-PD).[56]

In addition, the Luxembourg Administration created the national eHealth Agency, the Agence eSanté,[57] in 2011, based on the health reform implemented in 2010.[58] In October 2019, under the coordination of eSanté, development of the national eHealth strategy was initiated (work still in progress) 'to bring together the input of the various health stakeholders and to consolidate a coherent and efficient eHealth strategy by creating synergy with already existing initiatives and aiming to deploy the various use cases on a large scale'.[59]

The eSanté agency is also responsible for setting up and maintaining a digital health platform. eSanté has defined a national strategy on the interoperability of health information systems, which will enable the various health systems to interact smoothly.[60] [61] The system for maintaining electronic versions of each patient's file was launched in January 2020. All the patient's medical data will be stored in this file: antecedents, prescriptions, allergies and even X-rays and MRI scans in order to avoid double analyses, but above all to provide the doctor with better information about the patient's past. Laboratory analyses will be saved and consulted via this new platform. Diagnoses in the context of disability, such as IQ test results, are not mentioned here, but it can be assumed that such documents will also be included. If the file is not activated by its owner, it will be activated automatically within 30 days. It is the patient

53 Dr Anna Chioti / Directorate of Health Luxembourg, 'Towards the agency for medicines and health products in Luxembourg?'. *APL Pharma Luxembourg*, 6 November 2019, https://www.apl-pharma.lu/docs/2ql4ww/text/2019-11-06-apl-pharma.pptx.

54 Government of the Grand Duchy of Luxembourg (2019), Intelligence artificielle, https://gouvernement.lu/dam-assets/fr/publications/rapport-etude-analyse/minist-digitalisation/Intelligence-artificielle-une-vision-strategique-pour-le-Luxembourg.pdf.

55 Ministry of Digitalisation (2019), 'La transformation digitale du Luxembourg', https://digital.gouvernement.lu/dam-assets/actualites/articles/2019/06-juin/17062019-02-Debat-de-consultation-la-transformation-digitale-du-Luxembourg.pdf.

56 National Centre for Excellence in Research on Parkinson's Disease. See https://parkinson.lu.

57 eSanté Agency Luxembourg (Agence eSanté Luxembourg): see https://gouvernement.lu/dam-assets/fr/actualites/articles/2013/09-septembre/17-di-barto-esante/eSante.pdf.

58 Law of 17 December 2010 on the reform of the health care system (*Loi du 17 décembre 2010 portant réforme du système de soins de santé*), http://legilux.public.lu/eli/etat/leg/loi/2010/12/17/n12/jo.

59 Government of the Grand Duchy of Luxembourg, Ministry of Health, activity report (2019) (Rapport d'activité 2019), https://sante.public.lu/fr/publications/r/rapport-activite-ministere-sante-2019/rapport-activite-misa-2019.pdf.

60 eSanté Agency Luxembourg: see https://guichet.public.lu/en/organismes/organismes_citoyens/agence-esante.html.

61 Pauly, T. (2019), 'Luxemburg treibt E-Health-Innovationen voran', GTAI, https://www.gtai.de/gtai-de/trade/branchen/branchenbericht/luxemburg/luxemburg-treibt-e-health-innovationen-voran-131132.

who authorises access to his or her file, even if a hospital can access it automatically. Each person can configure his or her file as he or she sees fit by specifying which features he or she wants to use. All insured persons (approximately 890 000 in Luxembourg), will have access to their file by the end of 2021.[62]

The extent to which the introduction of the electronic patient health record could address challenges for people with disabilities, especially for people with cognitive impairments, is expected to be covered by the national eHealth strategy initiated in October 2019. However, as a public digital service, the provisions of the Act of 28 May 2019 on the accessibility of websites and mobile applications should apply. Currently, the eSanté-platform offers its services in three languages (French, German and Luxembourgish) but they are not offered in a simple language version.[63]

Teleworking

Bertschek et al. (2018) emphasise that people with disabilities could benefit from the consequences of digitalisation on the world of work. With reference to a study[64] conducted in Germany, the authors point out that, for people with physical and mental disabilities in particular, digitalisation will open up new opportunities for location-independent work, for example by allowing them to work in a home office and to transmit work results and the related communication via the internet. Technological development and new technical possibilities will help people with disabilities compensate for impairments and will allow them to adapt the workplace and the working environment to their individual needs. This aspect is also highlighted as an opportunity for Luxembourg. New employment models are expected to emerge, where people with disabilities will perhaps gain easier access to the labour market.[65] Büchel (2017) points out that, in Luxembourg, where the service sector dominates, the phrase 'third industrial revolution' is often used, even though the contribution of industry to the Luxembourg economy is comparatively small (5 % of GDP and 8 % of employees in 2015).[66] Corresponding labour market transformations, as mentioned in Rifkin's analysis on the third industrial revolution,[67] are therefore expected to be less severe in Luxembourg.[68] If one takes both analyses together and combines them under the caveat that the neoliberal orientation will continue to dominate in the future, given the

62 RTL (2020), 'En quoi consiste le dossier de soins partagé ?' (What is the shared health record?), https://5minutes.rtl.lu/actu/luxembourg/a/1520180.html; Luxemburger Wort (2020), 'En quoi consiste le dossier de soins partagé? https://www.wort.lu/fr/luxembourg/un-pas-de-plus-pour-la-medecine-numerique-personnalisee-5e5778ccda2cc1784e35709d.

63 eSanté platform: see https://www.esante.lu/portal/de/unser-helpdesk-ist-nun-auch-uber-dessen-virtuellen-schalter-erreichbar-246-380.html?args=WqUgQRqZkOs3%2AOTlhut_oRY7Mrtyc0IG8r85SIbUuL2%2AAtj_9GVBIeSv_E3N1Rx1KcN_qs3cEc_qyIuNs6X1ZQ.

64 Bundesministerium für Arbeit und Soziales - BMAS (2017), Weissbuch Arbeiten 4.0, Berlin, BMAS, https://www.bmas.de/DE/Service/Publikationen/a883-weissbuch.html.

65 Bertschek, I., Arnold, D., Erdsiek, D., Nicolay, K., Bieber, D. and Kreutzer E. (2018), *Arbeiten 4.0 – Chancen und Herausforderungen für Luxemburg. Economy / Finance Job / Work Luxembourg general Research / Science / Innovation Social dialogue / Unions Social justice / Social protection and security*, Luxembourg, Arbeitsministerium, Handelskammer, Arbeitnehmerkammer Luxemburg, https://ftp.zew.de/pub/zew-docs/gutachten/Arbeiten40_Luxemburg2018.pdf.

66 Büchel, D. (2017), *Comment of AK Luxembourg on Work4.0*., https://www.csl.lu/fr/telechargements/events/8eecaa0116.

67 Rifkin, J. (2011), *The Third Industrial Revolution: How Lateral Power is Transforming Energy, the Economy, and the World*, New York, Palgrave Macmillan.

68 Chamber of Employees (2019), *The Third Industrial Revolution in Luxembourg*, IMS Luxembourg, Chambre de Commerce, Ministère de l'Économie, http://imslux.lu/eng/nos-activites/pole-de-specialites/8_the-third-industrial-revolution-in-luxembourg.

role of the financial sector in Luxembourg, digital competences in the financial industry (rather than in digital engineering) may require to be taught to enhance the opportunities of persons with disabilities at the national labour market.

There are no data available on digitalisation or on teleworking for people with disabilities in Luxembourg, either in the mainstream labour market or in the context of employment in sheltered workshops.

Teleworking has been regulated in Luxembourg for more than a decade. The Social and Economic Council of Luxembourg (ECS) adopted an opinion on teleworking in Luxembourg on 11 September 2020,[69] and on the Right to Disconnect on 30 April 2021.[70] The ECS recommends updating several aspects of the 2006 national teleworking convention (*Convention nationale relative au télétravail*),[71] which has been transposed to the national legal framework and declared to be of general obligation by the Grand-Ducal Regulation of 15 March 2016.[72] These aspects include the definition of regular teleworking, contractual provisions, respect of privacy and mitigation of social isolation risks. A new agreement on teleworking was signed on 20 October 2020[73] between the social partners UEL,[74] OGBL[75] and LCGB,[76] and this was transposed to the national legal framework on 22 January 2021.[77]

The needs of people with disabilities are not explicitly addressed by the above. However, it is emphasised that, as far as employment conditions are concerned, teleworkers have the same rights and are subject to the same obligations under the applicable legislation and collective agreements as comparable workers on the company's premises.

Political participation and online voting

Based on the 2018 national act on elections (the Law of 8 March 2018)[78] and prompted by the digitalisation initiative, more and more internet-based government services for citizens have emerged in the context of political participation:

- registering on the electoral rolls;[79]

[69] Social and Economic Council of Luxembourg, 'TELEWORKING IN LUXEMBOURG', 11 September 2020, https://ces.public.lu/dam-assets/fr/avis/themes-europeens/teleworking-in-luxembourg.pdf.

[70] Social and Economic Council of Luxembourg, *Le droit à la déconnexion* (The right to disconnect), 30 April 2021, https://ces.public.lu/dam-assets/fr/avis/droits-salaries/deconnexion.pdf.

[71] Grand-Ducal Regulation of 15 March 2016 declaring a general obligation on a convention regarding the legal regime for teleworking (*Règlement grand-ducal du 15 mars 2016 portant déclaration d'obligation générale d'une convention relative au régime juridique du télétravail*), http://data.legilux.public.lu/file/eli-etat-leg-memorial-2016-45-fr-pdf.pdf.

[72] Grand-Ducal Regulation of 15 March 2016, http://legilux.public.lu/eli/etat/leg/rgd/2016/03/15/n6/jo.

[73] See https://clc.lu/wp-content/uploads/2020/10/2020-10-20-teletravail-convention-ogbl-lcgb-uel.pdf.

[74] UNION DES ENTREPRISES LUXEMBOURGEOISES: see https://uel.lu/en/.

[75] ONOFHÄNGEGE GEWERKSCHAFTSBOND LËTZEBUERG: see http://www.ogbl.lu.

[76] LËTZEBUERGER CHRËSCHTLECHE GEWERKSCHAFTS-BOND: see https://lcgb.lu/fr/.

[77] Grand-Ducal Regulation of 22 January 2021 declaring the convention of 20 October 2020 on the legal regime for telework to be generally binding. (*Règlement grand-ducal du 22 janvier 2021 portant déclaration d'obligation générale de la convention du 20 octobre 2020 relative au régime juridique du télétravail*), http://legilux.public.lu/eli/etat/leg/rgd/2021/01/22/a76/jo.

[78] Act of 8 March 2018 amending the amended Electoral Act of 18 February 2003; 2° of the amended Act of 4 February 2005 on the national referendum. (*Loi du 8 mars 2018 portant modification de la loi électorale modifiée du 18 février 2003 ; 2° de la loi modifiée du 4 février 2005 relative au référendum au niveau national*), http://legilux.public.lu/eli/etat/leg/loi/2018/03/08/a178/jo.

[79] Registering to vote in elections: see https://guichet.public.lu/fr/citoyens/citoyennete/elections.html.

- applications to vote by post;[80]
- staff delegate elections.[81]

These digital options certainly make it easier for people, especially those with mobility impairments, to participate in the political decision-making process, but there are no data on how people with disabilities are using these options. So far, electronic voting machines have not been used in Luxembourg.[82]

The problematic situation whereby persons under guardianship have neither the right to vote nor the right to stand for election, which has already been pointed out several times,[83] has not been improved in the context of digitalisation (e.g. by supporting remote consent for proxy voting by persons under guardianship – assuming the legal framework allows this).

[80] Apply to vote by post in elections: see https://guichet.public.lu/fr/citoyens/citoyennete/elections/elections-communales/vote-correspondance-elections-communales.html.

[81] Grand-Ducal Regulation of 11 September 2018 concerning the electoral operations for the appointment of staff delegates (*Règlement grand-ducal du 11 septembre 2018 concernant les opérations électorales pour la désignation des délégués du personnel*), http://legilux.public.lu/eli/etat/leg/rgd/2018/09/11/a838/jo &, https://guichet.public.lu/en/citoyens/travail-emploi/activite-professionnelle/relations-collectives-travail/voter-elections-delegues-personnel.html.

[82] 'Luxembourg: pas de vote électronique pour parer aux cyberattaques' (Luxembourg: no electronic voting to guard against cyber attacks), *Le quotidien Luxembourg*, 27 August 2018, https://lequotidien.lu/politique-societe/luxembourg-pas-de-vote-electronique-pour-parer-aux-cyberattaques/.

[83] Limbach-Reich, A. (2017) 'Le droit de vote est accordé à tous les citoyens majeurs / presque tous XIVe Congrès International AIRHM La Convention de l'ONU relative aux droits des personnes handicapées : une utopie ?' (The right to vote is granted to all/almost all adult citizens XIVth International Congress AIRHM the UN Convention on the Rights of Persons with Disabilities: A Utopia?) 11-14 September 2017, Geneva, HETS, https://orbilu.uni.lu/handle/10993/33118.

3 Do disability strategies address the potential of and challenges pertaining to digitalisation and digital transformation?

3.1 How digitalisation and digital transformation are addressed in the national disability strategy

The first national disability strategy, published in 1997,[84] has long been dominant in the national disability policy[85] by drawing attention to the right of people with disabilities to live like everyone else. The 1997 strategy did not make any references to social media or digitalisation but, nowadays, living like everyone else includes the use of such technologies and media.

The Grand Duchy of Luxembourg ratified the UN Convention on the Rights of Persons with Disabilities (CRPD)[86] on 13 July 2011, and the Convention was transposed into national law on 28 July 2011.[87] With this act, Luxembourg committed itself to implementing a National Action Plan with the aim of eliminating all barriers to the recognition and effective exercise of the rights of persons with disabilities. In addition, and as noted in the text of the Rights of Persons with Disabilities Act (Memorial 09 August 2011 A-169), there are two institutions mandated with the independent monitoring of the implementation of the Convention at national level: the Luxembourg Consultative Commission on Human Rights (CCDH) and the National Centre for Equal Treatment (CET).

The first National Action Plan (2012)[88] for implementing the CRPD aims to ensure universal accessibility as a basis for the self-determination and participation of people with disabilities. This includes ensuring that all information and communication tools are accessible to people with disabilities on an equal basis (see p. 9). Some suggested measures in the context of social media, new technologies, ICT and digitalisation include the following:

- The creation of a communication centre (assistive technologies should be provided to persons with disabilities, and precise information should be

[84] The Minister for the Disabled and the Injured (1997), *Plan d' action en faveur des personnes handicapées* (Action plan for people with disabilities).

[85] Sagramola, S. (2009). 'Behindertenpolitik' in: Willems, H., Rotink, G., Ferring, D., Schoos, J., Majerus, M., Ewen, N., Rodesch-Hengesch, M.A. and Schmit, C. (eds.), *Handbuch der sozialen und erzieherischen Arbeit in Luxemburg. Manuel de l'intervention sociale et éducative au Grand-Duché de Luxembourg (unter Mitarbeit von C. Reuter, M. Schneider, K. Brandhorst)*, Luxembourg, Éditions Saint-Paul, S. 341-342.

[86] Convention on the Rights of Persons with Disabilities New York, 13 December 2006, http://legilux.public.lu/eli/etat/leg/div/2016/08/08/n6/jo.

[87] Law of 28 July 2011 (*Loi du 28 juillet 2011 portant sur)*
1. approbation de la Convention relative aux droits des personnes handicapées, faite à New York, le 13 décembre 2006
2. approbation du Protocole facultatif à la Convention relative aux droits des personnes handicapées relatif au Comité des droits des personnes handicapées, fait à New York, le 13 décembre 2006
3. désignation des mécanismes indépendants de promotion, de protection et de suivi de l'application de la Convention relative aux droits des personnes handicapées),
http://legilux.public.lu/eli/etat/leg/loi/2011/07/28/n3/jo.

[88] Ministry of Family and Integration (2012), First National Action Plan for implementing the CRPD in Luxembourg. Both the specified home pages are no longer accessible: http://www.mfi.public.lu/publications/Handicap/PlanActionFR.pdf and http://www.mfi.public.lu/publications/Handicap/AktionsplanDE.pdf. However, an abridged version is still available at: https://gouvernement.lu/dam-assets/fr/actualites/articles/2016/06-juin/03-cahen-handicap/Plan-d_Action-FR-new.pdf. The full version can be provided by the author on request.

exchanged, e.g. existing material for visually and hearing-impaired people, or requests for subsidies).

- Accessible broadcasting (TV), the written press, documents, the internet and its services should be available to everyone, regardless of the material or software used, network infrastructure, mother tongue, culture, geographical location or the physical or mental abilities of the users.
- Alarm signals of all kinds should be made accessible to people with hearing impairments (e.g. via light signals, SMS, FM transmitters or GPS indicating ambulances in the surrounding area).
- A barrier-free telematics project for bus stops (featuring localisation of buses and direct information to passengers), should function according to the two-senses principle (e.g. with information available visually and acoustically) as an information point, but at the same time the traditional information systems (e.g. telephone information lines and traditional paper timetables) should also be maintained. All information systems and regulations must be bilingual (DE/FR).
- The development of a database, in cooperation with all partners who already have statistics in various disability fields, seems inevitable.
- The final result should be reliable data on persons with disabilities living and working in Luxembourg. Furthermore, it is important to create regulations to allow for the collection of statistical data, in consultation with the national commission for data protection.

The second National Action Plan (2019) for implementing the CRPD[89] addresses aspects of digitalisation, less as a general challenge but rather in addressing specific issues such as accessibility of digital communication media (see Chapter 4, 'Freedom of expression, implementing Art. 21 of the CRPD on Freedom of expression and opinion and access to information').[90] The Government urges private bodies providing services to the general public, including through the internet, to provide information and services in formats that are accessible to and usable by persons with disabilities. The media, including providers of information through the internet, should make their services accessible to persons with disabilities. Awareness should be raised in the media of the need to use information and communication technologies that are accessible to all. Print media and television should be accessible to all persons with disabilities, regardless of the type of disability.

The Luxembourg Independent Audiovisual Inspectorate (ALIA)[91] encourages audiovisual media service providers to ensure that the services they offer are progressively made accessible to people with visual or hearing impairments, and to develop accessibility action plans. Following the National Action Plan, Luxembourg will ensure that emergency information and, in particular, public notices and announcements of natural disasters that are communicated to the public through audio-visual media are made accessible to persons with disabilities. The Government will also designate an online contact point for any questions or complaints regarding accessibility. These measures are required by Directive (EU) 2018/1808 (the Audiovisual Media Services Directive or AVMSD).[92]

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89 Ministry of Family and Integration (2019), Second National Action Plan for implementing the CRPD in Luxembourg, https://mfamigr.gouvernement.lu/fr/publications/plan-strategie/handicap.html.

90 In the second National Action Plan (2019), under the keyword 'digitalisation', there is only a reference to the fact that the Ministry for Digitalisation also collaborated on the topic.

91 ALIA: see https://www.alia.lu.

92 Directive (EU) 2018/1808 of the European Parliament and of the Council of 14 November 2018 amending Directive 2010/13/EU on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the provision of audiovisual media

3.2 How digitalisation and digital transformation are addressed in specific disability-related strategies

The current National Disability Policy Strategy is based on the current National Action Plan 2019 - 2024,[93] which refers to the specific items on digitalisation mentioned in the Act of 28 July 2011 on the implementation of the CRPD, such as the use of social media and ICT. There are hardly any direct references, but in many parts of the plan there are implicit links with digitalisation topics arising from more general objectives.

Deinstitutionalisation: There is no direct reference in the current action plan (2019-2024) to implement the CRPD that addresses digitalisation and digital transformation in the context of independent living or deinstitutionalisation.

Health and care: The *Infoline Maladies Rares Luxembourg* (Rare Diseases Information Line)[94] is to be made easily accessible to people with disabilities so that they can be referred to the relevant European reference networks through specialised services when needed. It is proposed to create and develop apps that are accessible to all, because specific apps in the field of health and care, such as sante.lu[95] and DispoDoc,[96] are often not designed to be accessible to all. It is proposed that associations of people with disabilities should be able to participate in the committee that evaluates the apps developed for the health sector, with the aim of identifying how to optimise the accessibility of information for all. In order to facilitate communication with people with disabilities, the use of means of communication other than the telephone (e.g. e-mail or appointment reminders via SMS) should be offered. Websites (Editus, Doctena,97 etc.) should provide detailed information on the accessibility of the facilities for patients with disabilities. Patients with disabilities should be made aware, via a communication distributed to associations, that their Dossier de Soins Partagé (DSP), an electronic record for the exchange and sharing of health data between and for health professionals acting on patients, can be activated. The DSP allows health professionals to document care services and thus will facilitate continuity of health care. The evaluation of the DSP will identify the special needs of people with disabilities in order to integrate them into future versions.

Education: It is noted in the second National Action Plan that pupils with special educational needs sometimes receive assistive technologies at home that have proved successful, and that these tools could also be used in the school environment. Therefore, an exchange between school and non-school stakeholders, as well as parents, family assistants and external experts, is sought so that they can share – in full compliance with the applicable data protection rules – the resources, interests and talents of the child with disabilities as well as good support practices (further detailed in the Luxembourg 2019 Fact Sheets by EASPD, under the 'Education Support' section).[98]

services (Audiovisual Media Services Directive) in view of changing market realities, https://eur-lex.europa.eu/eli/dir/2018/1808/oj.

93 Ministry of Family and Integration (2019). Second National Action Plan for implementing the CRPD in Luxembourg, https://mfamigr.gouvernement.lu/fr/publications/plan-strategie/handicap.html.

94 ALAN: see https://alan.lu.

95 SANTE.lu: see https://sante.public.lu/fr/index.php.

96 DispoDoc: see https://sante.public.lu/fr/publications/a/aff-dispo-doc/index.html.

97 doctena: see https://de.doctena.lu.

98 Shahabi, S. and Limbach-Reich, A. (2019), *Luxembourg Fact Sheet on Social Care & Support Services Sector for Persons with Disabilities: Part of a series of Country Fact Sheets available on*

Disability-friendly courses in adult education, especially courses in ICT, are widely offered throughout Luxembourg, mostly organised at the municipal level, but there are also many adult education courses in ICT that are not suitable for people with disabilities. At the National Language Learning Centre (*Institut national des langues*, INL)[99] and the Life-Long-Learning Centre (*Service de la formation des adultes*, SFA),[100] ICT courses will be offered that take into account the needs of persons with disabilities.

Collaboration with the national centres of excellence and associations of and for persons with disabilities will be encouraged so that, where appropriate, curricula can be developed to meet the needs of learners with disabilities. Reasonable accommodation shall be provided where necessary.

The Department for the Coordination of Educational and Technological Research and Innovation (*Service de Coordination de la Recherche et de l'Innovation pédagogqiues et technologiques*, SCRIPT)[101] will be charged with developing teaching materials for pupils in the various forms of education, following the concept of design for all.

The Centre for visually impaired persons (*Centre pour le Développement des compétences relatives à la Vue*) offers a programme on the resources and aids that are available in Luxembourg for visually impaired and blind people, including the presentation of new technologies, such as android applications.[102]

In Luxembourg, there is an adult education and training network, with ICT courses offered in many communes, operated through the *Landesakademie*.[103] There are courses for every level, available in different languages and adapted to train senior citizens and persons with disabilities. However, the rate and frequency of courses offered varies greatly. Despite the number of courses offered, there is no central, uniform structure to ensure standardised and universally available ICT training in the Grand Duchy.[104]
The City of Dudelange offers inclusive computer courses for beginners, whether they are children, adults or people with special needs. The courses range from an introduction to the PC to handling new technologies and using the internet, to digital photography and learning basic Windows programs.[105]

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the EASPD website, coordinated and edited by the Policy Impact Lab, https://www.easpd.eu/sites/default/files/sites/default/files/Publications/countryreports1/easpd-luxembourg_fact_sheet.pdf.

99 INL Luxembourg 2021: see http://www.inll.lu.

100 SFA: see https://www.lifelong-learning.lu/Formateur/ministere-de-l-education-nationale-de-l-enfance-et-de-la-jeunesse/en.

101 SCRIPT: see https://www.script.lu/fr.

102 Centre pour le développement des compétences relatives à la vue AVJ: informations générales sur les aides techniques disponibles (AVJ Centre for the Development of Vision Kils: gênera information on available technical aids) - (CDV-AUT-6 2020/2021), http://www.cc-cdv.lu/fr.

103 Landesakademie: see https://www.landakademie.lu.

104 Ministry of Digitalisation (2019), 'La transformation digitale du Luxembourg', https://digital.gouvernement.lu/dam-assets/actualites/articles/2019/06-juin/17062019-02-Debat-de-consultation-la-transformation-digitale-du-Luxembourg.pdf.

105 City of Dudelange / Ville de Dudelange 2020/21 COURS INFORMATIQUES 2020-2021: 'Les cours sont offerts pour débutants, que ce soit pour enfants, adultes ou personnes à besoins spécifiques, vont de l'initiation au PC, au maniement des nouvelles technologies et à l'utilisation d'internet, à la photographie digitale et à l'apprentissage de programmes de base de Windows'. (The courses are offered for beginners, whether for children, adults or people with special needs, and range from introduction to the PC, handling new technologies and using the internet, to digital photography and

Employment: The second National Action Plan highlights government measures to promote inclusion in the mainstream labour market, such as financial support for further training and vocational skills development and state funding to cover the costs of adapting the workplace to the needs of a person with a disability (further detailed in the Luxembourg 2019 Fact Sheets by EASPD, under the 'Employment Support' section). Of course, this includes training in ICT as well as opportunities to use digital media and digitalisation applications. According to the national report on digitalisation progress (2019), Luxembourg has been displaying some really positive outcomes on training its population with digital skills. As mentioned in the report, one of the strengths of Luxembourg is the high e-skills level of its population and the digital literacy of its students and youngsters.[106] Specific figures on persons with disabilities are not included in the report, but there are indicators that the training programmes on digital skills are giving less consideration to people with disabilities, including cognitive disabilities. The jobseeker upskilling/reskilling initiative is aimed at jobseekers who have attended at least six years of secondary education and are fluent in French and offers the possibility of autonomous distance learning.[107]

Transport, access to goods and services, and tackling poverty: The second National Action Plan does not mention any specific statements on tackling poverty in connection with digitalisation and ICT techniques. However, it contains a commitment to maintain an online brochure in different formats on the rights of people with disabilities,[108] as well as an online service for any questions or complaints on accessibility.[109] On 19 March 2020 the Luxembourg Government set up an online/phone-based sales platform called Letzshop,[110] offering home delivery of more than 40 basic necessities to vulnerable persons, including persons over 65 and those suffering from chronic diseases or who are immunocompromised. In the context of the COVID-19 coronavirus pandemic, this platform supports people who are not able to make their purchases themselves. In order to reach out to all vulnerable people, the platform is not only available online, but can also be reached via telephone.

learning basic Windows programs.), https://www.dudelange.lu/fr/résidents/enseignement-et-formation-continue/cours-informatiques.

[106] Valdani Vicari & Associati and Wik Consult (2019), *Monitoring Progress in National Initiatives on Digitising Industry: Country report: Luxembourg*, https://ec.europa.eu/information_society/newsroom/image/document/2019-32/country_report_-_luxembourg_-_final_2019_0D313894-D5E2-2A2A-9885E6A433245CF5_61215.pdf.

[107] Ministry of Labour and the Public Employment Service (2020) Future Skills Initiative, https://www.cedefop.europa.eu/en/news-and-press/news/luxembourg-future-skills-initiative-launched-2020.

[108] Ministry for Family, Integration and the Greater Region, *Droits des personnes handicapées* (Rights of people with disabilities), https://mfamigr.gouvernement.lu/fr/publications/brochure-livre/droits.html.

[109] The Government's Commitment to Digital Accessibility: see https://gouvernement.lu/en/dossiers/2020/accessibilite-numerique.html.

[110] Letzshop online sales platform for vulnerable people, https://gouvernement.lu/en/actualites/toutes_actualites/communiques/2020/03-mars/19-corona-letzshop.html.

4 Promoting disability inclusion through funding, education and training

4.1 How funding promotes disability-inclusive digitalisation and digital transformation

The Fit 4 Digital service[111] gets support from government agencies. The Chamber of Crafts and the Chamber of Commerce provide assistance to businesses to guide them through the digital transformation process. This assistance includes an awareness and information component, a diagnosis of the company with recommendations, and support during the implementation of the proposed IT solutions. For the diagnostic phase and the subsequent implementation phase, the Chamber of Commerce and the Chamber of Trades rely on the service offer developed by Luxinnovation to help enterprises take advantage of digital technologies. During their digitalisation process, companies can benefit from various financial aids from the Ministry of the Economy. Under the Fit 4 Digital framework, the Ministry of the Economy covers the costs of the diagnosis provided by the approved consultant up to a maximum value of EUR 5 000.[112]

Fit4Innovation is a subsidised programme aimed at supporting SMEs and SMIs to identify innovation opportunities and to increase customer satisfaction by introducing new technologies and using digitalisation approaches.[113] The Ministry of the Economy supports this programme by granting participating businesses a capital grant to cover 50 % of the fees of external consultants. The fixed cost for the consultant is capped at EUR 15 000.[114]

The eHandwierk service aims to make companies aware of the challenges of digitalisation, to put them in touch with specialised players in this field, to encourage them to take the lead and to support them in their transformation towards digital. The programme does not provide information on direct funding or financial support. Instead, the focus of the programme is on offering specific workshops and training opportunities for this purpose.[115]

The StartupsVsCovid19 programme, launched in 2020, funded 15 startup projects relating to the development of innovative, technological products or services intended to limit, or even overcome, the economic, health and societal effects of the crisis linked to the COVID-19 pandemic.[116]

Horizon 2020, the European framework programme for research and innovation: in 2020, Luxinnovation supported 27 Luxembourg participations in projects funded under the ICT Leadership in Enabling and Industrial Technologies (LEIT) work programme, which received a total of EUR 12.9 million of EU funding.[117]
The National Research Fund of Luxembourg (FNR) is managing research programmes that leverage digital technologies. For example, on 3 April 2020, the FNR launched the

[111] Fit 4 Digital Service: see https://guichet.public.lu/fr/entreprises/financement-aides/regime-fit-for/fit-4-digital/aide-digitalisation.html.
[112] excl. VAT.
[113] Fit 4 Innovation: see https://www.luxinnovation.lu/innovate-in-luxembourg/performance-programmes/fit-4-innovation/.
[114] excl. VAT.
[115] eHandwierk: see https://www.cdm.lu/news/fiche/newsnew/news/nouveau-service-ehandwierk.
[116] StartupsVsCovid19: see https://www.startupluxembourg.com/startups-vs-covid19.
[117] Luxinnovation Annual Report 2020, https://www.luxinnovation.lu/wp-content/uploads/sites/3/2021/04/rapport-annuel-2020-final.pdf.

special FNR COVID-19 funding programme with a first deadline of 14 April 2020, and a second deadline of 11 May 2020. The aim of the programme is to (co-)support short-term projects or the starting phase of long-term projects. COVID-19 Detection by Cough and Voice Analysis and Pocket Rehab: Mhealth-based Rehabilitation Program for Patients with Cardiovascular Disease as Prevention and Treatment Strategy for COVID-19 Victims are examples of funded projects with relevance to digitalisation and potentially disability.[118]

The funding of these programmes is directed exclusively at companies and research institutions. The programmes are related to the Government's general digitalisation strategy, where (1) health technologies and their inclusiveness have been emphasised, and some projects funded under these programmes show relevance to people with disabilities (as indicated above), and (2) new digital services provided via websites and mobile applications fall under the accessibility law. However, reliable data or figures on how these programmes have been having a proven positive effect on the inclusion of people with disabilities are not currently available.

4.2 How disability inclusion is promoted through the education and training of digital professionals

The first National Action Plan (2012) stated that all teachers should have a basic knowledge of special education and should be able to identify special needs at an early stage. The University of Luxembourg will take this requirement into account in its basic training and will offer a module on this basic knowledge. As part of a forthcoming reorganisation of the traineeship, future teachers should become familiarised with the basics of special education and universal design.[119] This obviously also applies to the teachers who provide instruction in the field of digitalisation and new media in the national education system.

The second National Action Plan (2019) stresses the need to encourage the University of Luxembourg to integrate courses on inclusive education, on differentiated teaching, on the different types of disabilities and on the specific needs of people with disabilities into the initial training programmes for socio-educational staff. Training and information sessions on accessibility and Design for All sessions for construction professionals and those responsible for ensuring the accessibility of the built environment will be organised. These sessions will be carried out in collaboration with associations of and for people with disabilities. Thus, in university teacher programmes[120] in particular, as in the education of architects,[121] digitalisation and access to digital media are included as part of the curriculum. In addition, the University's Inclusion Office is offering a blended and connected approach to advice, guidance and support throughout the

[118] Research Luxembourg: Results of second FNR COVID-19 Call, https://www.fnr.lu/research-luxembourg-results-second-fnr-covid-19-call/.

[119] Ministry of Family and Integration (2012), *Plan d'Action de mise en œuvre de la CRDPH du Gouvernement luxembourgeois* (First National Action Plan for implementing the CRPD in Luxembourg), Measure 5, Formation des instituteurs de l'enseignement fondamental (teacher training for elementary education), and Measure 6, Formation initiale des professeurs de l'enseignement secondaire (initial teacher training for secondary education), https://gouvernement.lu/dam-assets/fr/actualites/articles/2016/06-juin/03-cahen-handicap/Plan-d_Action-FR-new.pdf.

[120] BScE 2021 Education in the digital age: see https://wwwfr.uni.lu/formations/fhse/bachelor_en_sciences_de_l_education/programme/cours_syllabus.

[121] Master's in Architecture at Luxembourg University: see https://wwwfr.uni.lu/formations/fhse/master_in_architecture/programme_acme.

COVID-19 pandemic. This means support is available in a combination of in-person and online formats. The Inclusion team is available via video, WhatsApp, email and phone.[122]

The second National Action Plan (2019) indicates that access to new information and communication technology systems, including the internet, is not always guaranteed for people with disabilities, due to a lack of knowledge among ICT professionals about accessibility and design for all. Therefore, in accordance with the provisions of the European directive on the accessibility of the websites and mobile applications of public sector bodies, information sessions and training will be organised for ICT professionals and anyone working with people with disabilities.[123] No information can currently be found on the training programmes that have been implemented on disability-related topics for digital professionals such as web designers, algorithm designers and engineers or those focusing on artificial intelligence, automation or robotics.

4.3 How digital inclusion and accessibility is addressed in the education and training of accessibility and inclusion professionals

An initial report on digitalisation in education from as early as 2002 states that specific ICT applications can be a valuable aid for students with disabilities or special needs.[124] The report recommends that schools should continue to be equipped with new technologies and access to digital media, that it should be ensured that the equipment in place functions properly, and that both pupils and teachers should receive training. Pedagogical added value should systematically be sought from the vast potential of ICT use in schools.[125]

The Smart Schoul 2025 programme is committed to this goal and brings together researchers, teachers, pupils and parents to discuss new technologies, artificial intelligence, computer vision and big data. The aim is to get pupils interested by giving them direct access to new technologies and allowing them to experiment with them. The active participation of students in research and school projects prepares them to become 'digital creators'. For researchers at the University of Luxembourg, the project is the basis for an exchange with teachers, pupils and parents that should lead to a number of ideas for implementation.[126]

The programme is not formulated exclusively for persons with disabilities, nor does it specify how exactly access for persons with disabilities should be achieved.

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[122] Inclusion Office of the University of Luxembourg: see https://wwwen.uni.lu/umatter/students/student_support/disability_learning_support_inclusion.

[123] Ministry of Family and Integration. (2019), Second National Action Plan for implementing the CRPD in Luxembourg, https://mfamigr.gouvernement.lu/fr/publications/plan-strategie/handicap.html.

[124] 'Des applications TIC spécifiques peuvent également constituer une aide précieuse pour des enfants handicapés ou à besoins spéciaux' (Specific ICT applications can also be a great help for children with disabilities or special needs.), Ministry of National Education, Vocational Training and Sports (2002), *Les Technologies de l'Information et de la Communication dans l'Enseignement Secondaire* (Information and Communication Technologies in Secondary Education) p. 29, https://gouvernement.lu/dam-assets/fr/actualites/articles/2003/03/18ntic/synthese.pdf.

[125] Ministry of National Education, Vocational Training and Sports (2002), *Les Technologies de l'Information et de la Communication dans l'Enseignement Secondaire*, https://gouvernement.lu/dam-assets/fr/actualites/articles/2003/03/18ntic/synthese.pdf.

[126] SCRIPT (2021), *Smart Schoul 2025*, https://www.script.lu/en/activites/innovation/smart-schoul-2025.

In the field of inclusive education and learning, the competence centres founded in 2018 to develop appropriate learning materials and curricula for students with special needs play an important role.[127] This concerns ICT as well as the use of social media and the internet. The Competence Centre for Visual Impairment offers visually impaired persons workshops on the most recent technologies.[128]

Both the first and second National Action Plans offer architects and civil engineers lifelong learning programmes, training and information sessions on accessibility and design for all approaches. This has been included in the Luxembourg lifelong learning centre programme.[129]

4.4 How digital inclusion is addressed via the training of people with disabilities

The non-profit organisation Digital Inclusion[130] states that it is seeking to help everybody in Luxembourg get access to information technology and computing. For this purpose, basic skills in the use of digital media and computers are offered in different languages. Even though the programme focuses on refugees and people who have recently arrived in Luxembourg, it also offers people with disabilities a particular opportunity to participate in the courses that are also offered online. This NGO is supported by the Œuvre Nationale de Secours Grand-Duchesse Charlotte, the European Union Social Fund, Luxembourg's Ministry of Labour and the US Embassy.

The national framework of non-formal education[131] provides inclusive pedagogy and training in digitalisation and ICT in *Maisons Relais* ('relay houses').[132] The relay house system is a communal service that takes care of children outside school hours. It is intended for families with children under 12 attending schools in the commune. Children with special needs attending basic school and requiring additional coaching hours are also welcome.
In general, schools are supposed to prepare children for a future in which digitalisation plays a central role through a series of measures: Medienkompass,[133] coding training[134] and awareness raising on screen use.[135] No explicit reference to children and youth with disabilities is highlighted. However, the current trend in Luxembourg is characterised by a progressive shift from institutionalised special education towards mainstream education for children with disabilities, boosted by the Law of 20 July 2018 on the creation of public competence centres for specialised psycho-pedagogy to

[127] Act on Centres of Competence 2018 (*Loi du 20 juillet 2018 portant création de Centres de compétences en psycho-pédagogie spécialisée en faveur de l'inclusion scolaire*), http://legilux.public.lu/eli/etat/leg/loi/2018/07/20/a664/jo.
[128] AVJ Centre for the Development of Vision Skills: general information on available technical aids - (CDV-AUT-6 2020/2021, http://www.cc-cdv.lu/fr.
[129] Disability accessibility training: see https://www.lifelong-learning.lu/Formation/accessibilite-handicape/en.
[130] Digital Inclusion: see http://digital-inclusion.lu.
[131] Nationaler Rahmenplan zur non-formalen Bildung im Kindes- und Jugendalter, https://www.enfancejeunesse.lu/wp-content/uploads/2018/02/Rahmenplan_DE_Web.pdf.
[132] Nationaler Rahmenplan zur non-formalen Bildung im Kindes- und Jugendalter, https://www.enfancejeunesse.lu/wp-content/uploads/2018/02/Rahmenplan_DE_Web.pdf.
[133] 'Un cadre général pour l'éducation aux et par les médias : le Medienkompass' (A general framework for media education: Medienkompass), https://men.public.lu/lb/grands-dossiers/systeme-educatif/digital-medienkompass.html.
[134] 'L'introduction du coding à l'école', (The introduction of coding in schools), https://men.public.lu/lb/grands-dossiers/systeme-educatif/digital-coding.html.
[135] 'Sensibiliser à l'usage des écrans en famille' (Raising awareness of screen use in the family), https://men.public.lu/lb/grands-dossiers/systeme-educatif/digital-ecran-famille.html.

favour school inclusion. Therefore, it can be assumed that the programmes are to some extent appropriate for students with disabilities.

At local level, many municipalities offer computer courses that also address the special needs of people with disabilities.[136] [137] [138]

[136] ITC programmes of the Landesakademie 2021: see https://www.landakademie.lu/de/search/seminar?sTopic%5B44%5D=44&provider_id=&day=&month=&year=

[137] Ministry of Digitalisation (2019), 'La transformation digitale du Luxembourg', https://digital.gouvernement.lu/dam-assets/actualites/articles/2019/06-juin/17062019-02-Debat-de-consultation-la-transformation-digitale-du-Luxembourg.pdf.

[138] Dudelange: see https://www.dudelange.lu/fr/résidents/enseignement-et-formation-continue/cours-informatiques.

5 The opportunities and challenges presented by digitalisation and digital transformation to the rights of persons with disabilities

5.1 The most significant opportunities presented by digitalisation and digital transformation for persons with disabilities

Digitalisation can provide employment opportunities for people with disabilities, since the digital working process can be adjusted or even supported by automation, and training can be provided in a structured manner. If digital interfaces are made accessible and installed in the physical world, this can contribute to independent living.

For example, the Digitised Regional Archives Project gives the NGO Autisme Luxembourg asbl the opportunity to develop their know-how about digitalisation and electronic archiving for people with autism, which will ultimately help create new activities and jobs for people with significant difficulties as they integrate into the mainstream labour market. The project also aims to provide employment under supervision for people with autism spectrum disorder. Whether people can find employment in the primary labour market after participating in the programme – and, if so, how many have done so – is not reported.[139]

Within the Fondation Kräizbierg, an institution for people with disabilities, the digitalisation unit (Atelier Multimédia) trains people with disabilities to update websites and digitise private analogue media for external clients. This enables people with disabilities who work there to use their digital skills and thus find employment. According to the Foundation, six people with disabilities work in this workshop.[140]

The ADAPTH service offers advice on the installation of automation and multimedia devices and the setting up of digital interfaces in connection with accessibility and disability-friendly furnishings,[141] which includes adapted interfaces in both the private and public domains. Independent living and the autonomous use of public facilities by people with disabilities can thus be facilitated.[142]

5.2 The most significant challenges faced by persons with disabilities in relation to digitalisation and digital transformation

Accessibility and inclusion issues, as well as violations of non-discrimination legislation against persons with disabilities in general, are reported in Luxembourg by the Centre for Equal Treatment (CET) in its annual activity reports. In 2020 the annual report indicates no cases in relation to digitalisation. In the five years since 2015, however, it emerges that the number of incidents involving non-accessibility of buildings has not decreased and has even slightly increased, with 87 cases in 2020 compared with 86 cases in 2015. This seems to indicate that, in addition to the fundamental problem of

[139] See https://aw.leader.lu/projekte/arnu-archives-regionales-numerisees-digitaliseiert-regional-archiven-autisme-luxembourg.

[140] Atelier Multimédia Fondation Kräizbierg: see http://www.kraizbierg.lu/index.php/fr/atelier-multimedia.

[141] ADAPTH disability-friendly furnishings services funded by the Dependency Insurance (‘Assurance Dépendance’), https://www.adapth.lu/j3/index.php/services/assurance-dependance.

[142] Centre de compétence national pour l’accessibilité des bâtiments Group MEGA (National centre of competence for the accessibility of buildings Group MEGA ADAPTH), https://www.adapth.lu/j3/index.php/services/logement.

accessibility, digital services have not yet been sufficiently implemented as an adequate alternative.[143]

In its 2019 activity report, the national Consultative Commission on Human Rights (CCDH) proposes that private actors should also be required to make their websites and mobile applications accessible and calls on the Government to make public and private sector media, including live broadcasts, accessible to all. In addition, the CCDH calls on the Government to specify, in the act on accessibility (2019),[144] a competent ombudsman to whom complaints can be referred. The CCDH further demands that a clear power of control and sanction, as well as effective procedures, be established.[145]

A particular challenge with regard to the participation of people with disabilities in the advancing digitalisation of society is faced by people with cognitive impairments, who are often unable to follow what are mostly complex programs and applications. The automation of services such as banking transactions, digital payment services and online business sometimes pose insurmountable barriers, which can lead to the exclusion of people with cognitive disabilities, especially with the disappearance of previous services based on personal interaction. For example, the current registration system for COVID-19 vaccination appointments represents an insurmountable barrier if this internet-based service involves tasks preceded by the identification of items that are intended to prevent misuse of the service.[146] As an alternative, people can register by phone. However, there is no information on how long this telephone-based alternative will exist.

Many government and private digital services and programmes are closely related to economic measures, whether in terms of employability enhancement or in terms of the inclusion of people (with and without disabilities) as customers, consumers or taxpayers.[147] [148] [149] It is obvious that one of the main drivers of digitalisation is the anticipated cost savings, but this is seldom discussed openly, as it is often associated with staff reductions affecting low-skilled workers, and particularly workers with disabilities. For employees with disabilities, the question of matching their skills to the needs of the labour market, and therefore their degree of employability, which also

[143] Consultative Commission on Human Rights 2020 (Commission consultative des Droits de l'Homme (CCDH) 2020): see https://ccdh.public.lu/content/dam/ccdh/dossiers_thématiques/cet/rapports/Rapport-annuel-CET-2020.pdf.

[144] Act of 28 May 2019 on the accessibility of websites and mobile applications of public sector bodies, http://legilux.public.lu/eli/etat/leg/loi/2019/05/28/a373/jo.

[145] Consultative Commission on Human Rights (Commission consultative des Droits de l'Homme (CCDH)): see https://ccdh.public.lu/dam-assets/fr/publications/rapports-activite/Rapport-d-activites-2019.pdf.

[146] The Luxembourg Guichet public asks the 'security question', 'What is the sum of 10 and 8?' before granting access. See https://www.services-publics.lu/login/TAMLoginServlet?TAM_OP=login&USERNAME=unauthenticated&ERROR_CODE=0x00000000&ERROR_TEXT=HPDBA0521I%20%20%20Successful%20completion&METHOD=GET&URL=%2Ffpgsa-fo%2Fjsp%2Factivate_service%3FserviceType%3DMS_RDV_VAC_COVID_GSA%26lang%3DEN&REFERER=https%3A%2F%2Fguichet.public.lu%2Fen%2Fcitoyens%2Fsante-social%2Fcoronavirus%2Fvaccination%2Fvaccination-covid-19.html&HOSTNAME=demarches.services-publics.lu&AUTHNLEVEL=&FAILREASON=&PROTOCOL=https.

[147] Electronic tax-aid portal: see https://taxx.lu/?locale=en.

[148] Tax return via online application form, https://impotsdirects.public.lu/fr/formulaires/fiches_d_impot.html.

[149] ADEM Future Skills Initiative, 'Get ready for future skills', https://adem.public.lu/de/employeurs/futureskills.html.

depends on the type of disability (physical, psychological, sensory, cognitive, mental, etc.), is becoming more and more acute. More and more employees with disabilities registered at the national Employment Agency (ADEM) are less educated than the rest of the working population. They have relatively low employment rates and a level of unemployment six times higher than the average.[150]

The use of digital services, such as the provision of accessible portals to record violations of human rights for persons with disabilities, has hardly been addressed.[151]

It is likely that the distance learning approaches, and digitised teaching offers introduced in the course of COVID-19 will be partly maintained, even after the pandemic has been overcome, and that this will have a detrimental effect especially on persons with learning difficulties.[152]

With a few exceptions, little attention has been drawn to the health risks of internet addiction and the health aspects of excessive media consumption. Especially for children and adolescents with psychological and mental health problems, the constant consumption of social media and excessive screen time may be an additional risk factor.[153]

[150] Mellouet, S. (2019), 'Handicap et entreprises : un « bilan emploi » en demi-teinte', https://www.fondation-idea.lu/2019/02/22/handicap-et-entreprises-un-bilan-emploi-en-demi-teinte/.

[151] Consultative Commission on Human Rights (Commission consultative des Droits de l'Homme (CCDH)): see https://ccdh.public.lu/dam-assets/fr/publications/rapports-activite/Rapport-d-activites-2019.pdf.

[152] University of Luxembourg, hybrid teaching mode: see https://wwwde.uni.lu/fhse/news_events/winter_semester_2020_2021_hybrid_teaching_mode.

[153] 'Sensibiliser à l'usage des écrans en famille' (Raising awareness of screen use in the family), https://men.public.lu/lb/grands-dossiers/systeme-educatif/digital-ecran-famille.html.

6 Conclusions and recommendations

6.1 Conclusions

Luxembourg has already been following a stringent digitalisation strategy for several years and over the terms of various Governments, focusing both on the development of e-government and on the general advancement of digital approaches and technologies, particularly in education, e-health, the world of work and the (financial) economy. Here, Luxembourg ranks as well advanced in comparison with other European countries.[154] [155]

This digital development is accessible for persons with disabilities to the rather limited extent that the current practices in education, e-health, employment etc. are inclusive[156], in one hand, and the Luxembourgish law of 28 May 2019 on the accessibility of websites and mobile applications of public sector bodies[157] is implemented, on the other hand. As a result, both general participation in digital offerings and services and the ability to participate equally in all social systems with the help of digital technologies remain limited. The situation is more difficult for people with cognitive impairments and mental disorders[158] in particular.

Training programmes for people with disabilities on new technologies are neither always accessible nor make sufficient use of simple language. [159] The Act on the accessibility of websites stipulates that the service assigned shall provide training programmes on the design of accessible network services. The Information and Press Service is responsible for promoting, facilitating and organising training programmes on website and mobile application accessibility for interested stakeholders and staff of public sector organisations on how to create, manage and update website and application content so that it is and remains accessible.[160]

6.2 Recommendations

When developing digitalisation, care must be taken to ensure that the corresponding machines, dispensers and input and output units are constructed in such a way that they come close to the universal design and at least comply with the two senses

[154] Ministry of Digitalisation (2019), 'La transformation digitale du Luxembourg', https://digital.gouvernement.lu/dam-assets/actualites/articles/2019/06-juin/17062019-02-Debat-de-consultation-la-transformation-digitale-du-Luxembourg.pdf.

[155] Valdani Vicari & Associati and Wik Consult (2019), *Monitoring Progress in National Initiatives on Digitising Industry: Country report: Luxembourg,* https://ec.europa.eu/information_society/newsroom/image/document/2019-32/country_report_-_luxembourg_-_final_2019_0D313894-D5E2-2A2A-9885E6A433245CF5_61215.pdf

[156] See for example the Activity Report 2019 of the Socio-Professional Guidance Centre (Programme COSPH (Centre d'Orientation Socio-Professionnelle asbl) Rapport d'activité 2019), available at http://www.cosp.lu/wp-content/uploads/2020/12/rapport-activité-2019.pdf.

[157] Act of 28 May 2019 on the accessibility of websites and mobile applications of public sector bodies, http://legilux.public.lu/eli/etat/leg/loi/2019/05/28/a373/jo. .

[158] I.e. people who's disability results from an interaction between a health condition or intellectual impairments and contextual factors.

[159] Consultative Commission on Human Rights (Commission consultative des Droits de l'Homme (CCDH)): see https://ccdh.public.lu/dam-assets/fr/publications/rapports-activite/Rapport-d-activites-2019.pdf.

[160] The Government's Commitment to Digital Accessibility, https://sip.gouvernement.lu/en/dossiers.gouvernement%2Ben%2Bdossiers%2B2020%2Baccessibilite-numerique.html.**Fout! De hyperlinkverwijzing is ongeldig.**

principle.[161] This recommendation is addressed to engineers but also to the Governments responsible for the certification of structures, services and equipment. This means that there must also be effective control and, if necessary, effective sanctioning mechanisms. Since 'design for all' cannot always be implemented, and as people with severe disabilities, cognitive impairments or mental disorders in particular are unable to use digital facilities, an alternative option must always be provided, for example by having a person available to assist them. This recommendation is addressed to service providers and to Governments. Hence, the 2019 synthesis document promises that appropriate non-digital services will be preserved for people who cannot or do not wish to choose the digital approach.[162]

Students with disabilities, including cognitive disabilities, should be taken out of digitalised distance education that was introduced due to COVID-19 and should be offered face-to-face instruction for as long as possible. Students with cognitive disabilities are more vulnerable to the disadvantages of distance education than students without disabilities. With the introduction of computer courses and media instruction, the possible dangers and undesirable side effects should be pointed out in such a way that this can also be understood by persons with disabilities. With the introduction of digitalised services, an alternative based on human contact should always be maintained, so that there is freedom of choice between digital and non-digital service offerings. The digitalisation of educational services, structures and procedures, including home-schooling and distance learning, which is currently spreading as a result of the COVID-19 pandemic, should largely revert to face-to-face teaching, because distance-based education, even when an effort is made to comply with the accessibility Act, tends to reinforce rather than compensate for existing educational differences. This recommendation is addressed to educational institutes, trainings providers and policymakers.

More attention should be given to side-effects and risks in the context of digitalisation and media use. Persons with mental health issues in particular risk getting addicted to the internet or may suffer from excessive media consumption. This recommendation is addressed to the Government, research institutes and providers of digital media.

Forcing people to use automated services, as can be observed more and more, should be prevented, as these depersonalised services remove the immediate responsive assistance that sometimes makes it possible for persons with disabilities to use services. Automated voice-activated telephone services, for example, are not accessible. This recommendation is addressed to the Government, research institutes and providers of digital services.

The introduction and enforcement of a global digital tax, as recently proposed by the new US Administration and endorsed by the G20 2021 summit in Rome, including

[161] The two-senses principle is a requirement of Universal Design and introduced as such. For a physically impaired person in a wheelchair, while the two-senses principle would not be sufficient to represent accessibility, disregarding the two-innings principle implies a lack of accessibility.

[162] Government of the Grand Duchy of Luxembourg (2019), 'Débat de consultation: La transformation digitale du Luxembourg', p. 5: 'Ainsi, tout échange entre l'Etat et les citoyens devra pouvoir être effectué par Internet, tout en garantissant que les administrations continuent à mettre à disposition les différents documents et dossiers sous forme papier pour les personnes qui ne peuvent pas ou ne souhaitent pas opter pour une démarche digitale.' (It should therefore be possible for all exchanges between the State and its citizens to be conducted via the internet, while guaranteeing that the authorities shall continue to make available various documents and files in paper form for people who cannot or do not wish to opt for a digital solution.) https://digital.gouvernement.lu/fr/actualites/article/2019/juin/03-debat-consultation.html.

Luxembourg, could usefully fund many disability-related initiatives on inclusion and full participation in society. This recommendation is addressed to the Government.[163]

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