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The impact of telework induced by the spring 2020 lockdown on the use of digital tools and digital skills [1]

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The spring 2020 lockdown has forced many employees to begin teleworking. With 63% of employed people in Luxembourg reported to be teleworking, for 83% of them, it was a new work organization. The digitalization of work imposed by telework has underlined the importance for employees to know how to use digital tools. Nevertheless, this demand for these kind of skills is part of a broader context, related to the 4th Industrial Revolution, in which firms and administrations request more digital skills from their staff.[2] Thus, in Luxembourg, 68% of online job vacancies published between September 2018 and September 2019 required basic digital skills (use of a computer, internet, office package, etc.) and 59% required more advanced digital skills (data analysis, programming language, etc.).[3] Lifelong learning programs have been provided to meet this growing demand and thus promote the job retention of employees and the integration of jobseekers (Digital skills bridge, Fit 4 Digital Future 2.0, etc.). This publication examines the impact of the telework imposed by the lockdown on employees' use of digital tools and their digital skills. More specifically, in this publication, we assess whether telework imposed by the lockdown led to an extensive (increase in the number of digital tools used) and/or intensive (increase in the intensity of use of digital tools digital) growth in the use of digital tools by teleworkers and whether it enabled them to increase their digital skills. To answer these questions, this publication draws on data from the first wave of the *COVID-19 socio-economic impacts in Luxembourg survey* (SEI) conducted between May and July 2020 by LISER and the University of Luxembourg with the support of the Luxembourg National Research Fund (FNR).

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[2] Probst, L., & Scharff, C. (2019). UPskill. 6 steps to unlock economic opportunity for all.
[3] Bourgeon et al. (2020), Les types de compétences recherchées dans la Grande Région, In Marché du travail transfrontalier : quelles équations à résoudre ?, LISER, Les Cahiers de la Grande Région, n°2.

**Digital communication tools were the most used and the most experienced during the lockdown**

Use of digital tools during the lockdown

During the spring 2020 lockdown, teleworkers used on average of a bit more than four types of digital tools out of the 10 types studied[4]: 11% used less than three and 31% more than five. The most used digital tools by teleworkers during this period were those aimed to communicate, with the exception, of internal firm communication tools such as internal social networks, wikis or blogs. Thus, 88% of teleworkers used web conference tools and 81% used instant messaging tools (*see Graphic 1*). Following these two figures, 75% of users reported using digital tools for collaborative work and document sharing (groupware). More specific tools, such as those supported by the progress of artificial intelligence (Intelligent and self-learning technologies), computer-assisted design (CAD) or customer relationship management (CRM) were used by less than one in five teleworkers.

Evolution of the use of digital tools

Unsurprisingly, tools aimed at compensating for the lack of face-to-face interactions are those that have seen their share of users increase. For example, tools related to web conference, instant messaging, and collaborative tools like workflow (*see Graphic 1*). Conversely, other types of tools have not seen their share of users increase. For example, tools related to intelligent and self-learning technologies and computer-assisted design have even seen their share of users slightly decline, probably due to a lower demand or lower need for high-performance IT equipment.
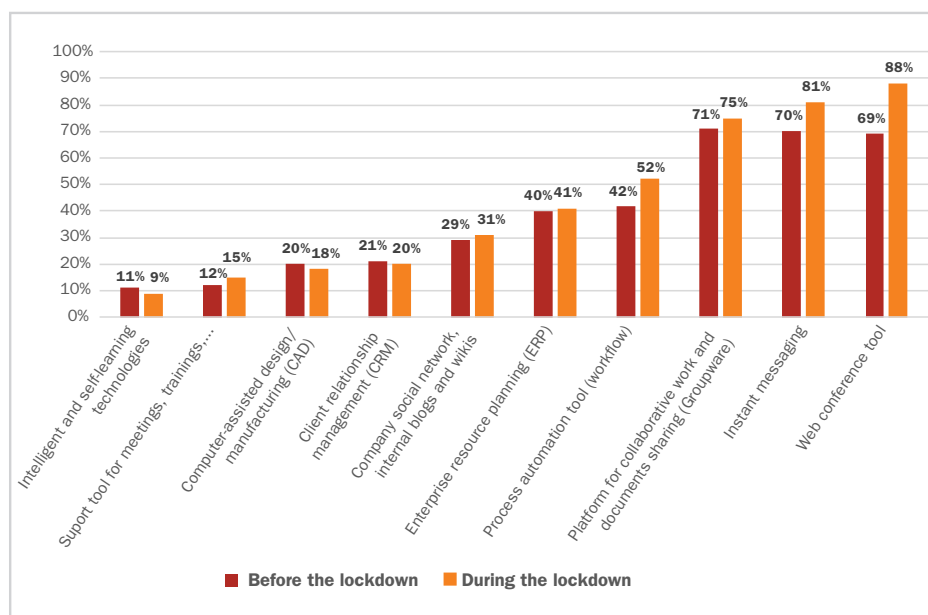
Graphic 1:
Share of teleworkers during the lockdown using digital tools before and during the lockdown, by type of tool

Reading guide: Among the people teleworking during the lockdown, 69% used web conference tools before the lockdown. During the lockdown, 88% used them.

Source: First wave of the Survey on the COVID-19 socio-economic impacts in Luxembourg (SEI), Telework sub-module, LISER and University of Luxembourg; calculations: LISER.

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[4]   *The ten digital tools studied are: Company social network, internal blogs and wikis; Computer-assisted design/manufacturing (CAD); Client relationship management (CRM); Enterprise resource planning (ERP); Instant messaging; Intelligent and self-learning technologies; Platform for collaborative work and documents sharing (Groupware); Process automation tools (workflow); Support tools for meetings, trainings, …; Web conference tools.*

Nearly two out of five teleworkers have experienced new digital tools during the lockdown

For 43% of teleworkers, the lockdown offered the opportunity to discover new tools. On average, teleworkers used 3.9 types of digital tools before the lockdown compared to 4.3 during the lockdown. Once again, the tools aimed at compensating for the lack of face-to-face interactions have been the most put to use (*see Graphic 2*). Among teleworkers who experienced new types of tools they had not used before, 50% reported using web conference tools, 40% using workflow-type tools, and 37% using instant messaging.

Women and men are equally likely to have experienced new digital tools during the lockdown. There are no differences to note by age class, education level or the fact of being a cross-border or a resident employee. In contrast, the discovery of new tools was more common among people working in the sector of public administration and education as well as among those who did not telework before the lockdown. 48% of people who did not previously telework discovered digital tools during the lockdown compared to 18% of those who practiced this work organization in the past. Employed people with complex or advanced digital skills were less encouraged during the lockdown to experience new digital tools.

More intensive use of digital tools for nearly three out of five users

In terms of intensity of use, we observe that 58% of teleworkers who used digital tools in the past used them more frequently during the lockdown. Once again, it is web conference tools that have seen the highest increase in their frequency of use: 46% of teleworkers who previously used web conference tools have intensified their use compared to 26% of those who used social network-type tools specific

Graphic 2:
Share of teleworkers who have experienced a new digital tool among those who have discovered at least one new tool during the lockdown

Reading guide: Among the teleworkers who experienced, at least, one new digital tool during the lockdown, 50% used for the first time web conference tools.

Source : First wave of the Survey on the COVID-19 socio-economic impacts in Luxembourg (SEI), Telework sub-module, LISER and University of Luxembourg; calculations: LISER.
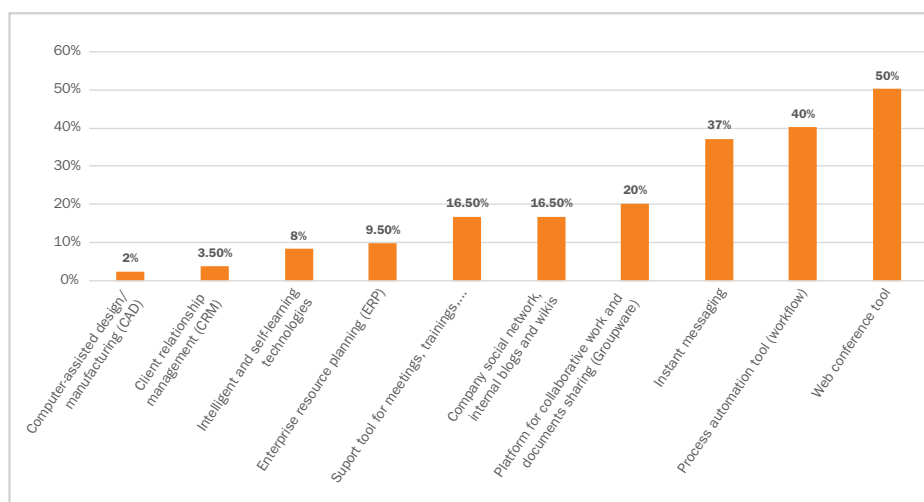
to the firm or 10% of those who used enterprise resource planning (ERP) (*see Graphic 3*). For intelligent and self-learning technologies tools (artificial intelligence, AI), half of their users reported a reduction in their intensity of use during the lockdown.

Five teleworkers' profiles stand out in terms of the evolution of their use of digital tools during the lockdown and the intensity of use

When we analyze the evolution of the number of digital tools used due to the lockdown and the intensity of the use of these tools during this period, five groups of teleworkers stand out (*see Figure 1*).[5]

The first group (G1) covers 16% of teleworkers. It consists of teleworkers who had low use of digital tools during the lockdown ('Low use'). During the lockdown, they used few or none of the ten types of digital tools studied with the exception of enterprise resource planning (ERP). This group is the only one to have seen the average number of digital tools used by teleworkers decrease compared to the situation before the lockdown, this number falling from 3 to 2.4. In this group, women, people aged between 20 and 29 years, and those with a secondary education level are over-represented. Members of this group work more often than those of the other groups in the sector of human health and social work activities.
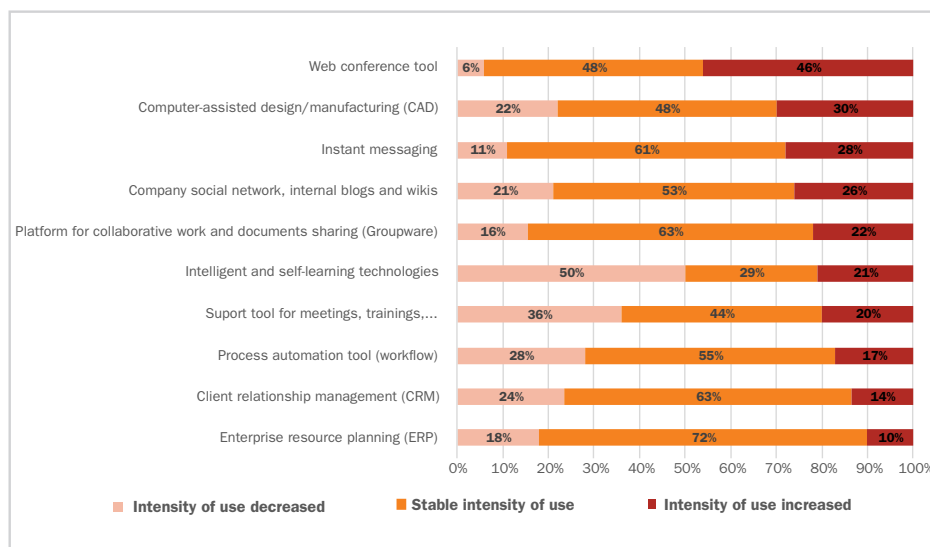
Graphic 3:
Evolution of the intensity of digital tools used among teleworkers who used them before the lockdown

Reading guide: Among teleworkers who used web conference tools before the lockdown, 6% used them less intensively during the lockdown, 48% with the same intensity as before and 46% more intensively.
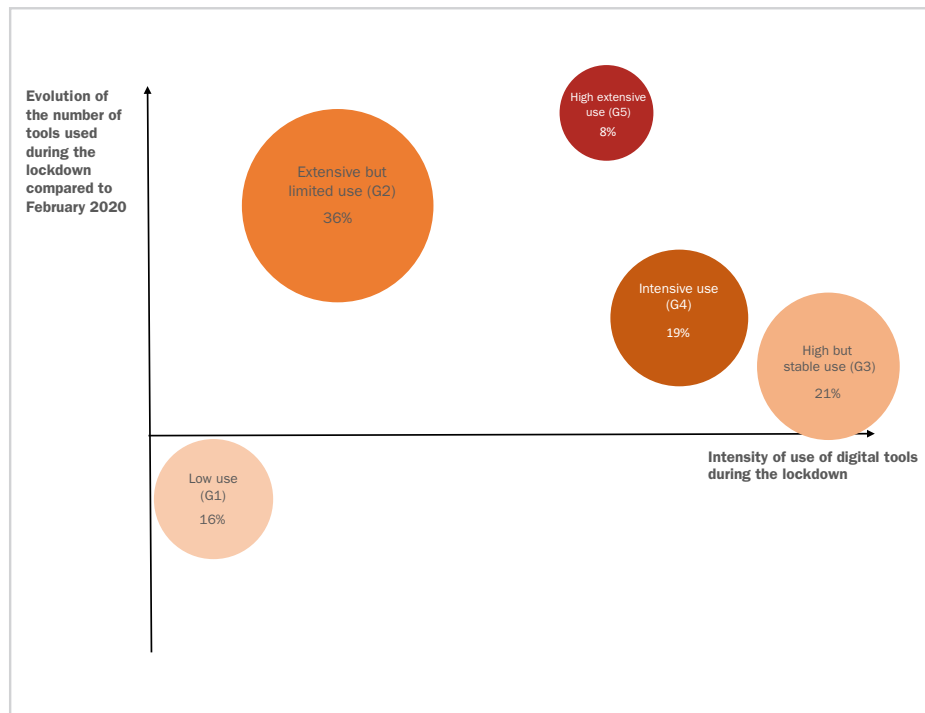
Source: First wave of the Survey on the COVID-19 socio-economic impacts in Luxembourg (SEI), Telework sub-module, LISER and University of Luxembourg; calculations: LISER.

Digital tool	Intensity of use decreased	Stable intensity of use	Intensity of use increased
Web conference tool	6%	48%	46%
Computer-assisted design/manufacturing (CAD)	22%	48%	30%
Instant messaging	11%	61%	28%
Company social network, internal blogs and wikis	21%	53%	26%
Platform for collaborative work and documents sharing (Groupware)	16%	63%	22%
Intelligent and self-learning technologies	50%	29%	21%
Suport tool for meetings, trainings,...	36%	44%	20%
Process automation tool (workflow)	28%	55%	17%
Client relationship management (CRM)	24%	63%	14%
Enterprise resource planning (ERP)	18%	72%	10%

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[5] *The methodology used is a Multiple Correspondence Factor Analysis (MCA) associated with a Hierarchical ascendant classification (cluster analysis). The use of digital tools and the importance of using these tools are directly used in the construction of the profiles, while socio-demographic characteristics intervene as illustrative variables.*

The second group (G2) covers 36% of teleworkers. It maps teleworkers who have experienced some new digital tools during the lockdown (the average number of tools used has gone from 3.4 to 3.8) ('Extensive but limited use'). Specifically, this group includes teleworkers who discovered web conference or instant messaging tools during the lockdown and those who are stable in the use of this type of tools compared to before the lockdown. They did not use any other type of tool except those related to computer-assisted design (CAD). Members of this group are more often, than those of other groups, to have a master's degree at minimum and work more often in the finance or insurance sector.

The third group (G3) covers 21% of teleworkers. These teleworkers have not changed their behavior regarding the use of digital tools during the lockdown ('High but stable use'). They used many digital tools before the lockdown and continued to do so during this period without increasing their intensity of use and without discovering new tools. Teleworkers of this group do not differ from those in other groups in terms of the socio-demographic characteristics studied.

The fourth group (G4) represents 19% of teleworkers. It is composed of teleworkers who, during the lockdown, used more frequently the digital tools already used in the past ('Intensive use'). They also stand out from other groups by a stronger resort to enterprise resource planning (ERP), to tools to support trainings, or meetings (for example Klaxoon, Roti.express) and to tools using artificial intelligence progress (for example chatbots). In this group, teleworkers aged from 40 to 49 years, those with a tertiary

education level below a master's degree and cross-border workers are over-represented.

The fifth group (G5) represents 8% of teleworkers. The teleworkers of this group took advantage of the lockdown to experience new digital tools: the average number of digital tools used rose from 0.5 in February to 4.5 during the lockdown. Unlike the second group, which is characterized by the discovery of some new digital tools, teleworkers of this group discovered the use of the four tools whose utilization took off during the lockdown (groupware, workflow, instant messaging and web conferencing) ('High extensive use'). Residents, secondary education graduates as well as teleworkers working in the public administration or education sector are over-represented.

Three out of ten teleworkers believe that their digital skills increased during the lockdown

30% of teleworkers estimate that their digital skills increased during the lockdown, while 68% believe that their skills have not changed and 2% report their skills have decreased.

Teleworkers who have experienced new digital tools during lockdown and who have used them intensively ('High extensive use') are those who believe the most that their digital skills improved: 50% of them have this feeling against 30% for all teleworkers. This result remains when controlling for structural effects.[6]

An analysis controlling for structural effects highlights that the discovery of new tools is positively linked to the feeling of digital up-skilling only in the case of intense use of digital tools. Indeed, the perceived chances of up-skilling when the discovery of new tools is limited to two digital tools ('Extensive but limited use') do not differ, all other things being equal, from those associated with low use ('Low use').

For the two groups that reported using many tools during and before the lockdown, whether with an increased intensity of use ('Intensive use') or a stable intensity ('High but stable use'), were also more likely of perceiving a digital up-skilling than teleworkers with little use ('Low use') (see graphic 4).

Some teleworkers, after controlling for structural effects, are more likely than others to perceive gains in their digital skills. This is the case for women, teleworkers aged 30 to 39 years, and those aged 50 and over. Teleworkers with a tertiary education degree are also more likely than others to believe that their digital skills increased during the lockdown. Differences are to be noted according to the sector of activity since teleworkers in the public administration or education sector or those in the finance or insurance sector are more likely than others to have perceived a growth in their digital skills.

Finally, the working environment during the lockdown also plays a role in the feeling of a digital up-skilling. Indeed, all things being equal, teleworkers who live in an optimal environment, characterized by a house where the

6   A logistic regression analysis was carried out. This analysis estimates the factors linked to the feeling of digital up-skilling during the spring 2020 lockdown (yes/no). This analysis permits to control not only for individual socio-demographic characteristics but also for the environment of the teleworking workplace and at the work level, the fact of having a previous telework experience, the level of digital skills before the spring 2020 lockdown, the perceived degree of autonomy in the work, the perceived managerial support and the perception of external actions implemented by the firm.

surface area per inhabitant is high and who enjoy an outside area (access to a garden, a terrace and to a nearby public park), took more advantage from the lockdown to improve their digital skills than those living in another type of environment.

However, all other things being equal, neither the level of digital skills before the lockdown, nor the fact of teleworking before this period is linked to the feeling of a digital up-skilling.

In summary, 72% of people teleworking during the lockdown used more digital tools during this period than before:

20.5% had only extensive use of digital tools (experimenting with new tools), 29% had only intensive use (increase in frequency of use) and 22.5% had both extensive and intensive use. The digital tools aimed at facilitating communication have been the most experienced and the most intensively used. If, during the lockdown, the majority of teleworkers have changed their behavior with regard to digital tools, only 30% share a feeling of a digital up-skilling during this period. Teleworkers with a 'high extensive use' profile are the most likely to have benefited from the lockdown to improve their digital skills.

Graphic 4:
Digital up-skilling during the lockdown according to the profile of the evolution of digital tools use
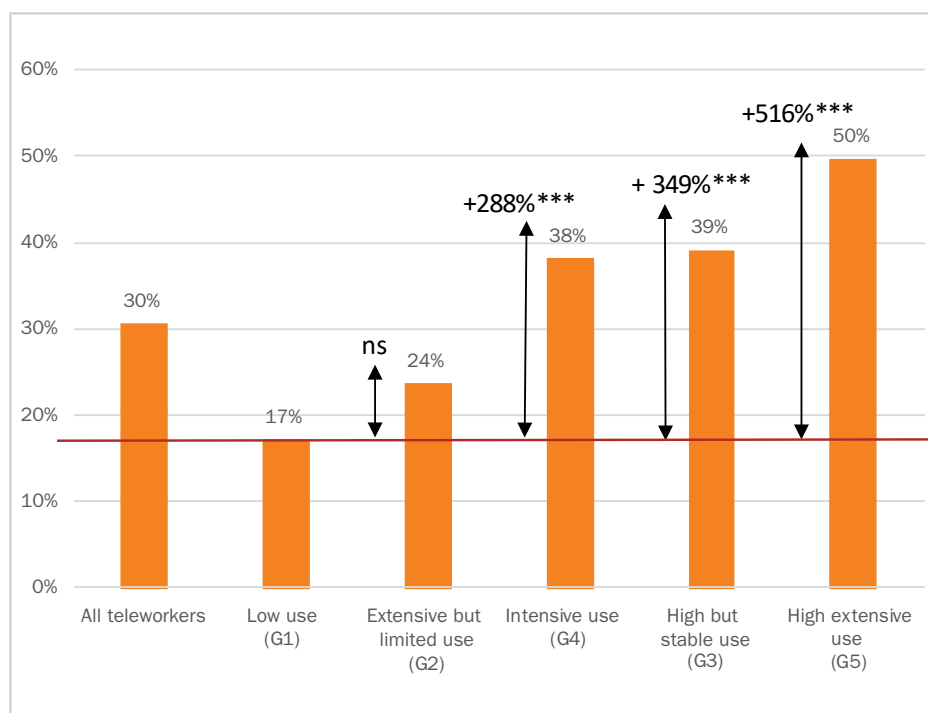
Reading guide: 50% of teleworkers in the 'High extensive use' profile believe that their digital skills increased. In the, all other things being equal, analysis, compared to teleworkers in the "Low use" profile, they are 516% more likely to have improved their digital skills during the spring 2020 lockdown.

Note: the odds ratios (above arrows) are calculated from a logistic regression estimating the determinants of the feeling of improvement in digital skills during the spring 2020 lockdown (yes/ no).
***: significant at the 1% level; ns: not significant at the 10% level.

Source: First wave of the Survey on the COVID-19 socio-economic impacts in Luxembourg (SEI), Telework sub-module, LISER and University of Luxembourg; calculations: LISER.

Data

This publication uses questions related to telework from the 'employment' module of the first wave of the *COVID-19 socio-economic impacts in Luxembourg survey (SEI)*.

The population of employed people who responded to this module was calibrated to ensure that the distributions by gender, age groups, residents versus cross-border workers and major groups of sectors of activity are representative of people in employment on the Luxembourgish labor market of March 31, 2020 (Figures from the 'Portail de l'Emploi').

In this publication, we focus on employed people who have practiced telework at least once during the spring 2020 lockdown period, i.e. 438 respondents.