DIGITAL SKILLS AUSTRIA 2023

DO WE HAVE THE SKILLS AND COMPETENCIES NECESSARY TO NAVIGATE THE DIGITAL TRANSFORMATION? AN OVERVIEW

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Digital Skills Austria 2023: Key Insights in English

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DISCLAIMER: This is a short English language overview of the study – the complete report in German can be accessed via the following source:

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1. Study Background

The Digital Skills Austria 2023 study focuses on the extent to which Austrians are able to navigate, communicate and even shape the digital space. While the first survey in 2022 measured not only digital skills but also digital knowledge about processes in the digital space, the focus of the follow-up study in 2023 is on the influence of formal education and training on skills and competences. Moreover, it tested the participants' problem-solving competences in the digital environment. The following document provides a brief insight into the methodology of the Digital Skills Austria 2023 study, the central themes of the project and a short overview of selected results.

2. Methodology

For the purpose of the study, a total of 2087 people from the Austrian online population aged 14 and over were surveyed in July and August 2023 on how they assess their digital skills (Online Access Panel, provided by the field agency of Marketagent). They also had to demonstrate their problem-solving competence by completing thirteen tasks related to different applications in the digital space.

DISCLAIMER: For more information about Marketagent and their services, please visit their official website at http://www.marketagent.com/en.

The fieldwork agency is ISO accredited. However, any work carried out using non-probabilistic sampling from a pre-selected access panel must be classified as structural matching and cannot be considered statistically representative of the population. Results must be read with appropriate caution.

Recent papers discussing this include Kohler & Post (2023) and Cornesse & Blom (2020).

2.1 Sampling

In accordance with the project framework, a so-called quota sample was realised, which (as in the 2022 study) represents the current distribution of the Austrian resident population, systematically excluding people without online access. Given the focus on digital skills, this exclusion is considered negligible, as discussions on related topics are not possible with people who do not have access to digital technology. The sample distribution achieved by Marketagent is very close to the target values that were established based on the basis of the Austrian microcensus 2022 (see Statistics Austria, 2022).

Indicator	Value (mean or percentage)
Age (mean)	46 years
14 – 30	26%
31 – 45	25%
46 – 65	33%
65 +	16%
Max. Secondary I (no Matura)	62%
Secondary II (Matura or equal)	21%
Tertiary (Univ. or equal)	17%
Male	49%
Female	51%

Table 1 - Sample Composition (n=2087)

It should be noted that the average age of the sample population is 46 years, which is higher than the 43 years reported by Statistics Austria for the resident population. The reason for this difference is methodological. The sample only includes persons aged 14 and over, which increases the average age. The gender distribution is in line with Statistics Austria's data for 2022 (Statistics Austria, 2022).

The picture is similarly positive with regard to education statistics. People with only lower secondary education or less account for 62% of the sample and 64% of the microcensus; for people with upper secondary education, the figure is 21% in the sample and 18% in the resident population. For those with tertiary education, it is 17% in the sample and 18% in the resident population. These deviations are minimal and no weights were applied due to the non-probabilistic sampling procedure (see, for example, Prandner, 2019).

2.2 Questionnaire Content

The questionnaire used in this study was developed by the research team and is based on established, internationally tested measurement instruments. The measurement of digital skills is carried out via 39 questions, which were originally designed by Alexander van Deursen and Ellen Helsper (e.g. van Deursen et al., 2016, 2017; Helsper et al. 2021) to map a four-dimensional structure of digital skills, based on their many years of experiences with the topic (see Figure 1).

English language examples on the items and questions used can be found in Helsper et al. 2021 (esp. pp. 16 and 12), which was the source of the original digital skills items and the starting point for the German language translations. The responses were accompanied by a 5-point Likert scale. These range from very true, mostly true, neither true or untrue, not very true, to not true at all.

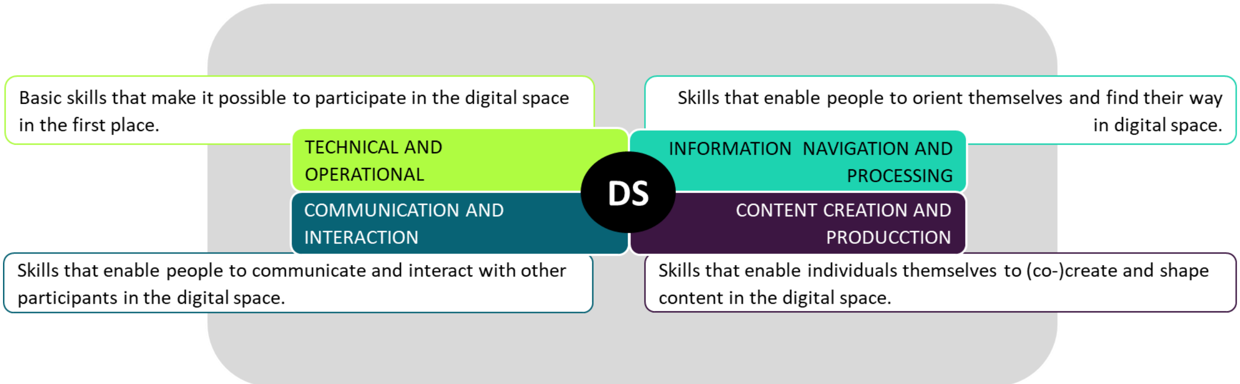

Figure 1 - Four Key Dimensions of Digital Skills, as used in the Digital Skills Austria 2023 Study

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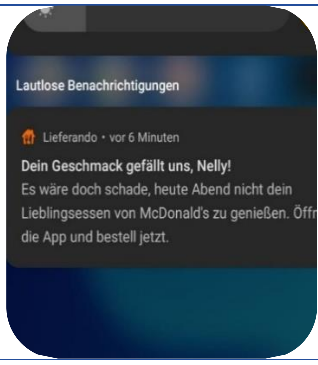
<tr><td></td><td>
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<tr><td>Participants had to recognize it as a QR code, scan it, follow the link and provide an insight into the type of website behind the link</td><td>Participants had to identify the screenshot as a push-message to the user of a recently used web application using web tracking data.</td></tr>
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Table 2 - Examples for the digital competencies test

The thirteen tasks for measuring digital competences were based on the European Union's DigiComp framework (Vuorikari et al. 2022). The test consisted of everyday problems that users of digital technologies might encounter, as well as more specialised situations that only a specific group of people would be concerned with. The researchers agreed that the aim of the competency test was to gain further insight into the importance and prevalence of different areas of digital competences. The tasks ranged from questions about specific spreadsheet functions, to reading QR codes and identifying email recipients, to pinging specific websites. In terms of content, we tested aspects of social media use, as well as office applications, communication methods and the use of artificial intelligence. For each example, four possible solutions were suggested, one of which was correct. Respondents were also able to openly state that they could not complete a task or that they assume that no answer was correct (examples of two of the tasks are shown in table 2).

Accordingly, people could give between 0 and 13 correct answers. Based on this information, it was possible to calculate a summative index expressing the level of competence of an individual. In order to place the results in an overall societal framework, questions were asked not only about socio-demographic data but also about their commitment to using technology (Neyer et. al, 2012, 2016), general media use behaviour and aspects of self-efficacy.

3. Study results

The results show a complex picture of both the digital skills and digital competences of the Austrian online population. Accordingly, we present the results in two steps. The first section deals with digital skills and their distribution in Austrian society, while the second section provides insights into their digital competences.

3.1 *Digital Skills*

Our first key finding is that digital skills are expected to be hierarchical, and that the data allow the four key dimensions of digital skills to be organised into a ladder with five different levels. Such a ladder model shows the sequential nature of the skills. For level 1 of the ladder, individuals need technical and operational skills (**level 1 of the ladder: application**) to navigate the digital space. Then, at level 2, additional skills for information navigating and processing information (**level 2 of the ladder: orientation**) become crucial. The third level furthermore includes the ability to exchange information, which involves communication and interaction skills (**level 3 of the ladder: communication**). Finally, the highest level of the digital skills ladder encompasses all the previous dimensions and adds skills related to content creation and production (**level 4 of the ladder: production**).

Such a sequence can be operationalised by a so-called Guttman scale (cf. Andrich, 1985). This statistical concept makes it possible to translate the previously outlined ladder into a statistical model that assumes that the next level of the ladder can only be reached if previous question or aspect is answered in a certain way. Accordingly, during the study we asked our respondents to assess their digital skills in the following order: application, orientation, communication, and production. The expectation is that someone will only be able to produce digital content if he or she can demonstrate all the skills that precede this level. The same applies to communication skills. You can only have communicative skills if you have also acquired application and orientation skills. The other levels work in the same way.

The actual construction and testing of the digital skills ladder took place in several steps. First, four so-called latent factor variables representing the four core dimensions were derived from the 38[1] original variables. These latent variables were then dichotomised, and the Guttman procedure was used to determine whether they can be put in the order of the proposed ladder.

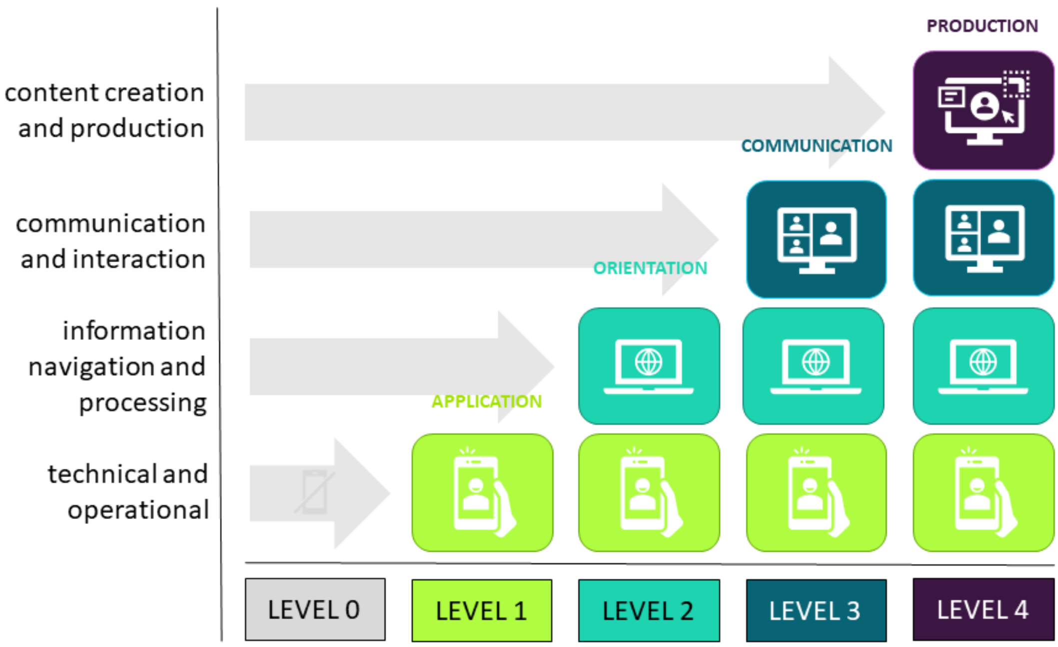

Figure 2 - Skill Ladder

[1] One variable of the scale was excluded in accordance with the literature.

3.1.1 Insights into the calculation of the digital skills ladder

Central to the process of creating the digital skills ladder is the reliability of the factors extracted. This reliability was checked based on Cronbach's alpha. In addition, an exploratory factor analysis was carried out to determine whether the theoretical dimensions could be extracted from the corresponding variables. The extracted variance and the fulfilment of the KMO criterion for the suitability of the sample were taken into account. An extraction threshold of 60% of the variance of the original variables and a KMO value of at least 0.7 are considered as the central quality criteria for the procedure. Based on these assumptions all four factors for the digital skills dimensions were sufficiently extracted, as the thresholds were exceeded for all indicators.

Skill dimension (number of cases)	*# items*	*Reliability (Cronbach's Alpha)*	*Extracted variance*	*KMO score*
technical and operational (n=1879)	10	0.928	61 %	0.955
information navigation and organisation (n=1913)	9	0.917	60 %	0.946
communication and interaction (n=1764)	10	0.931	62 %	0.953
content creation and production (n=1709)	9	0.922	62 %	0.942

Table 3 - Reliability of Skill Measurements and results of factor analysis.

The subsequent dichotomisation of the four extracted latent factor variables divided the respondents into those who thought they could use the respective digital skills at a (very) high level and those who did not share this assessment. The sum of the positive ratings of the four individual variables finally led to the ladder (see Figure 2). To confirm whether these ratings were correct, we calculated a so-called reproduction coefficient. This coefficient tests whether those who report high skills on one dimension also report high skills on hierarchically lower skill dimensions. Following the previously discussed layout for the digital skills ladder, we were able to show that it is possible to place 93%[2] of the respondents at a particular level.

3.1.2 Who stands where on the digital skills ladder?

A majority of 53% of the Austrian online population position themselves on the highest level 4, which enables active participation in the digital space. This contrasts with 16% of the Austrian online population who move in the digital space without feeling sufficiently empowered to do so (level 0). This ambivalent balance on digital skills is in line with the findings of 2022 (see the German-language report by Grünangerl & Prandner (2022)). In terms of their socio-demographic composition, no linear

[2] Coefficient according to Lowinger: 0.939; according to Goodenough & Edwards 0.929. The necessary level of 0.9 was surpassed (Bacher, 1990).

trends can be identified, details of which can be found in the table below (further detailed analysis at the level of individual items and multivariate models can be found in the German-language report, chapters 4.3 and 4.4).

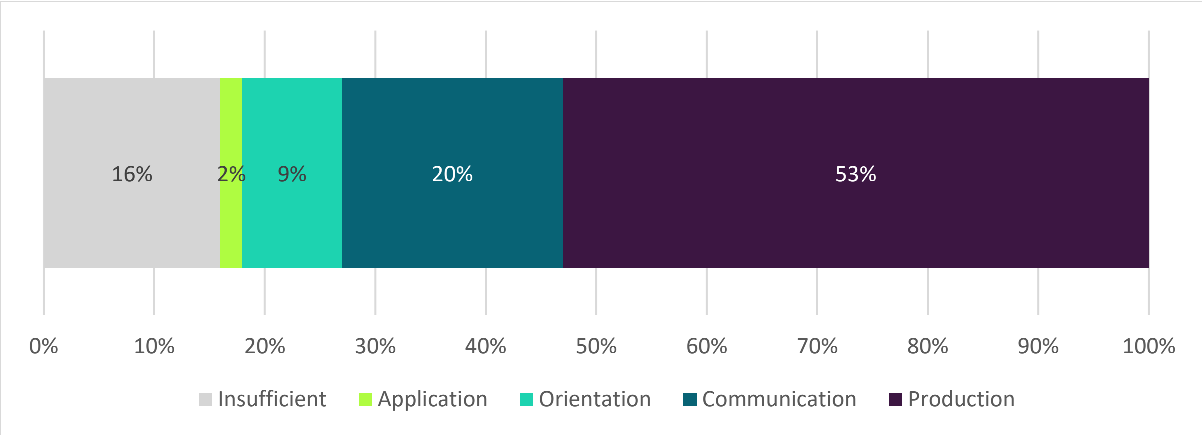

Figure 3 - Distribution of Participants on the Digital Skills Ladder 2023 (n=1313; rounded values to reach full percent)

Level	*0*	*1*	*2*	*3*	*4*
	Insufficient	Application	Orientation	Communication	Production
in % of the sample	**16%**	**2%**	**9%**	**20%**	**53%**
Age (mean)	51 Years	56 Years	50 Years	50 Years	42 Years
Sex (% of female)	49%	53%	37%	50%	47%
Education					
Secondary I or lower	69 %	83 %	60 %	58 %	55 %
Secondary II	18%	7%	20%	21%	25%
Tertiary	13%	10%	20%	21%	20%
Digital training courses	28%	28%	39%	60%	58%
Income (median)	1850 €	1850 €	2100 €	2100 €	2100 €

Table 4 - Digital Skill Scale - Demographic information (own calculations, n=1313)

3.2 *Digital Competencies*

Despite these somewhat positive assessments, further analysis reveals that the skills – and the set of actions to apply them in the digital space – do not necessarily translate into corresponding problem-solving competences. In fact, on average, respondents were able to solve only four of the thirteen tasks in the competency test, and one in ten respondents could not even solve a single task correctly (n=1048, see also Figure 3).

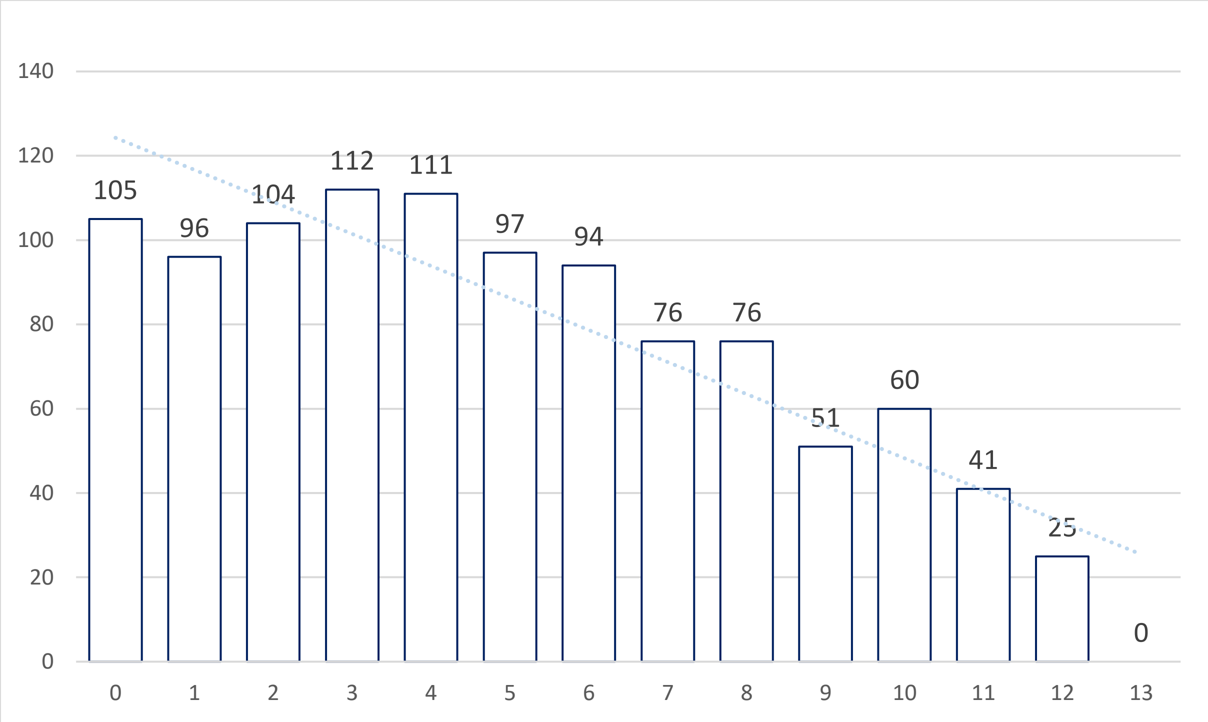

Figure 4 - Digital Competency Test Result (n=1048)

However, some tasks of the competency test were solved more often than others by the Austrian online population. For example, the study's participants found it easiest to correctly assign and apply basic knowledge in programme management (the "Save as..." command) and to interact with artificial intelligence: two thirds were able to solve these tasks correctly. Other tasks, such as identifying and using a QR code, recognising secure websites, or having a basic understanding of how artificial intelligence works, were solved by less than half of the respondents. Standards for connecting different technical devices were not a challenge for 44 % of respondents. In addition, 36 % of the respondents could easily handle email communication to multiple recipients and different addressees, and just under a third could use the basic functions of spreadsheets. Furthermore, around 30 % of the respondents could use e-governance/e-administration tools from public services to obtain relevant information, and a similar number could easily identify a line of HTML programming code (and its content). On the other hand, respondents were less successful in performing a targeted search for information on social networking sites, identifying an IP address or recognising user-specific advertising, with just over one in ten able to complete these tasks. While it can be argued that identifying an IP address is not a regular task in most people's daily lives, the other two aspects are more worrying, as these tasks are common in everyday web interactions.

Overall, the number of tasks solved varied widely (see also figure 3): the respondents were able to solve between zero and twelve of the thirteen tasks correctly. No-one was able to complete all the tasks correctly, with an average result of four correctly completed tasks. One in ten was even unable to solve a single task. This is just as worrying as the high proportion of people using digital technologies who remain at level 0 or 1 of the digital skills ladder, as it shows that a large proportion of the people are using technologies without having the skills or competences to do so.

Accordingly, people could give between 0 and 13 correct answers. Based on this information, it was possible to calculate a summative index expressing an individual's level of competence. In order to place the results in a general societal framework, questions were asked not only about socio-demographic data, but also about their commitment to using technology (Neyer et. al, 2012, 2016), general media use behaviour and aspects of self-efficacy.

There are significant differences in the results of the digital competency test in terms of age, gender, and education. Men performed better in the digital competency test than women. Looking at this difference in terms of age groups, it seems that in particular men up to the age of 45 were able to perform well in the competency test. More than half (55 %) of them were able to solve seven to nine or even ten to twelve tasks correctly. For women in the same age group, this proportion is only one third. The difference between men and women is largest in the 66+ age group: more than half of the women aged 66+ (57 %) could not solve any or only one to three tasks correctly, compared with only 40 % of men in the same age group. Up to the age of 30, men and women performed equally well. However, in the youngest age group, 43 % of men and 45 % of women could not solve any or just up to three tasks of the competency test.

When it comes to education, we can show that higher educational attainment is also associated with better results in the competency test. The proportion of people with a tertiary education who were able to solve seven to nine or ten to twelve tasks correctly is more than half (52%). In the group of people with upper secondary education (II) the proportion is still 30 %. On the other hand, the people with up to lower secondary education performed rather poorly in the competency test: 46% were unable to solve any or just up to three tasks correctly compared to about a third (34 %) of those who completed upper secondary education and about a quarter (26 %) of those who had completed tertiary education.

A closer look at the results of the digital competency test shows that at across all the different levels of education, people who have completed specific digital training courses perform better than those who have not. This effect can be seen at all levels of education: i.e., those who have completed digital training courses perform even better than those people at the next higher level of education who have no digital training, at all. This is most evident for people with a lower secondary education of less: without any further digital training half of them gave no or only up to three correct answers in the competency test; with digital training at this level, only 26 % performed so badly. On the other hand, more than half of those with upper secondary education (55 %) and those with tertiary education (67 %) were able to give seven to nine or even ten to twelve correct answers to the competency test if they had also received digital training. At both levels of education, this percentage is significantly lower for those who have not taken a subject-related course (37% at upper secondary level, 39 % at tertiary level).

People who were unable to complete a task in the digital competency test are also below average in their overall use of media offerings that include digital elements (i.e. web sites tied to quality media and tabloid media) and are also less likely to use social networks. People who score good or very good on the digital competency test use quality media more often than average and tabloid media less often. Those with the highest scores also use local and regional media less than the average of the population and their information behaviour is very much dominated by digital media. They are also the most frequent users of social networks.

More than half of the best performers in the digital competency test described themselves as (very) euphoric about technology. The euphoric attitude towards technology is lowest among those with the lowest scores on the digital competency test (zero or one to three correct answers) The idea of being able to master technological innovations is also above average in the top two ability groups, being held by up to three quarters of respondents in these groups. On the other hand, the least likely to believe that they can master technology are those with zero or one to three correct answers in the skills test (28% and 37% respectively). The correlation between performance in the competency test and fear of or being overwhelmed by technology is most pronounced: it is above average in the two worst scoring groups at 15% and 17% respectively, and well below average in the best scoring groups at 3% and 6% respectively (More detailed analyses at the level of individual items and multivariate models can be found in the German-language report, chapters 4.5 and 4.6).

4. Conclusion

The Digital Skills Austria study shows that almost three quarters of respondents reach the top two levels of the five-level digital skills ladder (53% even reach the highest level). However, it also shows that almost one in five participants even lack even the most basic skills for using digital technologies – i.e. they are not sufficiently empowered to participate successfully in the digital space.

Empirically, the results show that the modelling of the digital skills ladder to measure the perceived and reported digital skills of the population is promising for the future. The sequential and conditional nature of the digital skills measurements developed by van Deursen, Helsper & Eynon (2014) and van Deursen et al. (2017) based on Guttman's considerations can therefore be seen as a central contribution of the Digital Skills Austria study to both methodological and theoretical discussions in the field. Further parts of the study should move towards a more confirmatory approach. This is particularly relevant as the questions and measurement instruments are also being applied and used in different contexts (e.g. the European ySKILLS study; see also DeConinck et al., 2023; Kalmus et al., 2023, and Helsper et al., 2023).

In addition, the data collected on digital competences shows that despite the high level of user skills, that can be reported in the form of the digital skills ladder, not only is the knowledge about digital technology low among the Austrian online population (Grünangerl & Prandner 2022, pp. 60-62), but also the problem-solving competences are very unevenly distributed. Accordingly, it is worth reporting that none of the more than 1000 participants tested were able to solve all tasks correctly, and many also came up with incorrect solutions, rather than indicating that they did not have the relevant competences to solve the tasks.

In the light of these worrying findings, it is important that the study also showed that both skills and competences can be significantly improved if individuals receive in additional digital training on the subject.

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