Learning and Skill Development in Online Platform Work

Comparing Microworkers' and Online Freelancers' Practices (CrowdLearnPlus)

Margaryan, Anoush ; Charlton-Czaplicki, Timothy ; Gadiraju, Ujwal

Learning and skill development in online platform work:

Comparing microworkers' and online freelancers' practices (CrowdLearnPlus)

Project Final Report

25 September 2020

Anoush Margaryan[1], Timothy Charlton[1], Ujwal Gadiraju[2]

[1]Department of Digitization, Copenhagen Business School, Denmark

[2]Delft University of Technology, the Netherlands

Acknowledgements

The authors are grateful to Cedefop for funding the research reported in this document. We thank the crowdworkers for participation in the survey.

Table of Contents

Tables and Figures

Executive summary

This project undertook a comparative analysis of workplace learning and skill development practices within two different types of online platform work: online freelancing and microwork.

This project is a follow up to the CrowdLearn project[1] funded by Cedefop in 2018-2019 to scope and analyse workplace learning and skill development practices in online freelancing type of platform work. As part of the CrowdLearn project, a questionnaire survey of n=1001 online freelancers working on 4 global crowdwork platforms was undertaken. The current project applied the CrowdLearn questionnaire survey to examine workplace learning and skill development practices within the second type of crowdwork, microwork. The additional survey included n=1004 microworkers drawn from Amazon's Mechanical Turk platform.

Subsequently, the project carried out statistical analyses comparing the results obtained in the microwork platform with those obtained from the online freelancing platforms. In particular, the study examined what if any differences there are between microworkers and online freelancers in the use of workplace learning activities and self-regulatory learning strategies these two different types of online workers undertake to organise and direct their own learning in their crowd workplace. Furthermore, the study analysed what if any correlations there are between the types and frequency of use of workplace learning activities and self-regulated learning strategies the workers undertake and the key personal and environmental factors, in particular the perceived complexity and interdependence of tasks workers undertake; the reported differential personal motivations underpinning microworkers' and online freelancers' decisions to take up crowdwork; the intensity of workers' engagement in crowdwork; and the disposition to self-regulated learning they exhibit in their daily work on the platforms.

First of its kind internationally, this comparative study analysing learning practices in microwork and online freelancing extends the CrowdLearn study generating additional insights and policy recommendations to Cedefop on how to foster workplace learning and skill development within both types of online work, widening the reach of the policy conclusions drawn.

The following policy recommendations are formulated on the basis of this comparative study:

1. Supporting skill development in microwork marketplaces

Over the years microwork has gained prominence due to the relatively simple nature of work that requires innate human intelligence (Surowiecki, 2005). Most tasks that microworkers engage with therefore do not require a special set of skills. When asked about which skills microworkers had developed over the past three months, they reported frequently developing 'skills in obtaining work on

[1] CrowdLearn project: https://www.cedefop.europa.eu/en/events-and-projects/projects/digitalisation-and-future-work/crowdlearn-online-platform-work-and-skills

platform[s]' (61.1%), 'skills in being an online worker'[2] (60.1%) and 'analytical skills' (58.4%) as their top three skills categories. This can be explained by the time required for microworkers to develop the necessary skills to build good reputations, understand how best to access a large enough amount of good work, identify well-paying tasks and trustworthy clients, and as a result maximise their earnings.

In case of microwork, how workers think about their work also reflects a surface-level engagement with tasks. "Thinking deeply about my work" was prominently reported by online freelancers (73.2%), while only 49.7% of microworkers claimed to engage in this activity at least frequently. Similarly, our findings indicate that online freelancers are more prone to self-reflection in comparison to microworkers. Thinking frequently 'about how what I have learned impacts my work' was more prevalent among online freelancers (60.2%) than microworkers by over 24 percentage points. Additionally, 76.3% of online freelancers reported to frequently consider how their learnings will be useful to them in 'future jobs', compared to 48.3% of microworkers. Almost the entire sample of online freelancers (94.9%) in our study responded that they frequently 'try to understand the problem thoroughly', compared to 77.3% of microworkers. Similarly, online freelancers reported to frequently 'apply lessons learned' from previous work (82.8%), whereas only 51.4% of their microworking peers did so. This could be due to the more fast-paced and fragmented nature of microwork that, in comparison to online freelancing, may afford fewer opportunities to engage in self-reflection.

In general, microworkers and online freelancers reported developing most skill categories before their engagement in crowdwork, with the exception of specifically platform-related activities, such as "being an online worker / [a freelancer]" or "obtaining work on platforms". Efforts to lower the barriers of access to microwork can engage broader participation. At the same time, by creating appropriate workflows and task designs to decompose and manage complex/creative work, microworkers can be provided the opportunity to develop richer and specialised skill sets. For example, workers can develop writing skills through tasks that require creative generation of content. Task decomposition methods however should cater to optimizing skill development rather than only for being consumable as a microtask. Typical task decomposition in microtask crowdsourcing workflows amounts to breaking down work into smaller units of non-complex activities, that do not particularly consider skill-augmentation of workers. To this end, novel workflows and task decomposition methods that specifically focus on optimizing skill development among workers are needed.

2. Microwork as a viable secondary source of income for labour market reintegration

The majority of microworkers in our study suggested that they did not rely on microwork as a primary source of their income, with only 8.9% suggesting that earning primary income through microwork motivated them to undertake this form of work. This is in contrast to 20.2% of online freelancers for

[2] The survey item was worded as "Through work on [Platform], I developed skills in being a freelancer (e.g., how to get business permits, taxation, working alone, etc.)" for online freelancers and "Through work on MTurk, I developed skills in being an online worker (e.g., how to earn a livelihood online, taxation, working alone, etc.)" for microworkers.

whom earning primary income from crowdwork was a main motivating factor. Our findings suggest that microwork can be a viable source of earning a secondary income for microworkers (40.7%) and online freelancers (43.7%). 30.9% of the microworkers in our study reported to be studying compared to 13.2% of the online freelancer's sample. *This suggests the potential of microwork in supplementing the income of young adult populations.* Since there appears to be a continuous demand for online microwork (evidenced by the growing number of microtask crowdsourcing platforms in Europe), policymakers should explore the opportunities presented by microwork to help increase (part-time) employment among citizens. Our findings also suggest the potential of microwork in reintegrating marginalised groups (for example, retired or disabled individuals and the unemployed) into the labour market. This is all the more relevant since microworkers reported generally high levels of enjoyment while completing crowdwork tasks. By creating awareness campaigns to increase participation and engagement in microwork, building worker-centric platforms to serve specific needs and foster healthy relationships between all the actors involved (clients/task requesters, microworkers, platform owners), microwork presents an opportunity to find more work, or supplement existing incomes of individuals. This could be rather pertinent now that the EU, in line with the rest of the world, is dealing with the economic fallouts from the ongoing COVID19 pandemic and would arguably have to continue to deal with this for some time to come (Qiu et al., 2020a; Sawyer et al., 2020; Tang, 2020). Policies could be put in place to support large numbers of furloughed workers across the continent to earn income though online platforms. Finally, the considerable uptake of microwork among immigrant workers (approximately a third of our sample reported immigrant background, in line with the previous CrowdLearn and COLEEM studies funded by Cedefop) is another area that presents an opportunity to policymakers across the EU.

3. Microwork as an untapped market for creative and complex work

Our findings also indicate that many microworkers perceive their tasks as repetitive and monotonous, corroborating evidence from prior work (Gadiraju & Dietze, 2017). In contrast, online freelancers' tasks appear to be relatively more complex and creative. However, research advances in microwork have indicated the suitability of microtask platforms in accomplishing both creative and complex work – also referred to as macrotask crowdsourcing (Doroudi et al., 2016; Haas et al., 2015; Valentine et al., 2017). Macrotask crowdsourcing has been defined to be innately linked with *skill diversity*, and more fine-grained skill types, including expert and twenty-first-century skills, as well as valid skill identification and evaluation mechanisms (Lykourentzou et al., 2019). Examples of higher order cognitive and twenty-first-century skills that workers might need to complete such tasks include: creativity, curiosity and imagination, critical thinking and problem-solving, effective oral and written communication skills, information analysis ability, agility, adaptability and the capacity to learn new knowledge fast, collaboration ability, communication skills, taking initiative, leadership and people management skills (Wagner, 2014). Policymakers can support initiatives and platforms that build and promote support for complex and creative work to be executed in microwork marketplaces. This can be beneficial to microworkers, since creative and complex work has been shown to improve worker engagement and be mentally stimulating. Specifically, policymakers can attempt to incentivise platforms to optimize for skill-augmentation of workers, so that the worker population can gradually upskill and become capable of taking on new types of tasks requiring those skills. This can in turn attract new clients who can turn to

such platforms, creating the potential for a sustainable demand and supply of tasks. Although skilled and complex work is likely to warrant higher costs on microtasking platforms, clients on similar platforms have shown the inclination to reward high-quality work with commensurate pay (Hara et al., 2018).

4. Bridging communication gaps in microwork marketplaces

Microwork marketplaces have been recognised to exhibit power asymmetry between workers and task requesters (Irani & Silberman, 2013), and there are often issues related to communication that manifest due to the absence of open and fluid channels of communication (McInnis et al., 2016). In this study we found that face-to-face interaction with other online workers was reported to be slightly higher among microworkers, with 18,2% reporting at least weekly interactions, compared to only 16,5% of online freelancers. In contrast, communication via online channels was higher by seven percentage points in the online freelancer sample, due to a greater reliance on communication and relatively lesser power asymmetry on most online freelance platforms. The least frequently developed category of skills by microworkers in our study was found to be 'communication skills' (reported by 26,2% of the workers), which could be attributable to the autonomous and fragmented nature of microwork and the bare-bones communications between task requesters and workers that is mediated through minimalist platform features. In contrast to microworkers, most online freelancers (74,1%) reported frequently developing communication skills during the past three months. 39,9% of online freelancers also reported frequently asking others for help "when having difficulty learning something", compared to only 21% of microworkers, once again hinting at the potential lack of a network of peers to rely on in case of microworkers. Our findings in this study corroborate this well-known characteristic of microwork marketplaces and call platforms and policymakers to action with respect to bridging the communication gaps between clients/task requesters and workers, in an attempt to build a sustainable microwork labour market.

5. Microwork as an opportunity to facilitate labour market integration and skill development for refugees and other special groups

The broadening landscape of crowd work in Europe over the last decade has coincided with an influx of refugees across EU member states, with first-time asylum applicants going up by 12% in Q3 of 2019 when compared with Q2 of 2019. Recent studies have found that over 30% of online workers in Europe are immigrants (Cedefop, 2020). Although online work opportunities have provided migrants and refugees with viable means of earning a livelihood, few efforts have focused on optimising learning-related outcomes in online work and helping with the integration of migrants into the local population through sharing online workspaces and offline communities. Prior studies have highlighted the ambivalent implications of digital labour platforms for work and employment (Pesole et al., 2018). On one hand, they have the potential to lower the entry barriers to the labour market, facilitate work participation through effective matching mechanisms and improve the working conditions of workers (for example, people with disabilities or health conditions, youth, older workers, unemployed individuals, people with a migrant background). On the other hand, digital labour platforms such as microwork platforms typically rely on a workforce of independent workers whose conditions of work, representation and social protection are unclear or unfavorable. Drawing on a balanced assessment of

these opportunities and challenges, policymakers could consider initiatives to help engage refuges and other special groups in microwork platforms as a temporary measure to help facilitate labour market integration and skill development. In doing so, they can draw on examples and experiences from crowdwork platforms with a social mission such as Samasource (www.samasource.com) which provide work opportunities to low-income workers in developing countries at the same time training the workers in digital skills necessary to engage in crowdwork.

6. Educational institutions to focus on developing peoples' self-regulatory learning skills

An implication of our study is the importance of self-regulatory learning skills for microwork. Workers need a baseline level of self-regulatory skills to plan, implement and evaluate their own learning and development in order to find better-paid and stimulating tasks, understand the complex and sometime opaque platforms interfaces, workflows and rules, identify trustworthy clients, and overall succeed in platform work. Our study suggests that workers who are more highly self-regulated learners engage in more creative and complex tasks and more workplace learning. The importance of SRL skills was highlighted in the policy recommendations of the original CrowdLearn study (Cedefop, 2020) and it stands here as well. Therefore, educational institutions, including vocational training colleges, should help people develop self-regulated learning skills. This can be achieved through designing educational and training experiences in such a way that the SRL behaviours are fostered and rewarded.

1. Introduction

1.1. Context and aims of the project

Online platform work has emerged over the last couple of decades as a form of crowdsourced work, whereby Internet-based platforms are used to bring together people from across the world to carry out tasks (Lehdonvirta & Ernkvist, 2011). Crowdsourced work practices are heterogeneous, ranging from paid work to contest-based tasks, citizen science initiatives and volunteering (F. Schmidt, 2017). Some of these forms of work occur entirely online, within digital platforms or apps. Others are coordinated online, but the actual delivery of services occurs offline (Figure 1). The context of the present study is paid crowdsourced work where the delivery of service occurs entirely online (the upper right quadrant in Figure 1). We use the term *crowdwork* to characterise this form of platform work. Crowdwork occurs within Internet-based platforms, which act as intermediaries between people or organisations who post tasks (clients) and workers who perform them. Some of the largest and best-known examples of crowdwork platforms are Amazon Mechanical Turk (MTurk), People Per Hour and Upwork.

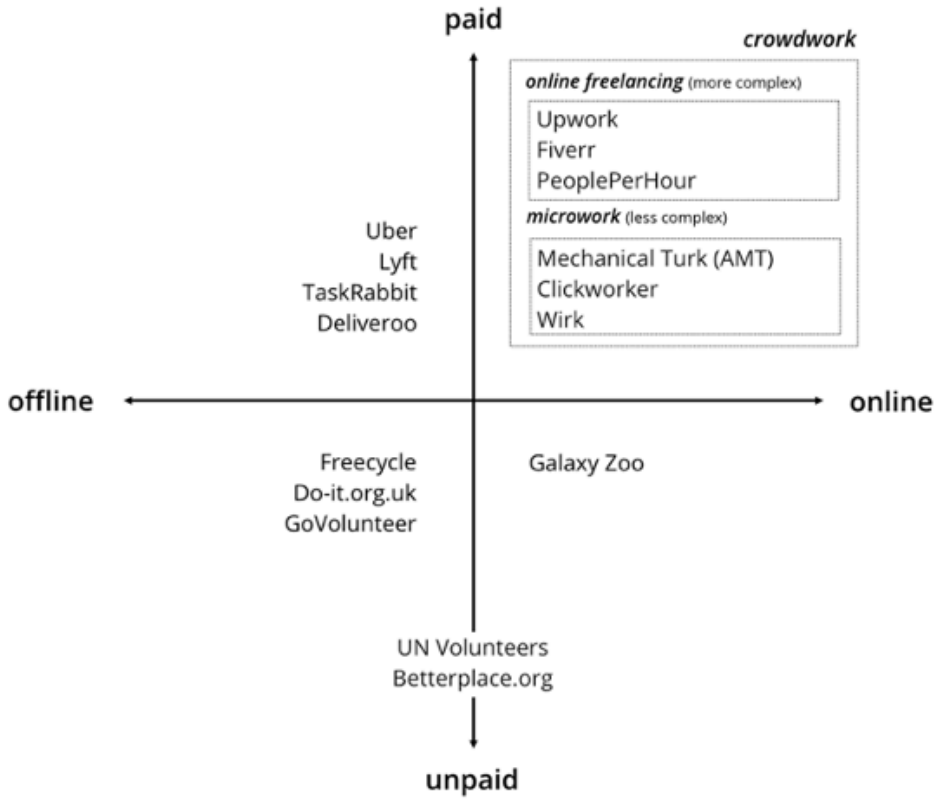


Figure 1 Types of crowdsourced labour (adapted from Margaryan, 2019a)

Shown in Figure 1, the two key types of crowdwork are microwork and online freelancing (Kuek et al., 2015). Microwork (MW) is a collective term for the form of crowdwork in which large projects outsourced to crowdwork platforms by clients are broken down – by the platform- into small units of

work (called micro-tasks) and posted on the platform for crowdworkers to carry out for pay. Microtasks typically can be completed in seconds or minutes and are generally considered not to require any specialised skills beyond basic computer and Internet literacy. Examples of micro-tasks are tagging images, rating public sentiment about a product on social media, finding or verifying information on the Web, writing short content, for example short product descriptions, or carrying out basic administrative tasks such as data entry. The distribution, completion and acceptance of microwork tasks are monitored largely by algorithms rather than humans, in an emergent mode of supervision of work termed 'algorithmic management' (F. Schmidt, 2017). Within microwork platforms, crowdworkers tend to be anonymous, distinguishable only by a set of numbers representing their worker ID. Compared to microwork, online freelancing (OF) tasks, sometimes called macrowork, tend to be larger, more complex and performed over longer periods of time - hours, days or months. Online freelancing often requires specialised, professional skills. Examples of online freelancing tasks are graphic, software and architectural design; video production; data analytics; PR and marketing services; business plan development; or legal advice. In contrast to microwork platforms, OF platforms enable workers to publish their profiles including their qualifications, work experience, skills and testimonials from previous clients. Furthermore, OF platforms enable clients to select crowdworkers based on their skills and profile, and, unlike in microwork, the pay and other contractual terms are typically negotiated between the client and the worker. Within OF platforms, task owners (clients) rather than algorithms monitor the quality of work.

Both type of crowdwork have seen a rapid and steady increase in the uptake both in the developing and developed countries, including within the EU (Lehdonvirta et al., 2019; Margaryan, 2019a). Online platform work occurs largely outside conventional organisational workplace settings, therefore crowdworkers typically don't have opportunities to benefit from organisationally-supported forms of learning, training and skill development. In recent years, some studies have examined how crowdworkers learn and develop skills in the context of their work on the platform (Cedefop, 2020; Margaryan, 2019a, 2019b), however the focus has been largely on online freelancers rather than microworkers. Yet microwork represents a unique form of platform work that poses challenges and opportunities in terms of learning and skill development warranting further research.
Since their inception over a decade ago, microwork platforms tended to be largely used for processing big datasets related to digitisation of archives or marketing. However, recently there has been a surge in the use of microwork platforms to process big datasets for training machine learning algorithms underpinning AI applications (Le Ludec et al., 2019; F. A. Schmidt, 2019; Tubaro & Casilli, 2019). Microworkers engaged in these platforms are preparing, categorising and qualifying data for the Artificial Intelligence (AI) applications, assessing the performance of these algorithms, and making corrections where necessary. As microwork becomes increasingly central to the production of AI and machine learning algorithms, it is now quickly becoming a worldwide phenomenon that is not confined to the developing countries as previously believed and observed, with the European workers increasingly taking up microwork, for example, to train voice recognition software for regional European accents, including in affluent regions of Europe or to train algorithms for self-driving cars for the automotive sector in Germany (F. A. Schmidt, 2019). Therefore, systematic evidence and insights on

microworkers learning practices could help inform Cedefop's and EU policymakers' initiatives aimed at fostering learning and skill development in this emergent form of work.

Against this background, the aim of this project is two-fold: (a) to scope and analyse workplace learning and skill development practices of microworkers; and to (b) compare and contrast microworkers' learning practices with those of online freelancers. In particular, we identify and analyse the similarities and differences between microworkers and online freelancers in terms of their key demographic characteristics; their perceptions of the nature of their work; their motivations for undertaking crowdwork; the skills they develop through crowdwork, and their use of workplace learning activities and self-regulatory learning strategies to plan, implement and reflect on their learning and skill development. The comparison would help us develop more nuanced insights into the demographics of these different types of platform workers, the various approaches to workplace learning and skill development, as well as on the potential interrelationships between of the nature, organisation and design of these different types of platform work and the learning potentialities of microwork and online freelancing.

The project underpinning this report is a follow up to the CrowdLearnF project[3][4] funded by Cedefop in 2018-2019 to scope and analyse workplace learning and skill development practices in online freelancing (Cedefop, 2020). As part of the original CrowdLearnF project, a questionnaire survey of n=1001 online freelancers working on four global crowdwork platforms across five EU countries representing the main types of welfare regimes in the EU across North-South and West-East geographic divides as well as the UK was undertaken (Cedefop, 2020). The follow up project applied a modified version of the CrowdLearnF questionnaire survey to examine workplace learning and skill development practices within microwork. The follow up survey included n=1004 microworkers from Amazon's Mechanical Turk platform based in a comparable set of five EU countries. The details of the methodology and the sample are further outlined in Section 2 of this report.

1.2. Research questions

The following key research questions (RQs) are examined:

> **RQ1**. What are the similarities and differences in the scope and frequency of use of workplace learning activities (WLAs) and self-regulated learning strategies (SRL strategies) between online freelancers (OFs) and microworkers (MWs)?

[3] CrowdLearn project: https://www.cedefop.europa.eu/en/events-and-projects/projects/digitalisation-and-future-work/crowdlearn-online-platform-work-and-skills

[4] *CrowdLearnF* refers to the original sample of online freelancers whereas *CrowdLearnM* refers to the subsequent study of microworkers.

RQ2. What if any correlations are there between the *complexity and interdependence of crowdwork tasks as perceived by the workers and the scope, frequency and nature of WLAs and SRL strategies workers undertake*? What hypotheses could we formulate about the possible causes underpinning these potential correlations, to be explored in future research?

RQ3. What if any correlations are there between the *differential primary motivations that lead individuals to undertake crowdwork and the scope, frequency and nature of WLAs and SRL strategies that the workers undertake*? What hypotheses could we formulate about the causes underpinning these potential correlations, to be explored in future research?

RQ4. What if any correlations are there between the *intensity of workers' engagement in crowdwork – as defined by the number of hours per week a worker spends carrying out crowdwork tasks - and the scope, frequency and nature of WLAs and SRL strategies that the workers undertake*? What hypotheses could be formulated about the possible causes underpinning these potential correlations, to be explored in future research?

RQ5. What if any similarities and differences are there in the *scope and frequency of use of WLAs and SRL strategies between microworkers and online freelancers who report low, medium and high levels of self-regulated learning behaviour*?

2. Methodology and data collection

2.1. Survey design

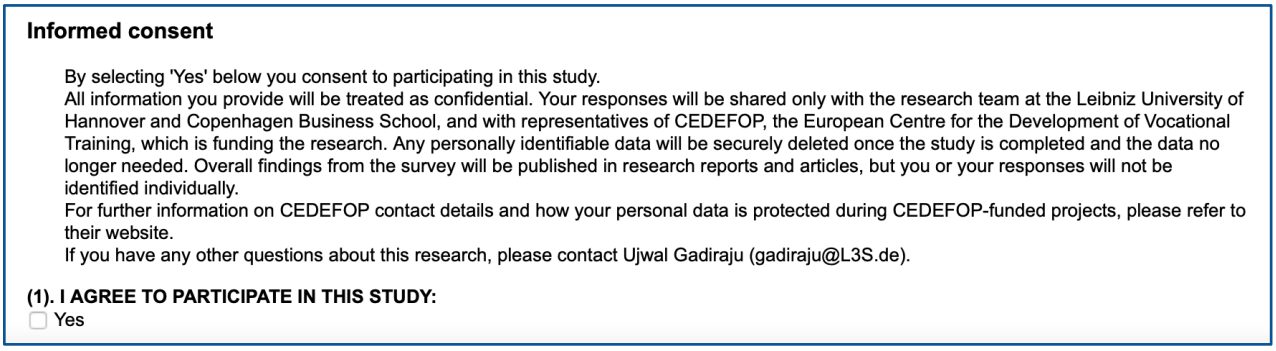
We adapted the survey from the CrowdLearnF study[5] to fit the context of microwork on the popular crowdsourcing platform, Amazon Mechanical Turk (MTurk) that has good representation of EU workers.[6] The survey consisted of a total of 28 questions, including a combination of open-ended, multiple-choice, and Likert-scale type questions. The estimated task completion time for the survey is around 10-15 minutes on average. Survey questions were adapted to reflect the context of microwork by referring to them as "online workers" rather than "freelancers". Task categories were completely changed to reflect the types of tasks that are typically completed in microtask marketplaces (Gadiraju et al., 2014). The complete survey can be found in Annex 1.

[5] CrowdLearn project: https://www.cedefop.europa.eu/en/events-and-projects/projects/digitalisation-and-future-work/crowdlearn-online-platform-work-and-skills

[6] https://www.mturk.com/

Prior research in microtask crowdsourcing and survey deployment in particular has revealed the importance of task instructions in shaping the quality of responses (Gadiraju et al., 2016; Gadiraju, Yang, et al., 2017; Han et al., 2019). Through clear instructions, recruited participants were informed that the survey pertained to their learning and professional development as part of their work on MTurk. They were informed that survey questions were about the work they carried out on the MTurk platform, the skills they develop through this work, and their interactions with other workers, and the platform. We informed the participants that while responding to questions, it would be useful to think about a concrete task during which they had to learn new skills. Learning can happen through means such as self-study, seeking feedback from the task requesters or their peers when applicable, solving problems, keeping up to date with developments in their field, or taking an online tutorial or attending a training workshop. Workers were requested to hold this broad view of learning in mind when considering their responses. Finally, workers were reassured that there were no right or wrong responses to the questions in our survey. To avoid social desirability bias, we encouraged workers to report how they typically behave, rather than how they feel that they should behave. As a final note of the instructions, workers were assured of the privacy of their responses and that their individual data would not be shared with MTurk.

Before starting the survey, workers were first asked to indicate their informed consent (Figure 2). The survey was set up in such a way that respondents could not progress unless they formally consented to taking part in the study.


Informed consent

By selecting 'Yes' below you consent to participating in this study.
All information you provide will be treated as confidential. Your responses will be shared only with the research team at the Leibniz University of Hannover and Copenhagen Business School, and with representatives of CEDEFOP, the European Centre for the Development of Vocational Training, which is funding the research. Any personally identifiable data will be securely deleted once the study is completed and the data no longer needed. Overall findings from the survey will be published in research reports and articles, but you or your responses will not be identified individually.
For further information on CEDEFOP contact details and how your personal data is protected during CEDEFOP-funded projects, please refer to their website.
If you have any other questions about this research, please contact Ujwal Gadiraju (gadiraju@L3S.de).

(1). I AGREE TO PARTICIPATE IN THIS STUDY:
☐ Yes

Figure 2 Informed consent

2.2. Method

To address the research questions listed in Section 1.2, we deployed the survey on the popular crowdwork platform, Amazon's Mechanical Turk (MTurk). MTurk has been widely used over the last decade for a variety of applications requiring human input or intervention across several domains (Demartini et al., 2017; Gadiraju et al., 2014; Hube et al., 2019; Zhang et al., 2019). A recent analysis of the population dynamics and demographics on MTurk (Difallah et al., 2018) revealed that there are over 100*K* active workers on the platform and there are over 2*K* active workers on the platform at any given time. Authors found that the half-life of workers on the platform is between 12 to 18 months and that the rate of departure of workers balances the rate of arrival of new workers, keeping the overall population of workers on the platform relatively stable. Most of the workers on the platform have been reported to be

from the US (~75%), followed by India (~16%), Canada (~11%), Great Britain (~7%), Philippines (~3.5%) and Germany (~2.7%). Other European countries featured in the top-15 countries of origin for AMT workers are France, Italy and Spain.

Considering that MTurk was one of the first microwork platforms to gain prominence, and due to its reasonable popularity in Europe, we deployed the survey on MTurk in March-May 2020 acquiring responses from workers in each of the following countries: the United Kingdom, Germany, Italy, Spain and France[7]. To ensure the reliability of responses received, we constrained worker participation to those with an approval rating[8] of >80% using an inbuilt feature on the MTurk platform. In addition, we embedded two attention check questions in the survey to filter out unreliable workers in a post-hoc manner (Gadiraju et al., 2015). Figure 3 shows an attention check question which explicitly asks the participant to select a given option.

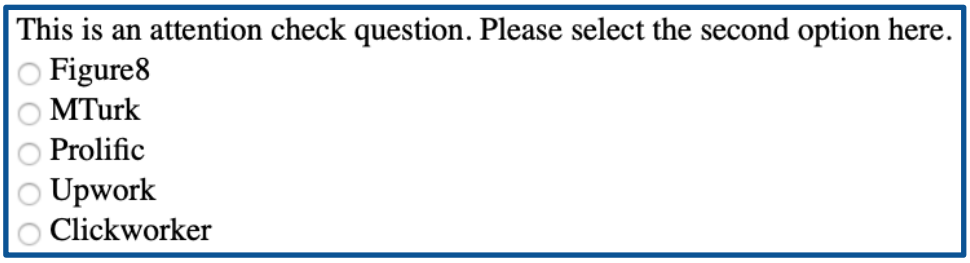


Figure 3 Example of an attention check question embedded in the survey

We aimed to collect responses from 270 unique MTurk workers from each of these countries. However, due to '*task stagnation',* also referred to as '*HIT starvation*',[9] and after filtering out unreliable workers (who responded incorrectly to at least one of the two attention check questions), the final dataset we collected includes responses from: 248 unique MTurk workers from the UK, 232 workers from Germany, 259 workers from Italy, 267 workers from Spain and 84 workers from France. Overall, responses from 1075 microworkers from five different countries were collected. Of these, 71 were discarded due to failing at least one of the two attention check questions or otherwise providing non-applicable answers, resulting in a final microwork dataset of 1004 respondents.

Respondents were rewarded with a monetary compensation of USD 1,80 for completing the 10-15 minute survey successfully. Payments were approved through the MTurk platform within 2-3 days of workers submitting their responses.

[7] Note that Germany, Italy, Spain and the United Kingdom coincide with the countries that were considered in the CrowdlearnF survey, while we additionally considered France with respect to microwork alone.

[8] HIT approval ratings on AMT reflect the proportion of tasks completed by workers that are accepted by task requesters.

[9] HIT starvation is a phenomenon typical of AMT, where batches of HITs tend to become less popular over time with fewer new workers completing them (Chilton et al., 2010).

3. Results

In the following sections the key findings from the CrowdLearnM survey are presented, discussed and contrasted with the results of the original, CrowdLearnF, survey (3.2 - 3.4). Evidence of relationships or notable discrepancies between the two forms of crowdwork are then discussed towards the end of the chapter (3.5).

3.1. Demographic characteristics of the samples

3.1.1. Age, gender and geography

The majority of microworkers in our sample reported working from Italy (24.6%), followed by Spain (24.3%), the UK (23.8%) and Germany (19.3%). A lower percentage of microworkers in our study were working from France (8.0%) (Figure 5).

69.6% of survey respondents identified as 'male', 30.1% as 'female' and 0,3% (three respondents) as 'other'. This skewed distribution with respect to gender is consistent with what has been reported on the AMT platform (Difallah et al., 2018). For the microwork sample, the average participant age was 31 years across all genders, with a standard deviation of 9 years (Table 1).

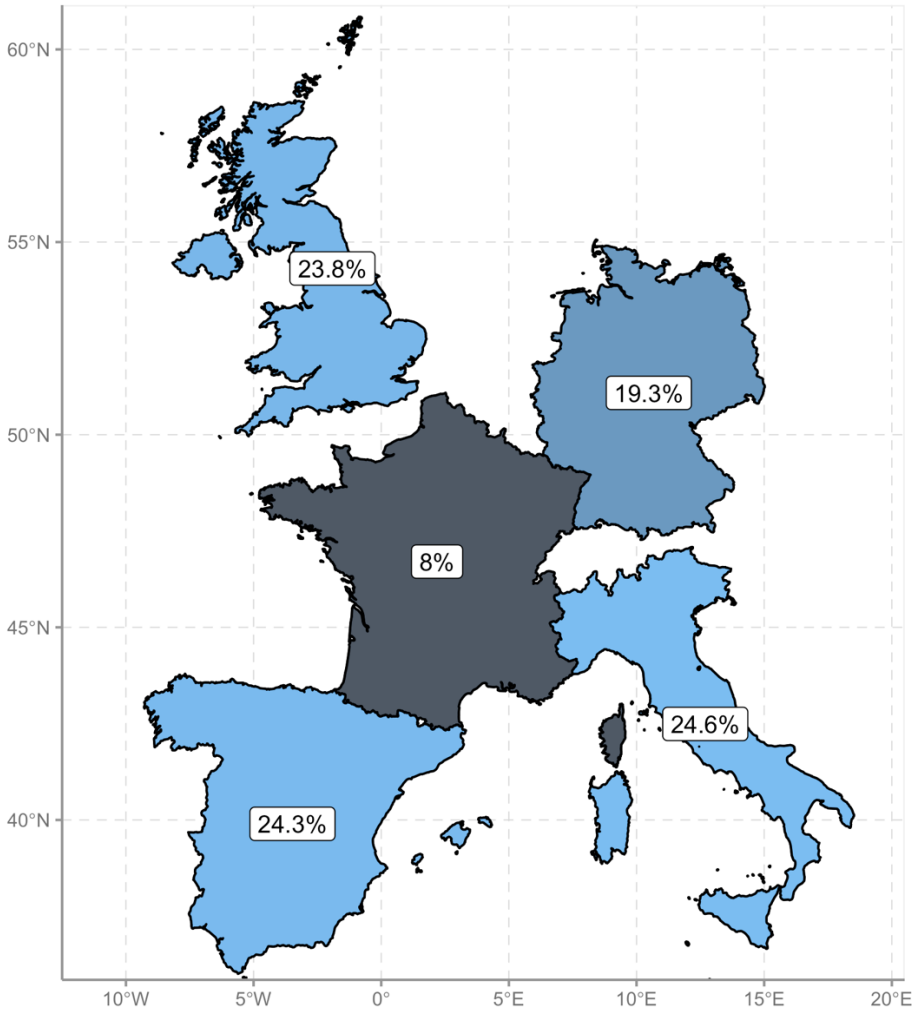


Figure 4 Geographical distribution

Immigration background, determined by comparing respondent's country of birth and the country they were currently working from, was reported by around one third of participants in both samples (31.7% among microworkers and 32.3% among online freelancers) in both surveys. Similar proportions of workers with immigrant background have been reported in other recent EU surveys of crowdworkers (Pesole et al., 2018). There is no statistically significant difference between the two samples in this aspect.

Table 1 Age, gender and geographic distribution of microworkers

	Total	**Female**	**Male**	**Other**
	n=1,004	n=302	n=699	n=3

Age	31 (±9)	32 (±9)	30 (±9)	31 (±8)
Country				
France	80	19 (23.8%)	61 (76.2%)	0 (0%)
Germany	194	44 (22.7%)	150 (77.3%)	0 (0%)
Italy	247	65 (26.3%)	182 (74.7%)	0 (0%)
Spain	244	91 (37.3%)	152 (62.3%)	1 (0.4%)
UK	236	82 (34.7%)	152 (64.4%)	2 (0.9%)

Note. Percentages (%) / standard deviations (±) in Parentheses.

Gender was more equally balanced among the original online freelancer sample, with 47% percent of respondents of the previous sample identifying as female, and the average age of participants in the OF survey was slightly higher at 35 years with a standard deviation of 11 years.

3.1.2. Educational background

The level of educational attainment was similar in both samples, with most online freelancers (33.6%) and microworkers (28.1%) reporting having completed university education at the undergraduate level (Figure 6).

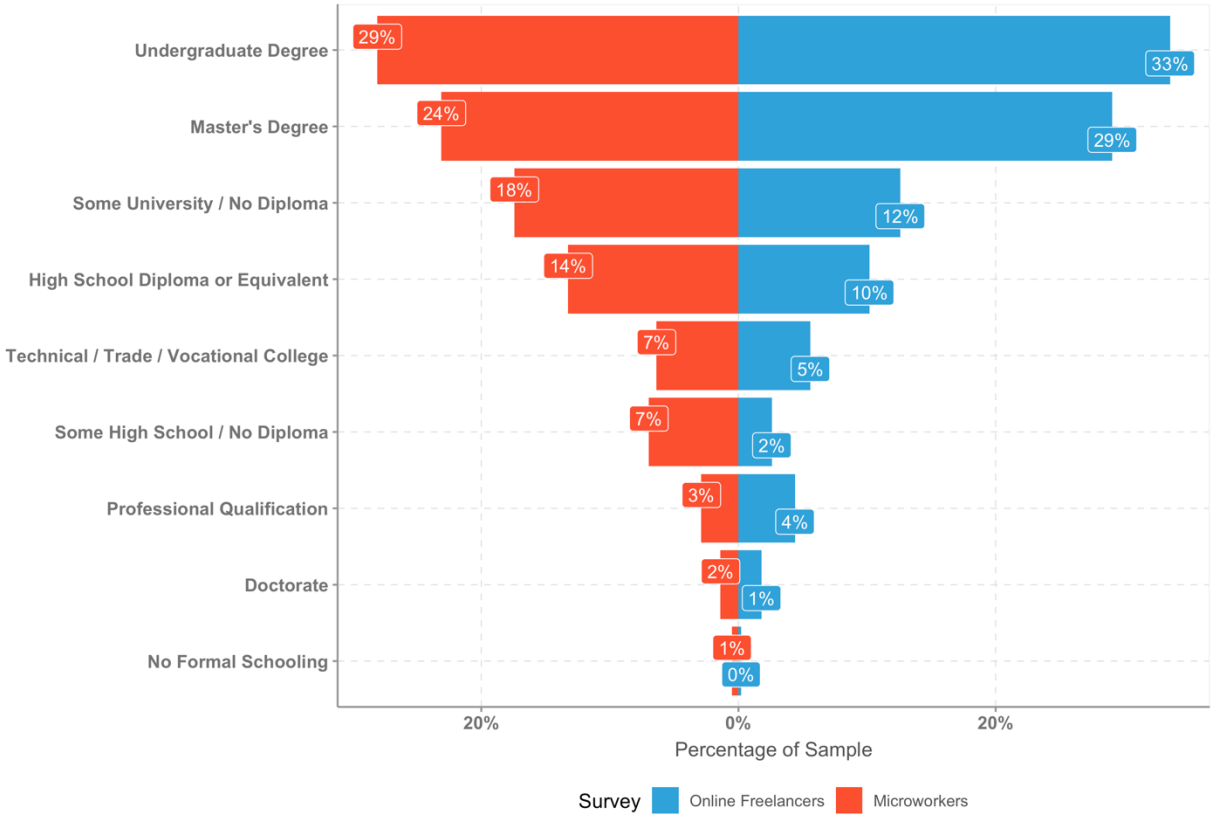


Figure 5 Level of educational attainment

29.1% of online freelancers and 23.1% of microworkers reported holding a postgraduate (Master's level) qualification, with 1.8% and 1.4% respectively claiming to have obtained a doctorate. In combination, the level of respondents with an undergraduate or postgraduate university degree was 11.9 percentage points higher in the CrowdLearnF (online freelancer) than in the CrowdLearnM (microworker) sample. The rate of microworkers with leaving certificates from "technical / trade / vocational college" was 6.4%, compared to 5.6% of online freelancers. Online freelancer's were claiming to hold other "professional qualifications" (4.4%) at a slightly higher rate than microworkers (2.9%). This suggests that microworkers – despite performing what could be considered low-skill tasks- are not themselves necessarily low-skilled individuals. There are different reasons- such as different life course factors or motivational reasons – why skilled individuals may choose to engage in low-skill tasks, therefore the nature of tasks should not be conflated with the nature of the skill profile of crowdworkers. Future research is needed to surface and analyse such relevant life course factors and motivational rationalities that lead skilled/educated people to undertake low skill tasks (Margaryan and Hofmeister, in press).

Age and educational attainment rates could indicate a more mature audience engaging in online freelancing activities (i.e. more complex crowdwork), while microworkers are less likely to have completed their formal education. This is potentially corroborated by the higher rates of microworkers claiming a "high-school diploma or equivalent" (13.2% compared to 10.2%), "some university" (17.4% compared to 12.6%) or "some high school" (7% compared to 2.6%) as their highest level of educational attainment. The lead of microworkers over online freelancers in these categories could indicate that microworkers are more likely to remain in active education.

3.1.3. Intensity of engagement in crowdwork

Weekly commitment to platform-facilitated work (Figure 7) and self-reported main form of employment (aside from crowdwork) provide further insights into the differences between the two types of workforces.

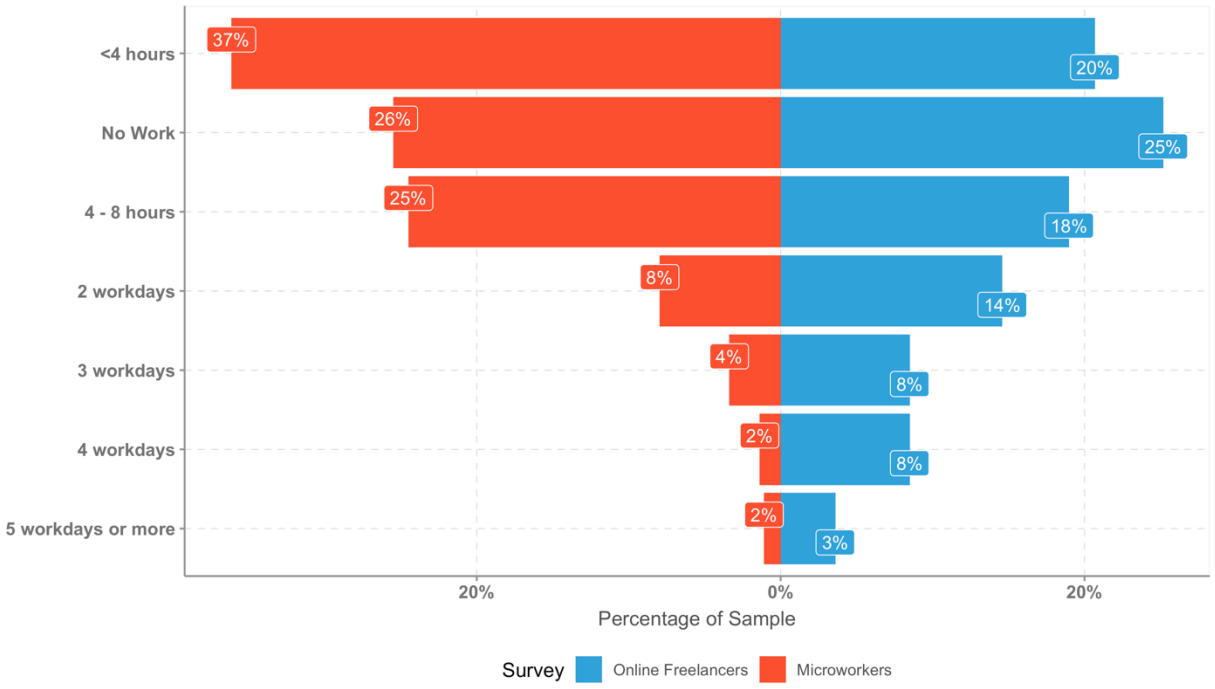


Figure 6 Hours worked on platforms in the past week

Overall, across both types of crowdwork, the least number of workers reported investing a full five-day week into their crowdwork over the past week, with only 1.1% of microworkers and 3.4% of online freelancers choosing this option. The number of respondents increased markedly to 8.5% of online freelancers for a four-day week but remained similarly low at only 1.4% (14 respondents) for microworkers, who saw a two percentage point increase in the three-day week category, whereas the proportion of online freelancers remained at 8.5%. 14.6% of online freelancers and 8% of microworkers engaged in crowdwork two days a week, suggesting that both types of crowdwork in our samples are undertaken primarily as a secondary or part-time form of work. The number of microworkers reporting to have engaged in crowdwork between half a day and a full day over the past week was considerably higher at 24.5% of the microworkers' sample compared to 19% of online freelancers. The overall highest proportion of respondents did not engage in crowdwork for more than half a day (under four hours) in the specified period, with 20.7% (207) online freelancers and 36.2% (363) microworkers indicating as much. A noteworthy observation is that around a quarter of both samples, 25.2% of online freelancers and 25.5% of microworkers, claimed not to have undertaken crowdwork at all over the past week, potentially indicating difficulties in reliably obtaining work.

3.1.4. Employment status and self-identity as entrepreneurs

Participants were asked to report their current primary employment status in a "check all options that apply" question as detailed in Q18 in Annex 1. The comparative responses across both types of crowdwork are summarised in Figure 8.

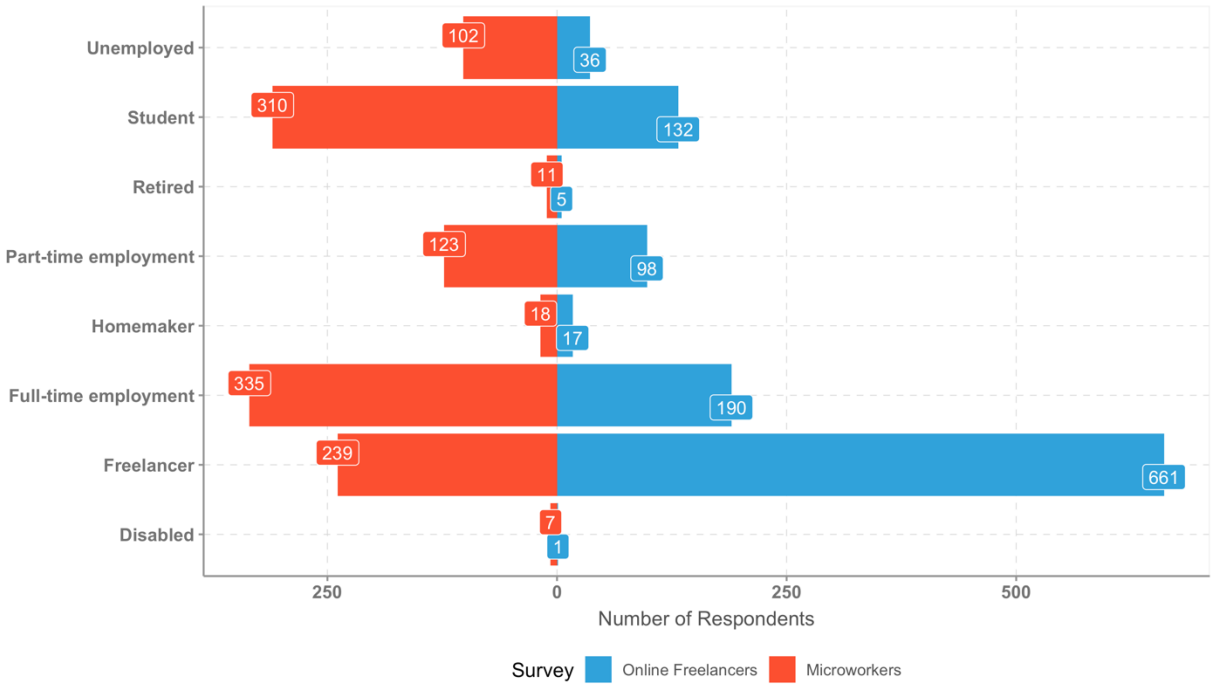


Figure 7 Employment categories

Since more than one option could be selected (e.g. “Freelancer” and “Student”), each response category represents an individual poll. The results exhibited some noteworthy differences between the two groups of crowdworkers. Whereas 661 online freelancers (66%) selected the option “freelancer/self-employed”, only 239 microworkers (23.8%) reported this as their primary employment status. Inversely, while one third (33.4%) of microworkers reported to be in a full-time employment arrangement, only 190 online freelancers (19%) selected full-time work as their employment status. Similarly, 310 microworkers (30.9%) reported to be studying compared to only 132 online freelancers (13.2%). This corroborates the notion that microwork is a primarily supplementary work activity, while online freelancing, requiring more commitment and dedication, is more of a category for itself. This insight might be important to appropriately support crowdworkers skill development practices. Whereas online freelancers might be better served by improving their entrepreneurial and administrative skills, multi-job-holding microworkers might require improved analytical skills to efficiently complete tasks and substitute their incomes while in active employment or education.

Part-time employment was more closely aligned between the groups, with 12.3% of microworkers and 9.8% of online freelancers reporting it as their main employment status. The percentage of unemployed online freelancers was very low at 3.6%, compared to 10.2% of microworkers. Despite receiving only very few responses from either group, the remaining options, such as being “disabled”, “retired” or a “homemaker”, were slightly higher in the microworkers sample. Crowdwork could provide a means of labour market reintegration for such groups.

Participants were further given the option to specify “other” employment categories not represented in the list. Across the samples, 29 participants provided such additional information (Figure 9). Self-describing as an “entrepreneur” is a recurrent theme throughout the free-form responses for both categories, potentially indicating that the term carries a different meaning in the context of crowdwork that is distinct from the available “freelancer / self-employed” category option.

Figure 8 Employment categories (other)

In the corresponding survey section, one third (33.2%) of microworkers identified as entrepreneurs, compared to 51.8% of online freelancers. We do not know why this is from the survey alone and further qualitative research is required to understand the reasons for this difference. One potential reason is that this may be attributable to the different nature of the performed crowdwork, with higher levels of creative freedom in online freelancing platform work leading to an entrepreneurial self-image.

3.1.5. Income from crowdwork

A noteworthy difference between the two types of crowdwork was evident in the proportion of respondents claiming to earn 81% or more of their monthly income through platforms, with 13% of online freelancers and no microworkers selecting this category (Figure 9).

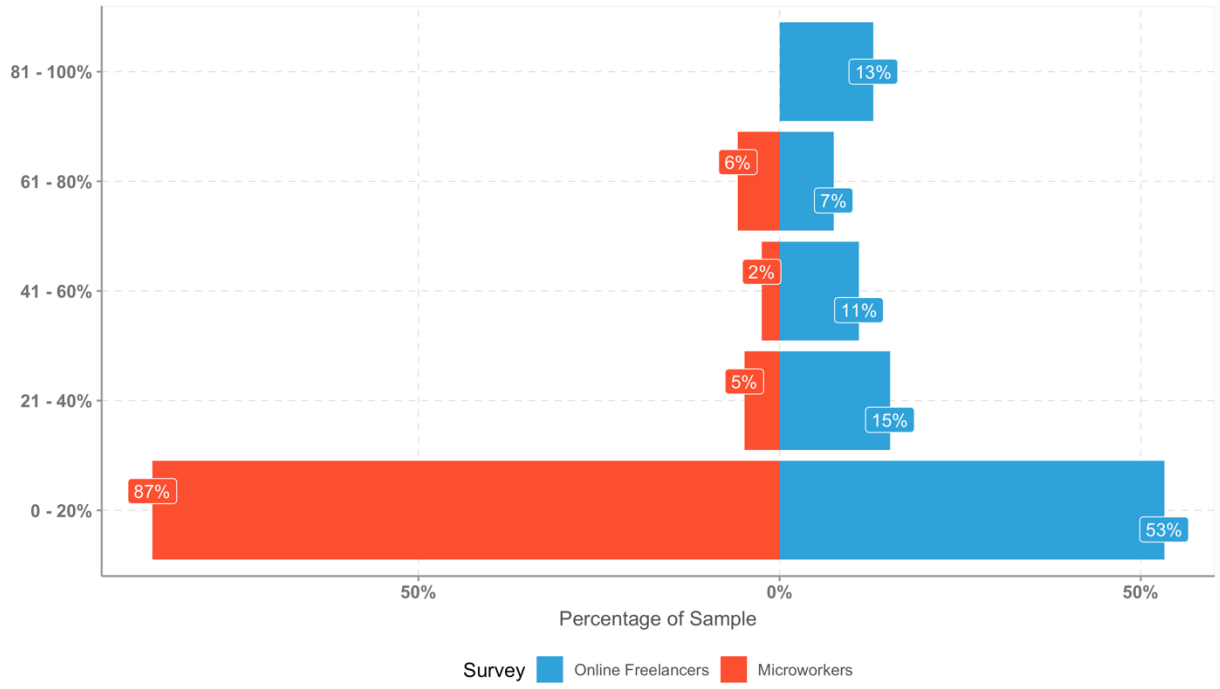


Figure 9 Share of income earned through platforms in the past month

In the case of microworkers, this is consistent with research findings in HCI/CSCW research where a smaller fraction of microworkers have reported their reliance on microwork marketplaces for their primary income (Barbosa & Chen, 2019; Gadiraju, Checco, et al., 2017; Kaufmann et al., 2011; Saito et al., 2019). The percentages of online freelancers reporting incomes through crowdwork of 61 - 80%, 41 - 60% or 21 - 40% were 1.7, 8.5 and 10.4 percentage points higher respectively than those of microworkers in the same categories. The majority of microworkers (86.9%) saw themselves in the lowest available bracket of income earned through crowdwork in the past month, 0 - 20%, compared to 53.2% of online freelancers. Another reason why microworkers may have self-reported relatively low incomes can be due to the experience required to earn high incomes on platforms like Amazon's Mechanical Turk (Gadiraju, Checco, et al., 2017; Han et al., 2020; Savage et al., 2020).

3.1.6. Enjoyment of crowdwork

Overall, the levels of enjoyment of crowdwork were similar across the two samples. 22.8% of online freelancers claimed to "always enjoy" their crowdwork compared to 16.1% of microworkers (Figure 11), indicating that fewer workers unconditionally enjoy their crowdwork when engaging in less complex microwork.

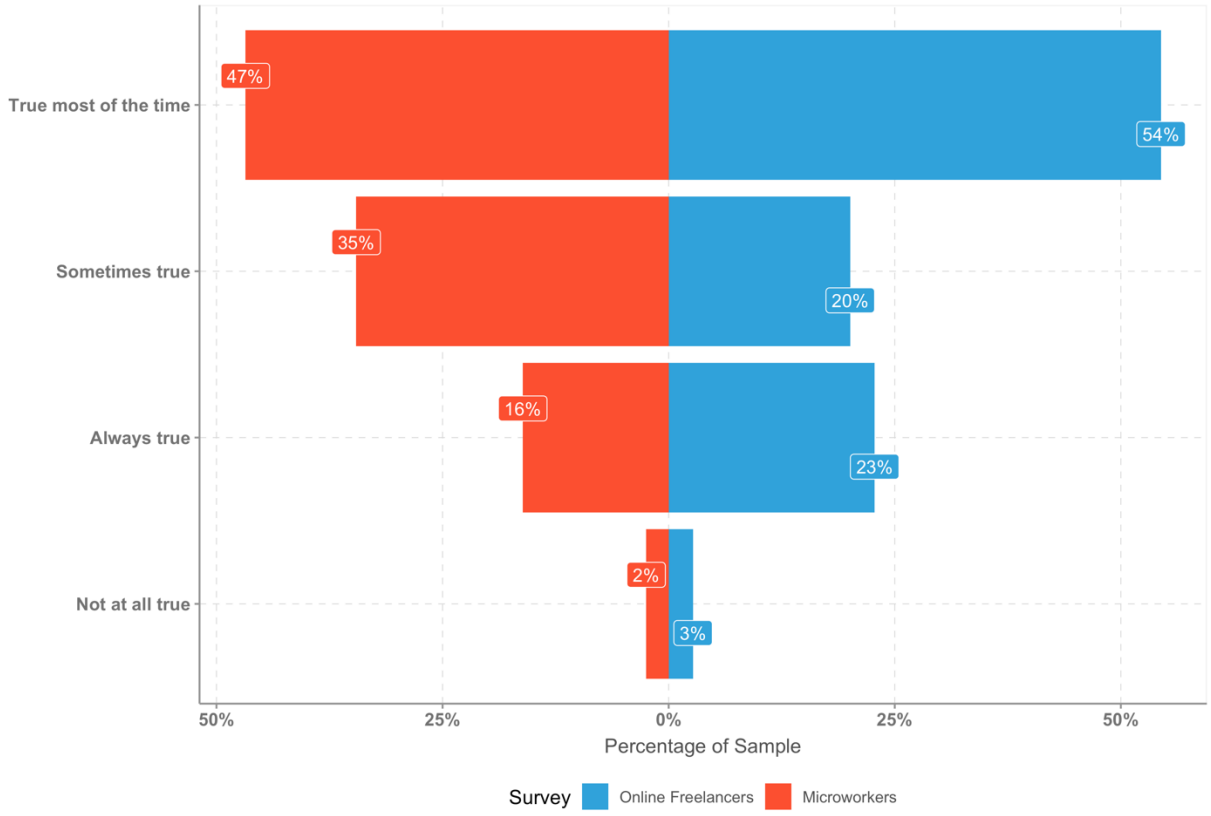


Figure 10 Enjoyment of crowdwork

The largest percentage of respondents enjoyed their crowdwork "most of the time", with 46.8% of microworkers and 54.4% of online freelancers choosing this option. Occasional enjoyment ("sometimes true") was higher among microworkers (34.6%) than online freelancers (20.1%). Only 25 microworkers (2.5%) and 27 online freelancers (2.7%) claimed not to enjoy their crowdwork at all. This is consistent with other studies that explored the self-reported moods of microworkers across different studies, showing that the majority of workers reported being in pleasant moods (Gadiraju & Demartini, 2019; Qiu et al., 2020b; Xu et al., 2019; Zhuang & Gadiraju, 2019).

3.1.7. Motivations to undertake crowdwork

The motivations for undertaking crowdwork ("Why do you work on [platform]?") were notably different between the two groups (Figure 12).

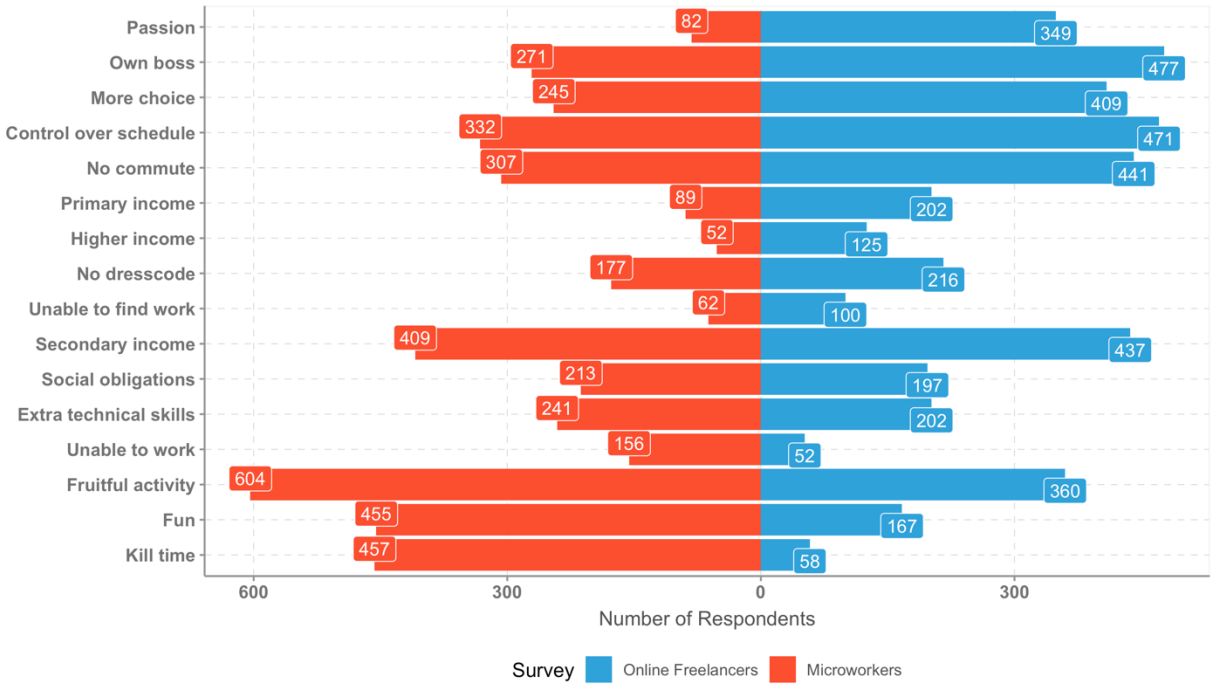


Figure 11 Motivations for crowdwork

Participants were able to select multiple options. Among online freelancers, the main motivations for crowdworking were "being my own boss" (477 responses, 47.7%), "control over my schedule" (471 responses, 47,4%), "no commute / working from anywhere" (441 responses, 44%) and having a "secondary source of income" (437 responses, 43.7%). Microworkers claimed their crowdwork was a "fruitful way to spend time and earn money" (604 responses, 60.2%), a way to "kill time" (457 responses, 45.5%), a source of enjoyment (455 responses, 45.3%) and also a "secondary source of income" (409 responses, 40.7%). These findings may be explained by the earlier finding suggesting that microwork might be a supplementary/side activity with relatively low time and resource investment.

3.2. Nature of work, task categories and communication

3.2.1. Task categories

Asked about the nature of tasks they performed, most microworkers (85.3%) indicated *surveys / questionnaires* to be their top activity on the platform (Figure 13).

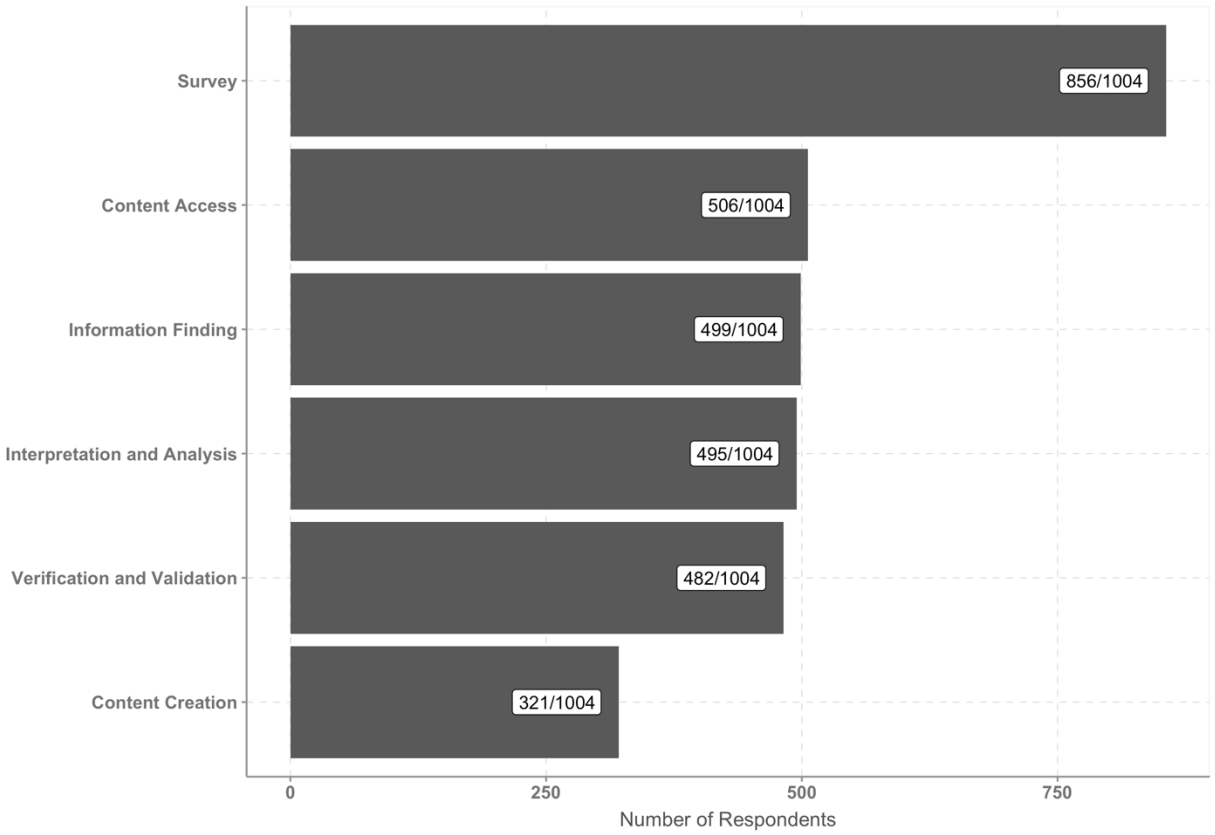


Figure 12 Types of microwork

Content access, defined as simple tasks requiring only the access of content, e.g. a video, an no further interaction, *information finding*, defined as tasks involving basic research on specific topics, e.g. companies, *interpretation and analysis* tasks, such as categorisations, and *verification and validation* tasks, involving the following of instructions to confirm the validity of content, were listed by around half of respondents. *Content creation* and other generative tasks were only reported as a microwork category by 32% of participants.

3.2.2. Nature of work: Complexity and interdependence of crowdwork tasks

In addition to scoping workers' primary task categories, we also analysed workers' perceptions on the nature of their crowdwork tasks, in particular the complexity and interdependence of the tasks and the skill variety and complexity required to complete these tasks (Figure 14).

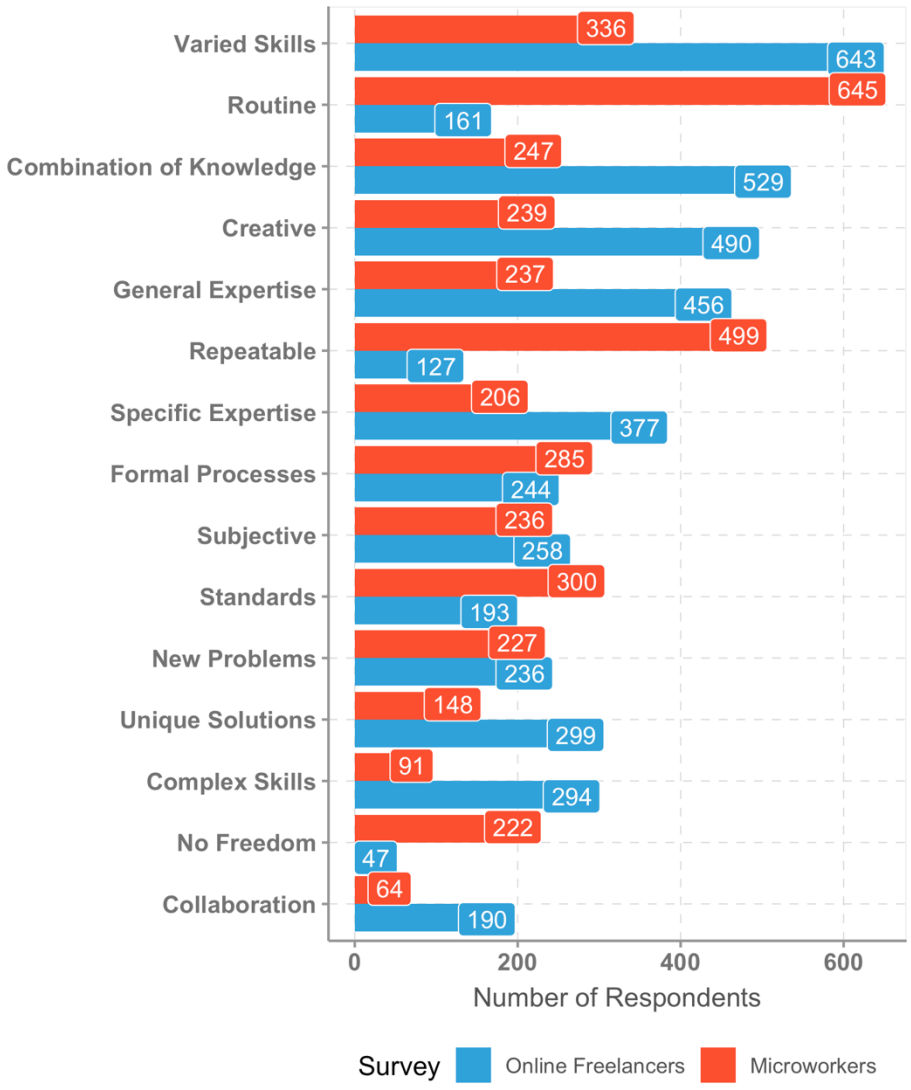


Figure 13 Nature of crowdwork

645 microworkers (64.2%) described their tasks as "routine" and 499 (49.7%) as "repeatable". Only 16.1% and 12.7% respectively of online freelancers responded in the same categories. Instead, online freelancers reported categories indicative of more complex works, with 643 (64.2%) claiming their crowdwork required "varied skills", 529 (52.8%) listing "combination of knowledge from various fields" and 490 (49%) highlighting the "creative / improvisational" nature of their work. In comparison, only one third (336 respondents, 33.5%) of microworkers thought their work required "varied skills" and around one quarter (247 respondents, 24.6%) thought their work required "combination of knowledge from various fields" or was "creative" (239 respondents, 23.8%). Other noteworthy differences included 190 (19%) online freelancers reporting their work involved "collaboration", compared to only 64 (6.4%) of microworkers. Further, 222 microworkers (22.1%) reported that their work did not offer them "freedom to decide", compared to only 47 online freelancers (4.7%). These findings potentially point to some key fundamental differences in the nature of work between microwork and online freelancing.

3.2.3. Communication with other workers

Overall, microworkers reported slightly more communication activities than did online freelancers (Figure 15), possibly due to the limited communication channels available on microwork platforms and the necessity to use external, non-platform provided communication platforms reported in other previous studies (Yin et al., 2016).

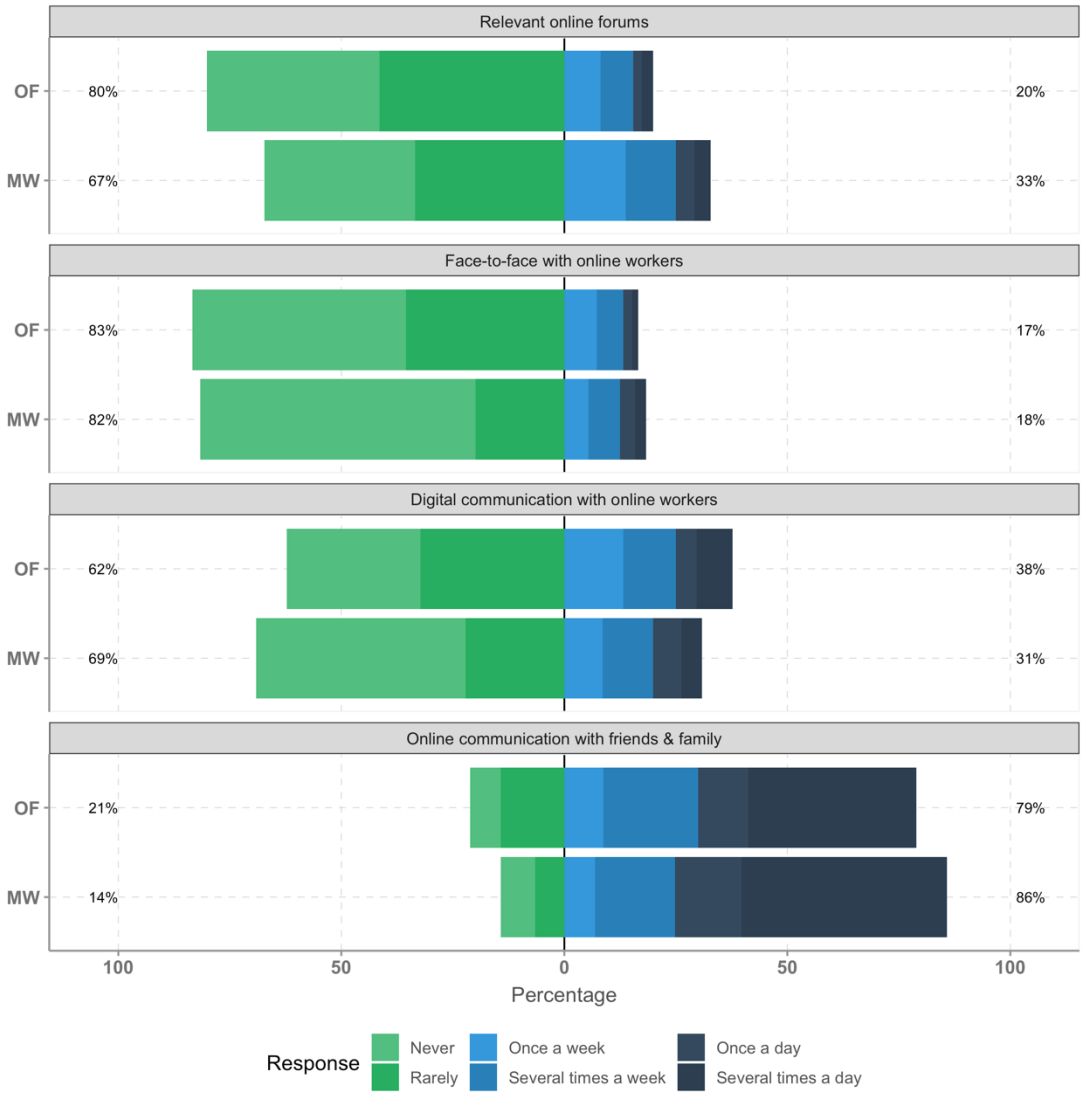


Figure 14 Communication activities. OF refers to "online freelancers" and MW to "microwork".

32.8% of microworkers reported making use of external online forums at least once a week, compared to only 19.9% of online freelancers. Self-reported face-to-face interaction with other online workers was also slightly higher among microworkers, with 18.3% reporting at least weekly interactions, compared to only 16.6% of online freelancers. In contrast, communication via online channels was higher by 6.9 percentage points in the online freelancer sample. General communication (with friends and family) was reported by a large majority of both samples.

3.3. Skill development and workplace learning activities

In this section we address RQ1, concerning the nature and frequency of Skill Development (SDEV) and Workplace Learning Activities (WLA), by examining their uptake in the sample of microworkers and comparing the results with data collected from online freelancers.

3.3.1 Skill development

Asked about which skills they had developed over the past three months, microworkers reported frequently developing "skills in obtaining work on platforms" (61.1%), "skills in working online" (60%) and "analytical skills" (58.4%) as their top three strategies (Figure 16). This is consistent with recent research that has highlighted the difficulty and role of experience in finding well-paid and high-quality work on microtask marketplaces (Han et al., 2020; Savage et al., 2020). The least frequently developed category was "communication skills" (26.1%), which could be attributed to the autonomous and fragmented nature of microwork and the bare-bones communications between task requesters and workers that are mediated through minimalist communication features on the platforms.

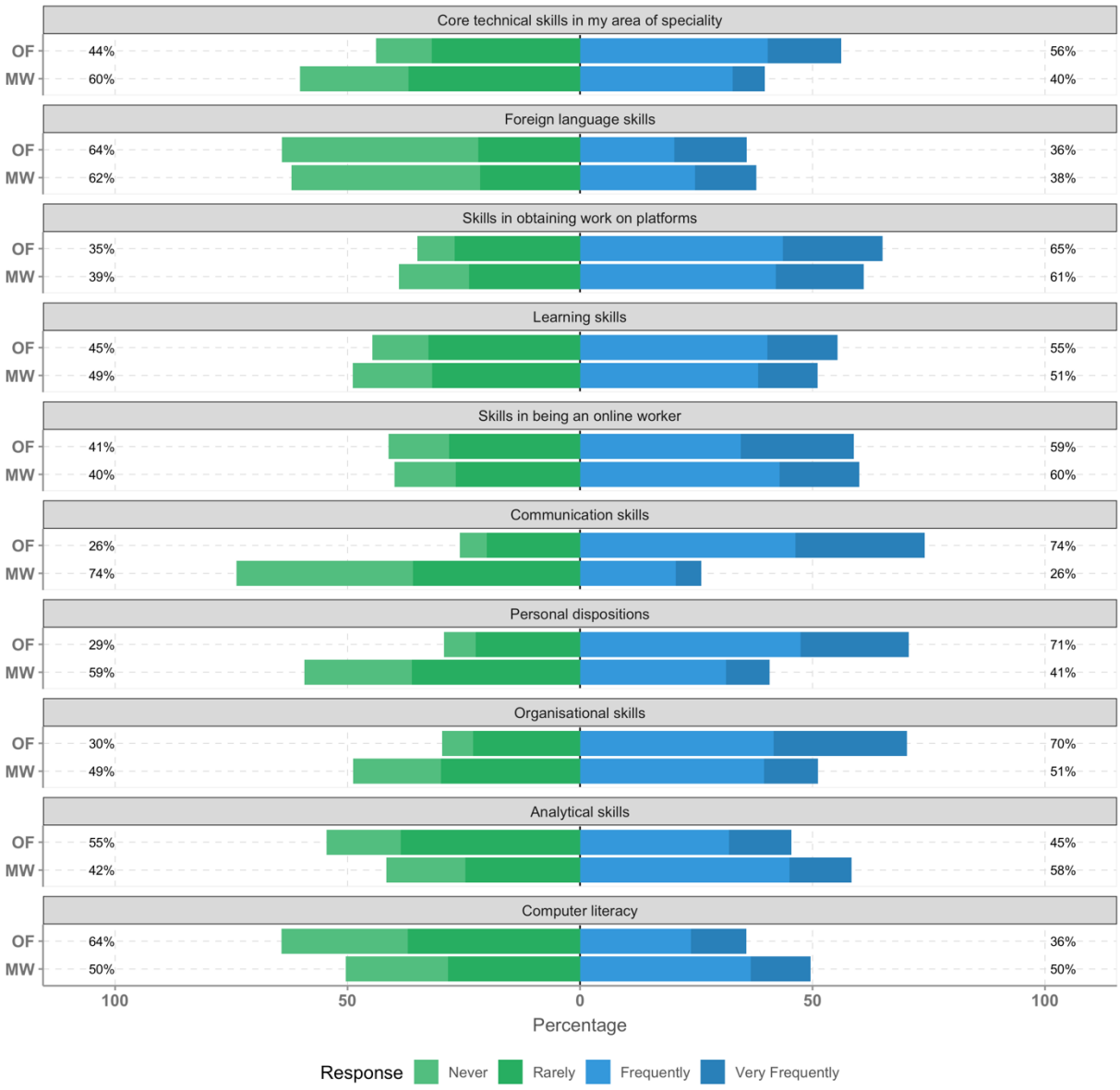


Figure 15 Skill development (SDEV)

In contrast to microworkers, most online freelancers (74.1%) reported frequently developing "communication skills" during the past three months, a 48 percentage point difference compared to microworkers. This further strengthens the assumption that fundamental differences exist between the two major forms of crowdwork. "Developing personal dispositions", e.g. confidence, creativity or resilience was also reported by a majority of online freelancers (70.7%), a value which is 30 percentage points higher than among microworkers. "Organisational skills", e.g. time or project management, were reported by 70.3% of online freelancers.

Based on a typology of skills developed from the original survey and interview data (Cedefop, 2020), microworkers were also requested to indicate which categories of skills they had developed before and during crowdwork (Figure 17).

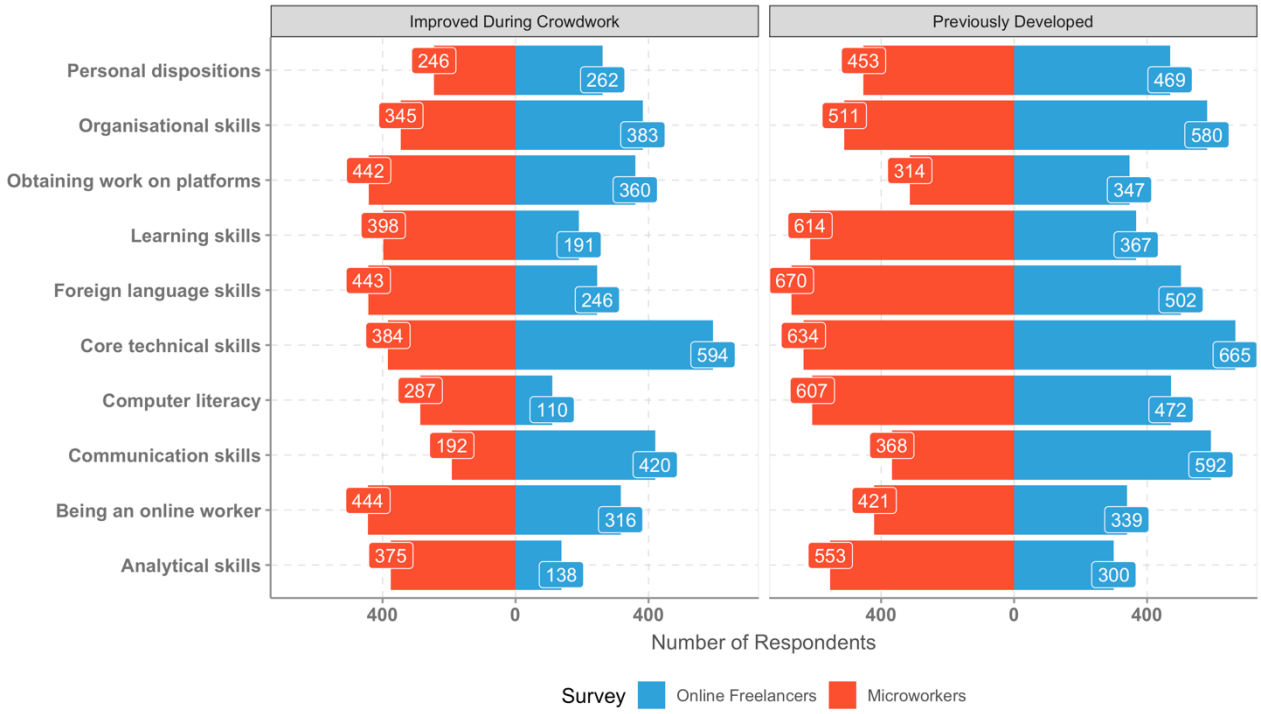


Figure 16 Skills developed before / during crowdwork

In general, microworkers and online freelancers reported they developed most skill categories before their engagement in crowdwork, with the exception of specifically platform-related activities, such as "being an online worker" or "obtaining work through platforms". A major finding of the CrowdLearnF survey was that a large proportion of online freelancers (59.3%) reported developing their 'core technical skills' during their on-the-job learning. Microworkers seemed to be less engaged in developing these skills (38.2%). A noteworthy difference exists in the analytical skills category, where 37.3% of microworkers reported an improvement during crowdwork, compared to only 13.8% of online freelancers. Overall, when asked about skills improved during crowdwork, more microworkers reported focusing on the six out of ten of skill categories, with the largest differences reported in the following categories: analytical skills, computer literacy, learning to learn skills, foreign language skills, as well as obtaining work on platforms and skills in being an online worker. In the original CrowdLearnF study, the survey item on 'skills improved during crowdwork' was used as a proxy for 'skill gaps' among crowdworkers. Whilst our findings here could be possible indicators of gaps in these six categories of skill among microworkers, we would caution that other plausible explanations are possible. For example, microworkers may choose to focus on improving and optimise those existing skills because of the demands posed by their particular crowdwork tasks rather than because they have a skill deficiency in that area. In combination with previous insights about the differences in nature between microwork and online freelancing, these findings may further bolster the hypothesis that microworkers, who tend to view their crowdwork as a supplementary activity, may consider that they are developing skills in areas not directly related to their current work or the pursuit of new work opportunities, such as general analytical or learning skills. In comparison, online freelancers may have reported activities more closely related to their areas of specialism.

Workers responding to the CrowdLearnM survey were given the option of specifying any other skills they felt they had developed through their crowdwork. 287[10] distinct answers were obtained this way, including frequent mentions of improvements in specific data analysis techniques, such as analysing photos and "tagging videos", how "ML" and "artificial intelligence" training works, and an improved way of "seeing data" in general. Other frequently mentioned skill improvements included "concentration" and "time management" (7.7% of respondents) and skills related to rapid "typing", "reading" transcription (12.9% of respondents). Participants may have used the free text field to emphasise particularly valuable skills they have gained, such as "time management", beyond the generic "organisational skills" category. Further, they might have had trouble mapping skills related mainly to clerical work, such as transcription and typing, onto the existing categories if they did not consider them "core skills" for their line of work.

3.3.2 Workplace Learning Activities (WLAs)

When asked about their learning activities, a large majority of microworkers (86.8%) reported learning by working alone on their tasks (Figure 18).

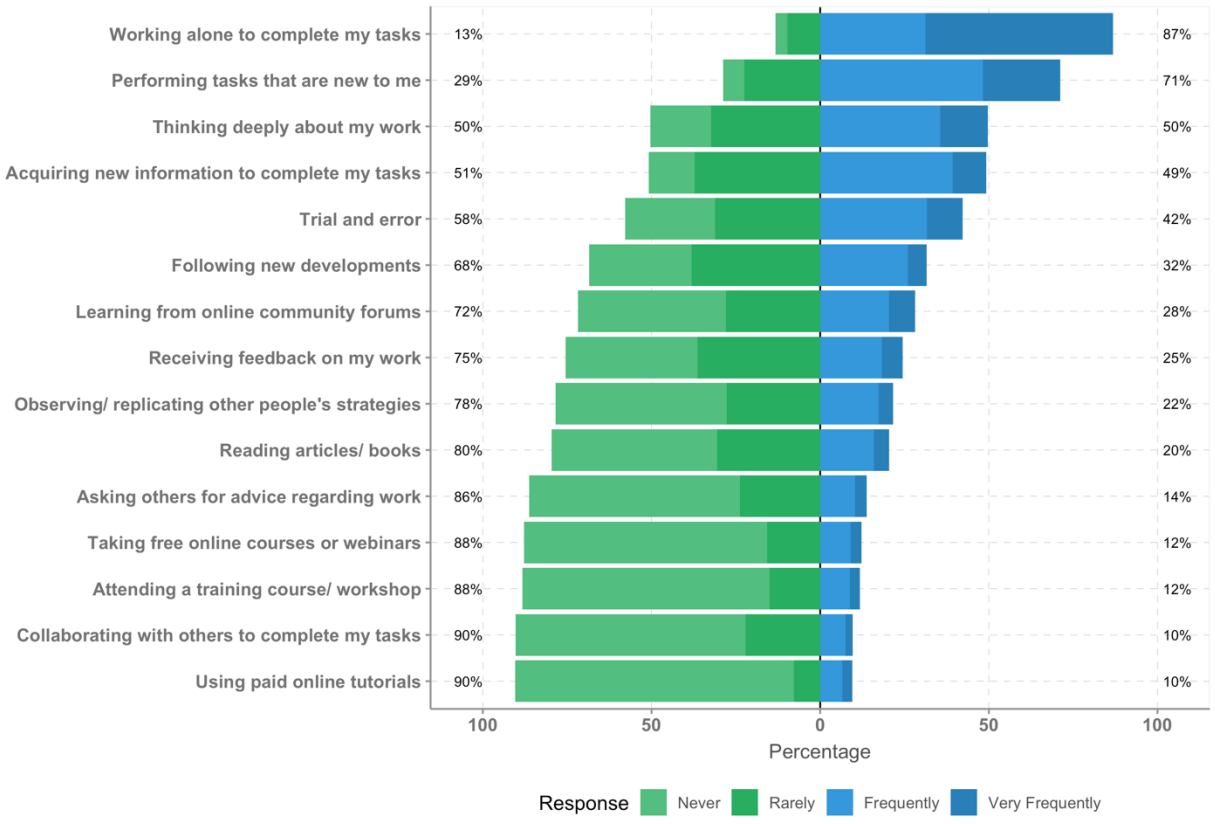


Figure 17 Workplace learning activities (WLAs) among microworkers

[10] In total, 307 answers were obtained but those stating no additional skills gained were excluded from the analysis.

Another mentioned frequent activity (71.2%) was learning by performing novel tasks. Only a small group of microworkers reported learning by using "paid online tutorials" (9.6%) or by engaging in "collaboration" (9.7%) during the course of their crowdwork. This may be due to the lack of availability of such options to microworkers in general, the autonomous nature of their work that doesn't require collaboration, the nature and (lack of) complexity of the skills they develop through crowdwork or simply lack of interest in investing their own financial resources to develop particular skills that may require a participation in an online tutorial. Overall, very few microworkers reported using formal learning approaches to develop their skills - this is consistent with earlier findings among online freelancers who reported more extensive use of informal rather than formal learning (Cedefop, 2020).

Similarities exist between the two samples in that the most frequently engaged in workplace learning activity among online freelancers was also "working alone" (87.2%) and "paid online tutorials" were the least common (11.6%) (Figure 19).

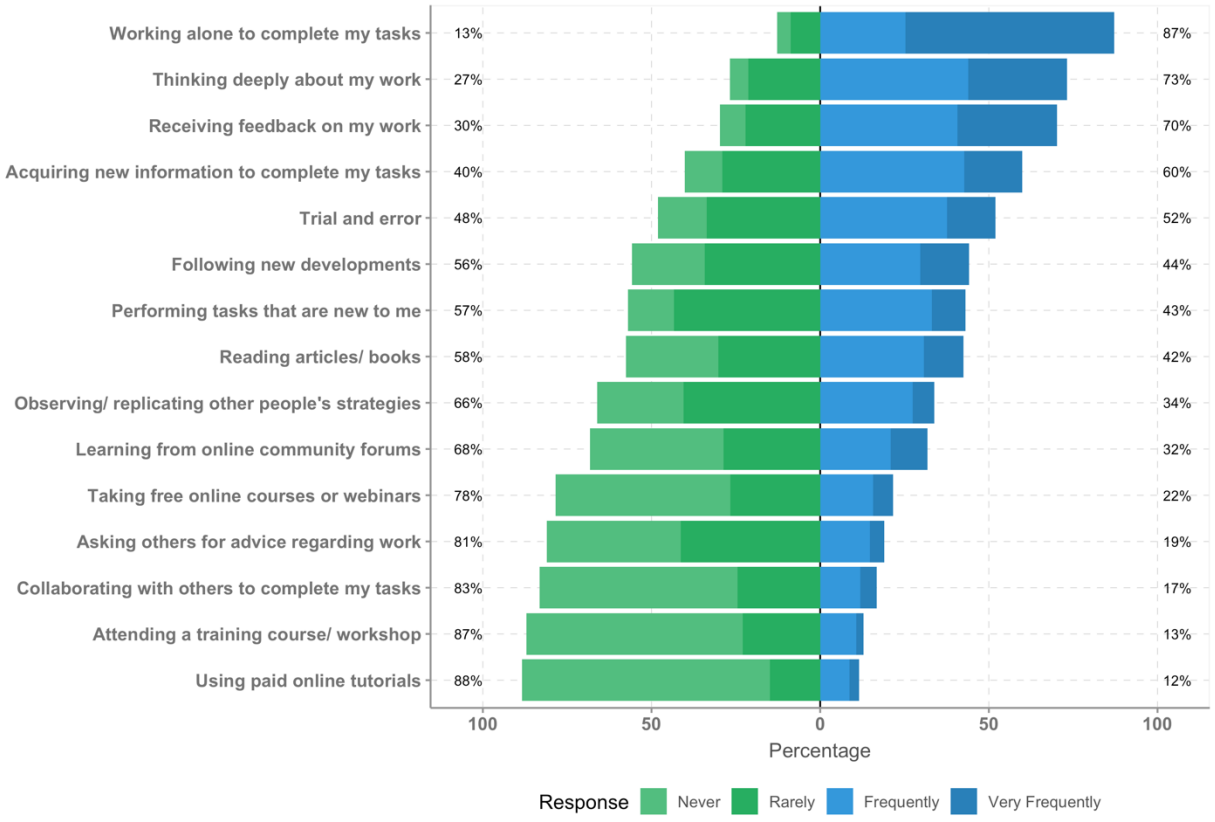


Figure 18 Workplace learning activities (WLAs) among online freelancers

"Thinking deeply about my work" was also a relatively prominent strategy reported across both groups, with 73.2% of online freelancers and 49.7% of microworkers claiming to engage in this activity at least frequently. A notable difference is observed in the "receiving feedback on my work" category, with 70.2% of online freelancers and only 24.5% of microworkers reporting frequent engagement. This 45.7

percentage point difference can be attributed to the less communication-intensive nature of microwork identified in the previous comparisons. We also observe contrasting reports with respect to the activity of "performing tasks that are new to me". 71.2% of microworkers reported to be engaging in this frequently, compared to only 43.1% of online freelancers. This can be explained by the nature of task consumption on microwork platforms where workers tend to complete tasks that are readily available rather than selecting tasks based on their skills (Chilton et al., 2010). Microworkers also have the opportunity to engage with a variety of tasks (Gadiraju et al., 2014) that mainly require innate human intelligence. This lies in contrast to online freelancers who tend to specialize in a given type of work, and continue to select work that they are skilled in. Across all items, the levels of engagement in workplace learning activities were comparable between the two samples, with a calculated average engagement score[11] of 1.95 in the microwork and 2.0 in the online freelancing sample.

3.4. Self-regulated learning strategies

Self-regulated learning (SRL) refers to the "thoughts, feelings and actions that are planned and cyclically adapted to the attainment of personal goals." (Zimmerman & Kitsantas, 2005). The survey section measuring self-regulated learning strategies (SRLS) was adapted from a previous instrument, SRLWQ (Fontana et al., 2015) based on Zimmerman's Cyclical Phases Model (Zimmerman, 2006), which proposes that individuals self-regulate their learning in three distinct phases (*forethought*, *performance* and *self-reflection*) that individuals engage in while self-regulating their learning. Findings on the 35 scale items are presented according to their cyclical phases.

3.4.1 Forethought phase

In the forethought phase (Figure 20), a majority of microworkers claimed to at least frequently "set performance standards" (66%), be "confident" in meeting the demands of their work (61.8%) and ask themselves what they needed "to learn to complete a task" (52.6%). For online freelancers, the two categories with the highest engagement rate were also "confidence" in meeting demands (88.3%) and setting "performance standards" (82.9%). Additionally, 76.3% of online freelancers reported to frequently consider how their learning from crowdwork might be useful to them in "future jobs", compared to 48.3% of microworkers who reported doing so. Our findings suggest that online freelancers tend to plan more using a long-term perspective than microworkers who tend to set short-term goals with respect to developing skills that can be immediately useful. This differences in approaches to forethought may be explained by the nature of the tasks these different types of workers undertake, with microwork tasks being smaller-scale, more rapid and therefore necessitating a shorter-term goal orientation.

[11] We calculated the intensity of engagement by normalising the WLA and SRLS scales and rating their intensity based on the standard deviation into "*low*", "*moderate*" and "*high*" intervals on a scale of 1-3.

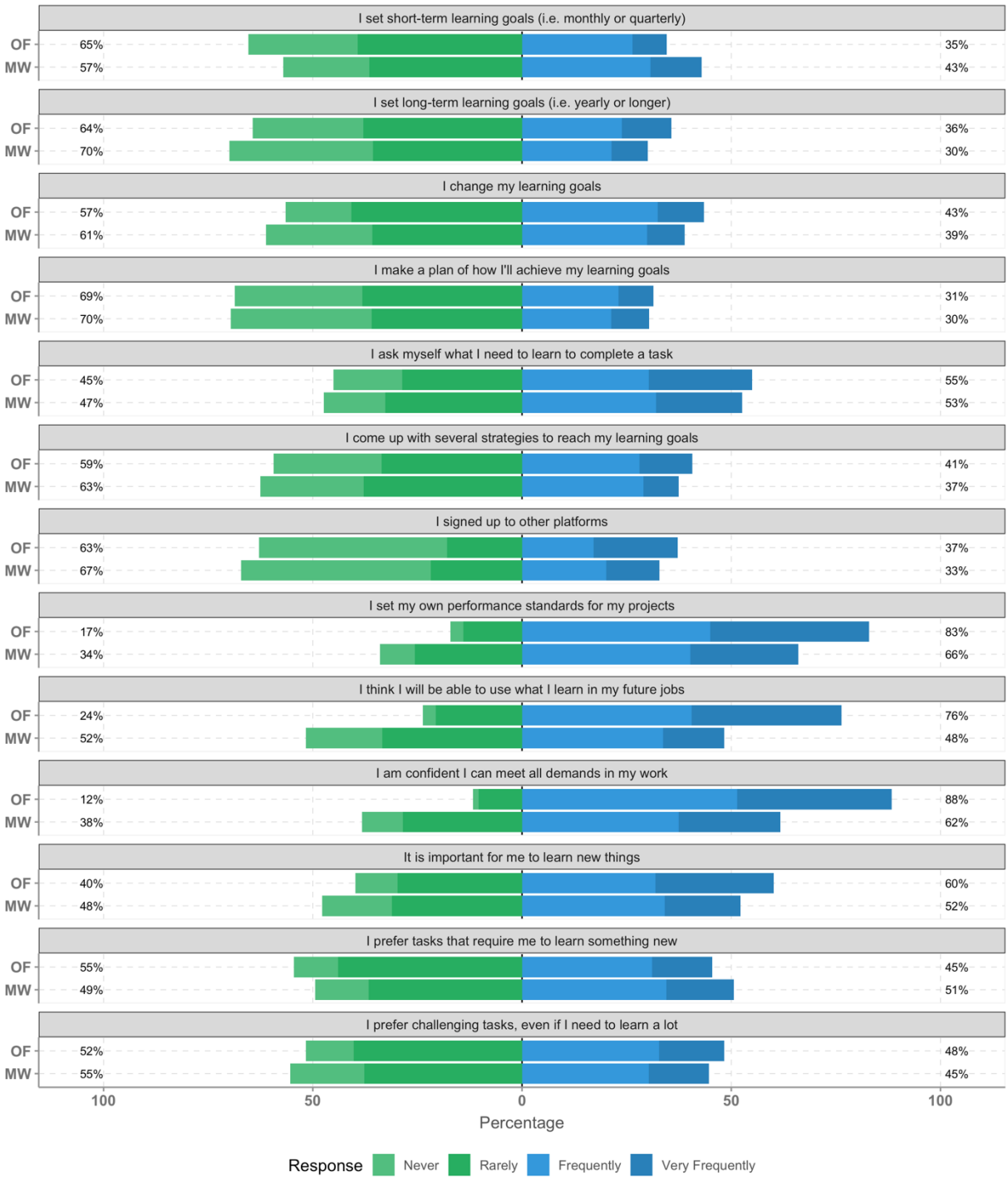


Figure 19 Self-regulated learning strategies (forethought)

3.4.2 Performance phase

Some noteworthy discrepancies between the samples exist in the scale section associated with the performance phase of self-regulated learning (Figure 21). Almost the entire sample of online freelancers (94.9%) responded that they frequently “try to understand the problem thoroughly”, compared to 77.3% of microworkers. Similarly, they reported to frequently “apply lessons learned” from previous work (82.8%), whereas only 51.4% of their microworking peers did so. This can be at least partially explained by looking at other results of the survey, which indicate that online freelancers are more likely to treat their crowdwork as an extension of their professions and are therefore able to draw on previous work experience. 40.1% of online freelancers also reported frequently asking others for help “when having difficulty learning something”, compared to only 21.1% of microworkers, which could be seen as an indication of stronger professional networks online freelancers are embedded in, probably due to their platform-facilitated work being closely related to their regular professional activity.

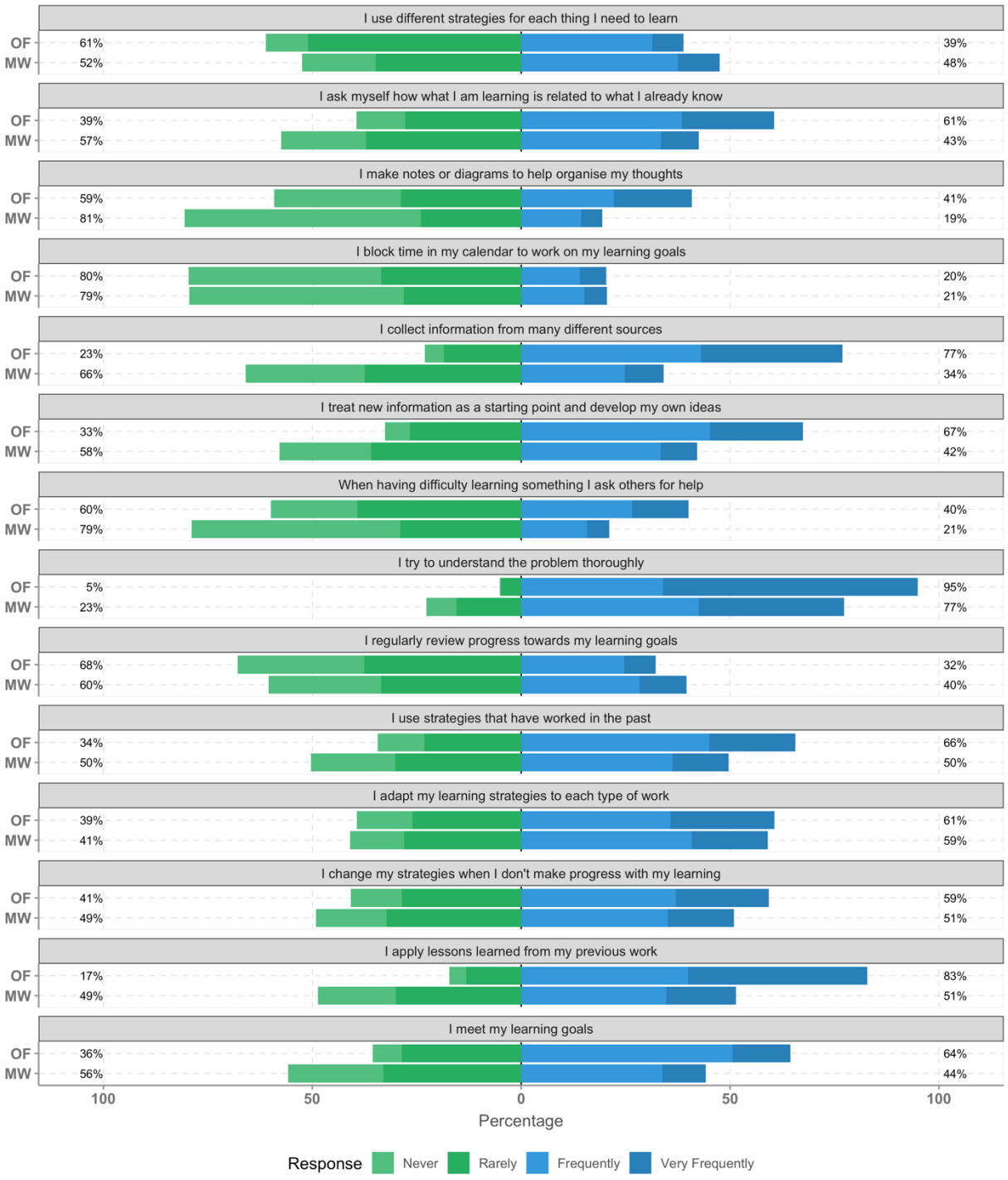


Figure 20 Self-regulated learning strategies (performance)

3.4.3 Self-reflection phase

Responses in the self-reflection phase (Figure 22) related to recording notes about their learning progress either for personal use or sharing with others were notably low among both online freelancers and

microworkers. Thinking frequently 'about how what I have learned impacts my work' was more prevalent among online freelancers (60.2%) than microworkers by 24.4 percentage point. This discrepancy might be attributable to differences in the employment status between the samples and a tendency among online freelancers to see their online work more closely connected to their regular professions. This is corroborated by the responses to the question of how learnings fit into the "bigger picture of professional development", which 64.3% of online freelancers think about frequently, compared to only 39.1% of microworkers, who are more likely to see crowdwork as a supplementary activity. Also noteworthy is the tendency among online freelancers to consider how their learning might be of "interest to others" (45.8%) and sharing these insights (32.5%). Microworkers responded lower in these categories with 31.4% and 24.2% respectively claiming to frequently engage in such behaviour. This might indicate a higher level of engagement with fellow crowdworkers and potentially tighter knit networks in the online freelancing community.

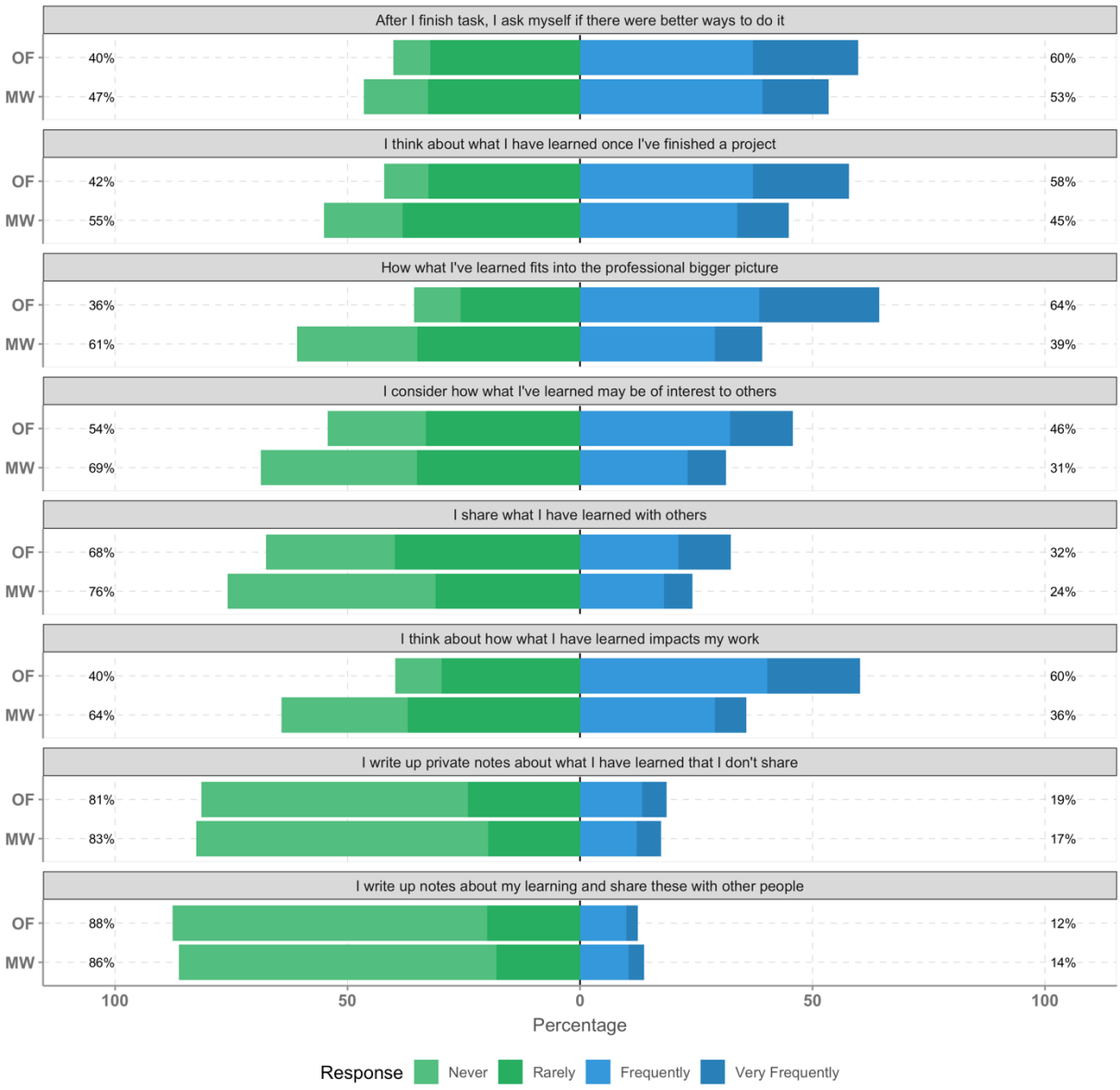


Figure 21 Self-regulated learning strategies (self-reflection)

3.5. Correlational analyses

In this section, we explore statistically significant relationships between the types and frequency of workplace learning activities and self-regulated learning strategies that microworkers undertake, and key personal and environmental factors to address research questions RQ2 to RQ5.

It is important to emphasise that these findings should be treated as indicative only due to the uncovered relationships mostly being very weak and based on an analysis treating individual scale items as variables. These findings therefore should be viewed as preliminary and exploratory. Determining the

true relationships between the underlying constructs of workplace learning and self-regulation will require further research and theory-driven analysis.

3.5.1. Perceived complexity and interdependence of tasks and microworkers' uptake of SRLS and WLAs

To address RQ2, concerning correlations between the *complexity and interdependence of crowdwork tasks* reported by microworkers and their uptake of WLAs and SRL strategies, we performed correlation analysis (Person product-moment correlation) to determine which characteristics of crowdwork tasks (e.g. their creativeness) reported by microworkers had a statistically significant effect on the intensity of their engagement in workplace learning and self-regulated learning behaviour (Table 2). We calculated the intensity of engagement by normalising the WLA and SRLS scales and rating their intensity based on the standard deviation into "*low*", "*moderate*" and "*high*" intervals. Based on the assessment of the survey data, we determined that microwork, compared to online freelancing, was a primarily casual activity, often associated with secondary income and routine tasks. We hypothesised that work requiring more active engagement and more complex skills, e.g. a combination of knowledge or creativity, would be related to higher levels of self-regulated learning, which is defined by the planning and adaptation of and self-reflection on learning goals to match the requirements of the work.

Table 2 Means, standard deviations, and correlations with confidence intervals (nature of work)

Variable	*M*	*SD*	SRL-I	WLA-I
Routine	0.64	0.48	-.08* [-.14, -.02]	-.05 [-.11, .01]
Formal Processes	0.28	0.45	.05 [-.01, .11]	.09** [.02, .15]
No Freedom	0.22	0.42	-.01 [-.07, .05]	.04 [-.02, .10]
Repeatable	0.50	0.50	-.06* [-.13, -.00]	-.01 [-.07, .05]
Standards	0.30	0.46	.05 [-.01, .11]	.07* [.01, .13]
Combination of Knowledge	0.25	0.43	.18** [.12, .24]	.15** [.08, .21]
Creative	0.24	0.43	.17** [.11, .23]	.17** [.11, .23]
Specific Expertise	0.21	0.40	.10**	.09**

			[.04, .16]	[.03, .15]
Collaboration	0.06	0.24	.12** [.06, .18]	.11** [.05, .17]
General Expertise	0.24	0.42	.08** [.02, .15]	.07* [.01, .13]
Subjective	0.24	0.42	.07* [.01, .13]	.07* [.00, .13]
New Problems	0.23	0.42	.09** [.03, .15]	.07* [.01, .13]
Unique Solutions	0.15	0.35	.18** [.11, .23]	.12** [.05, .18]
Varied Skills	0.33	0.47	.16** [.09, .22]	.18** [.12, .24]
Complex Skills	0.09	0.29	.17** [.11, .23]	.13** [.07, .19]

Note. M and *SD* represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * $p < .05$. ** $p < .01$.

Our analysis indicates that statistically significant weakly-positive relationships (p<.01) exist between the intensity of SRLS uptake and the following characteristics of microwork: requiring the *combination of knowledge* from different fields as well as *general* and task-*specific expertise*, being *improvisational* or *creative*, requiring a *varied skill set* and *complex, high-level skills* and requiring *unique ideas* or *solutions* to *new problem*s. A *collaborative* nature of the work performed is related to SRLS intensity in this way. This suggests that microworkers who perceive their crowdwork as more complex and interdependent report higher uptake of self-regulatory learning strategies, whereas more repeatable or mundane types of work do not have the same effect. However, further research - in particular a more thorough statistical model - is needed to better explain the true complex relationship between the perceived nature of microwork tasks and self-regulated learning behaviour.

A similar pattern emerged when substituting the intensity of SRLS uptake with the intensity of WLA uptake. We were able to detect also in this case a statistically significant (p<.01) relationship between the intensity of microworkers' engagement in workplace learning and their self-characterisations of their crowdwork tasks as requiring a *combination of knowledge* and being *creative, collaborative* and relying on *specific expertise*. Additionally, we found that the perceived *variety* and *complexity of skills* as well as the necessity to find *unique solutions* required to complete crowdwork is related to the uptake of WLAs.

Reliance on *formal processes,* e.g., clear definition of input and output, structured interactions with clients, was also correlated with the intensity of WLA uptake. As in the previous case, we recommend a more rigorous examination of these relationships in future work. Despite this, we see these preliminary results as an indication that the uptake of WLAs and SRLs in the workplace may be dependent on the extent to the task design being creative and engaging. The preliminary findings may also suggest that task design may promote microworkers' uptake of learning activities and self-regulatory learning behaviours in the workplace.

3.5.2. Personal motivations that lead workers to take up crowdwork and microworkers' uptake of SRLS and WLAs

Table 3 Means, standard deviations, and correlations with confidence intervals (motivations)

Variable	*M*	*SD*	SRL-I	WLA-I
Fruitful activity	0.60	0.49	.05 [-.02, .11]	.02 [-.04, .08]
Secondary income	0.41	0.49	.09** [.03, .16]	.16** [.10, .22]
Kill time	0.46	0.50	-.15** [-.21, -.09]	-.09** [-.15, -.03]
Primary income	0.09	0.28	.08* [.01, .14]	.09** [.03, .15]
Fun	0.45	0.50	.17** [.10, .22]	.12** [.06, .18]
More choice	0.24	0.43	.09** [.03, .16]	.12** [.05, .18]
Unable to work	0.16	0.36	.02 [-.04, .08]	.01 [-.05, .08]
No commute	0.31	0.46	.04 [-.03, .10]	.05 [-.01, .11]
Control over schedule	0.33	0.47	.11** [.05, .17]	.13** [.06, .19]

Higher income	0.05	0.22	.05 [-.01, .11]	.08* [.02, .14]
Unable to find work	0.06	0.24	.05 [-.01, .11]	.07* [.01, .13]
Social obligations	0.21	0.41	.09** [.02, .15]	.08** [.02, .14]
Passion	0.08	0.27	.14** [.07, .20]	.13** [.07, .20]
Own boss	0.27	0.44	.19** [.13, .24]	.17** [.11, .23]
Extra technical skills	0.24	0.43	.21** [.15, .27]	.13** [.06, .19]
No dresscode	0.18	0.38	.03 [-.03, .09]	.05 [-.02, .11]

Note. M and *SD* represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * $p < .05$. ** $p < .01$.

To address RQ3 concerning potential correlations between microworkers' differential primary motivations for engaging in crowdwork and their uptake of WLAs and SRL strategies, we performed correlation analysis (Person product-moment correlation) (Table 3). Based on the results of the survey we hypothesised that microwork (compared to online freelancing) was often a supplementary activity that workers performed in addition to regular work or education. In this case, we interpreted the intensity of workers' uptake of SRLS and WLAs as a proxy for their engagement in crowdwork. The analysis uncovered weakly-positive statistically significant (p<.01) relationships between SRLS and the following motivations: earning a *secondary income,* wishing to *kill time*, having *fun*, following one's *passions*, being one's *own boss / self-employed,* earning money while being able to fulfil *social obligations*, *controlling one's own schedule*, having *more choice* over the nature of the projects, and wishing to gain extra *technical skills* while retaining the stability of a regular job. This is partly in line with our assumptions that microwork is mainly a productive side activity performed during microworkers' spare (otherwise unutilised) time for enjoyment, skills attainment or extra income. However, we recommend that the role of the interplay between extrinsic and intrinsic motivations to engage in crowdwork and the SRLs (such as for example the role of monetary income in motivating self-regulated learning in crowdwork) should be analysed more thoroughly in future research.

Similar results were found for the intensity of workplace learning activities, which is related in a statistically significant way (p<.01) to earning *primary* or *secondary* income, more *choice, fun/enjoyment* or following one's *passion* and *killing* excess *time*. The intensity of WLA uptake is additionally related to the flexibility of the work arrangement, including the motivation of *controlling one's own schedule,* having additional opportunities to *fulfil social obligations* and *being one's own boss*. The combination of additional income, enjoyment and flexibility seems to encourage WLA uptake among microworkers.

Table 4 Means, standard deviations, and correlations with confidence intervals (self-employment)

Variable	*M*	*SD*	SRL-I	WLA-I
Being own boss	4.01	0.99	.16** [.10, .22]	.10** [.04, .17]
Being a freelancer	3.35	1.16	.26** [.20, .31]	.16** [.10, .22]
Better than formal employment	3.75	1.11	.18** [.12, .24]	.12** [.05, .18]
Proud to be an entrepreneur	3.91	1.03	.21** [.15, .27]	.10** [.04, .16]
Not a lot of risk involved	2.64	1.29	.15** [.09, .21]	.05 [-.01, .11]

Note. M and *SD* represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * $p < .05$. ** $p < .01$.

These findings are reflected in the correlations between the survey segment measuring how crowdworkers feel about their self-employed status (Table 4). It is worth noting that being *proud to tell friends and family* about being an *entrepreneur* and seeing oneself as a *freelancer* are both weakly correlated with the intensity of SRLS and WLI uptake.

Table 5 Means, standard deviations, and correlations with confidence intervals (entrepreneurship)

Variable	*M*	*SD*	SRL-I	WLA-I
Identifying as an entrepreneur	0.33	0.47	.21** [.15, .27]	.16** [.09, .22]

Note. M and *SD* represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * $p < .05$. ** $p < .01$.

Based on this insight, we further hypothesised that identifying as an entrepreneur would be linked in a statistically significant way to WLA and SRLS uptake, since self-employment is commonly associated with additional income and increased flexibility (Table 5). The results of the correlational analysis suggest that a weakly-positive statistically significant (p<.01) relationship exists between identifying as an entrepreneur and engaging in WLAs and SLRS. We recommend including entrepreneurial identity in future models analysing the impact of motivation on learning activity and self-regulated behaviour in microwork.

3.5.3. The intensity of microworkers' engagement in crowdwork and its impact on their self-regulated learning strategies (SRLS) and workplace learning activities (WLAs)

To address RQ4, concerning the intensity of microworkers' engagement in crowdwork and its relation to their uptake of WLAs and SRL strategies, we interpreted both the number of previously completed HITs (ranging in intervals from "none" to "over 1000 Hits") and the hours spent microworking over the past week (ranging in intervals from "none" to ">40 hours") as indicators of workers' overall engagement in microwork. To determine whether a statistically significant relationship exists between microworkers' completed tasks or their invested time and their propensity to engage in learning activities during microwork or adopt self-regulation strategies, we performed correlation analysis (Person product-moment correlation) (Table 6).

Table 6 Means, standard deviations, and correlations with confidence intervals (intensity)

Variable	*M*	*SD*	1	2
HITS Completed	2.09	1.65	-.07* [-.13, -.01]	.06 [-.01, .12]
Hours Worked (Last Week)	1.37	1.24	.11** [.05, .17]	.21** [.15, .27]
Enjoyment Working on MTurk	2.77	0.74	.40** [.35, .45]	.29** [.23, .35]

Note. M and *SD* represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * $p < .05$. ** $p < .01$.

The results indicated that a weak statistically significant (p<.01) relationship exists between the overall intensity of WLA and SRLS uptake and hours worked. Again, this could indicate that they are components

of a more complex model explaining the true nature of the relationship between engagement, self-regulation and workplace learning in crowdwork.

Successful and productive self-regulation has been linked to a more satisfactory work experience (Kanfer et al., 2008). This is corroborated by a weak to moderate positive statistically significant correlation between microworkers' *enjoyment of working on the platform (MTurk),* ranging from "not at all" to "always true", and their uptake of self-regulated learning strategies.

Table 7 Means, standard deviations, and correlations with confidence intervals (communication activities)

Variable	*M*	*SD*	1	2
Relevant online forums	2.29	1.34	.33** [.27, .38]	.40** [.34, .45]
Face-to-face with online workers	1.78	1.27	.26** [.20, .32]	.29** [.23, .34]
Digital communication with online workers	2.22	1.51	.26** [.20, .32]	.30** [.24, .35]
Online communication with friends & family	4.64	1.61	.18** [.12, .24]	.12** [.06, .18]

Note. M and *SD* represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * $p < .05$. ** $p < .01$.

The overall proportion of microworkers claiming to engage in communication activities, such as socialising with other workers on online forums, was relatively low, with the exception of personal and family-related communication. Despite this, based on insights from the literature (Billett, 2001) that identify social interaction with fellow workers as a key engagement factor in the workplace, we hypothesised that workers engaging in such behaviour would show increased workplace learning activity and self-regulated behaviour compared to their peers who do not. Based on the correlational analysis (Table 7), we detected weak to moderate statistically significant correlations between microworkers' tendency to "Participate in an online forum related to online work" and their uptake of workplace learning activities. Further, weak relationships exist between online forum participation and self-regulated learning strategy uptake and between *face-to-face* and *digital* "communication with online workers" and both workplace learning activities and self-regulation. Workers that go the "extra mile" to network and communicate with their peers beyond the platforms appear to be more engaged in learning than their peers who do not.

3.5.4. The uptake of the phases of self-regulation during daily work and workplace learning activities (WLAs)

In order to address RQ5, concerning possible relationships between the scope and frequency of SRLS and WLAs among microworkers and online freelancers, we first compared the overall relationship between SRL and WLA intensity and subsequently treated each constituent phase (*forethought, performance* and *self-reflection*) of the self-regulation model underpinning the SRLS scale (Zimmerman, 2006) individually and performed a correlational analysis between the individual phases and WLA intensity.

Table 8 Means, standard deviations, and correlations with confidence intervals (SRL/WLA, CrowdLearnM)

Variable	*M*	*SD*	SRL-I	WLA-I
WLA-I	1.95	0.79	.59** [.55, .63]	
SRL-Forethought	2.00	0.80		.54** [.50, .58]
SRL-Performance	2.02	0.77		.56** [.52, .60]
SRL-SelfReflection	2.01	0.80		.54** [.50, .59]

Note. M and *SD* represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * $p < .05$. ** $p < .01$.

In the sample of microworkers (CrowdLearnM), we identified a moderate to strong statistically significant correlation (*p<0.01*) between the general uptake of workplace learning activities and self-regulated learning strategies. The analysis of the individual phases yielded a statistically significant (p<.01) moderate positive correlation in each case. However, the similarity between the results among each other and the results of the correlation test between overall SRLS intensity and WLA intensity indicate that there is no interpretable difference between engagement in particular phases of the cyclical model of self-regulation and (crowd)workplace learning among microworkers.

Table 9 Means, standard deviations, and correlations with confidence intervals (SRL/WLA, CrowdLearnF)

Variable	*M*	*SD*	SRL-I	WLA-I
WLA-I	2.00	0.80	.51** [.46, .55]	
SRL-Forethought	2.02	0.78		.47**

			[.42, .51]
SRL-Performance	2.05	0.79	.48** [.43, .53]
SRL-SelfReflection	2.01	0.84	.43** [.38, .48]

Note. M and *SD* represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * $p < .05$. ** $p < .01$.

We subsequently performed the same analysis using the original CrowdLearnF data collected from online freelancers (Table 9) and obtained overall similar, albeit slightly weaker, results. In particular, online freelancer's scoring on the self-reflection related items was only weakly to moderately correlated with the intensity of their workplace learning activities. We recommend that the differences in the cyclical nature of self-regulatory learning behaviour between microworkers and online freelancers be examined more thoroughly in future research.

4. Conclusions and recommendations

A number of key conclusions and recommendations can be formulated on the basis of this study.

4.1. Supporting skill development in microwork marketplaces

Over the years microwork has gained prominence due to the relatively simple nature of work that requires innate human intelligence (Surowiecki, 2005). Most tasks that microworkers engage with therefore do not require a special set of skills. When asked about which skills microworkers had developed over the past three months, they reported frequently developing 'skills in obtaining work' (61%), 'skills in working online' (60%) and 'analytical skills' (58,2%) as their top three skills categories. This can be explained by the learning curve that microworkers have to go through before they can build good reputations, understand how best to access a large enough amount of good work, identify fair tasks and requesters, and as a result maximise their earnings.

In case of microwork, how workers think about their work also reflects a surface-level engagement with tasks. "Thinking deeply about my work" was prominently reported by online freelancers (73,2%), while only 49,7% of microworkers claimed to engage in this activity at least frequently. Similarly, our findings indicate that online freelancers are more prone to self-reflection in comparison to microworkers. Thinking frequently 'about how what I have learned impacts my work' was more prevalent among online freelancers (59,9%) than microworkers by over 24 percentage points. Additionally, 76% of online freelancers reported to frequently consider how their learnings will be useful to them in 'future jobs', compared to 48,3% of microworkers. Almost the entire sample of online freelancers (94,9%) in our study

responded that they frequently 'try to understand the problem thoroughly', compared to 77,3% of microworkers. Similarly, online freelancers reported to frequently 'apply lessons learned' from previous work (82,9%), whereas only 53,4% of their microworking peers did so. This could be due to the more fast-paced and fragmented nature of microwork that, in comparison to online freelancing, may afford fewer opportunities to engage in self-reflection.

In general, microworkers and online freelancers reported developing most skill categories before their engagement in crowdwork, with the exception of specifically platform-related activities, such as "being an online worker / [a freelancer]" or "obtaining work on platforms". Efforts to lower the barriers of access to microwork can engage broader participation. At the same time, by creating appropriate workflows and task designs to decompose and manage complex/creative work, microworkers can be provided the opportunity to develop richer and specialised skill sets. For example, workers can develop writing skills through tasks that require creative generation of content. Task decomposition methods however should cater to optimizing skill development rather than only for being consumable as a microtask. Typical task decomposition in microtask crowdsourcing workflows amounts to breaking down work into smaller units of non-complex activities, that do not particularly consider skill-augmentation of workers. To this end, novel workflows and task decomposition methods that specifically focus on optimizing skill development among workers are needed.

4.2. Microwork as a viable secondary source of income for labour market reintegration

The majority of microworkers in our study suggested that they did not rely on microwork as a primary source of their income, with only 8.9% suggesting that earning primary income through microwork motivated them to undertake this form of work. This is in contrast to 20.2% of online freelancers for whom earning primary income from crowdwork was a main motivating factor. Our findings suggest that microwork can be a viable source of earning a secondary income for microworkers (40.7%) and online freelancers (43.7%). 30.9% of the microworkers in our study reported to be studying compared to 13.2% of the online freelancer's sample. *This suggests the potential of microwork in supplementing the income of young adult populations.* Since there appears to be a continuous demand for online microwork (evidenced by the growing number of microtask crowdsourcing platforms in Europe), policymakers should explore the opportunities presented by microwork to help increase (part-time) employment among citizens. Our findings also suggest the potential of microwork in reintegrating marginalised groups (for example, retired or disabled individuals and the unemployed) into the labour market. This is all the more relevant since microworkers reported generally high levels of enjoyment while completing crowdwork tasks. By creating awareness campaigns to increase participation and engagement in microwork, building worker-centric platforms to serve specific needs and foster healthy relationships between all the actors involved (clients/task requesters, microworkers, platform owners), microwork presents an opportunity to find more work, or supplement existing incomes of individuals. This could be rather pertinent now that the EU, in line with the rest of the world, is dealing with the economic fallouts from the ongoing COVID19 pandemic and would arguably have to continue to deal with this for some time to come (Qiu et al., 2020a; Sawyer et al., 2020; Tang, 2020). Policies could be put in place to support large numbers of furloughed workers across the continent to earn income though online

platforms. Finally, the considerable uptake of microwork among immigrant workers (approximately a third of our sample reported immigrant background, in line with the previous CrowdLearn and COLEEM studies funded by Cedefop) is another area that presents an opportunity to policymakers across the EU.

4.3 Microwork as an untapped market for creative and complex work

Our findings also indicate that many microworkers perceive their tasks as repetitive and monotonous, corroborating evidence from prior work (Gadiraju & Dietze, 2017). In contrast, online freelancers' tasks appear to be relatively more complex and creative. However, research advances in microwork have indicated the suitability of microtask platforms in accomplishing both creative and complex work – also referred to as macrotask crowdsourcing (Doroudi et al., 2016; Haas et al., 2015; Valentine et al., 2017). Macrotask crowdsourcing has been defined to be innately linked with *skill diversity*, and more fine-grained skill types, including expert and twenty-first-century skills, as well as valid skill identification and evaluation mechanisms (Lykourentzou et al., 2019). Examples of higher order cognitive and twenty-first-century skills that workers might need to complete such tasks include: creativity, curiosity and imagination, critical thinking and problem-solving, effective oral and written communication skills, information analysis ability, agility, adaptability and the capacity to learn new knowledge fast, collaboration ability, communication skills, taking initiative, leadership and people management skills (Wagner, 2014). Policymakers can support initiatives and platforms that build and promote support for complex and creative work to be executed in microwork marketplaces. This can be beneficial to microworkers, since creative and complex work has been shown to improve worker engagement and be mentally stimulating. Specifically, policymakers can attempt to incentivise platforms to optimize for skill-augmentation of workers, so that the worker population can gradually upskill and become capable of taking on new types of tasks requiring those skills. This can in turn attract new clients who can turn to such platforms, creating the potential for a sustainable demand and supply of tasks. Although skilled and complex work is likely to warrant higher costs on microtasking platforms, clients on similar platforms have shown the inclination to reward high-quality work with commensurate pay (Hara et al., 2018).

4.4. Bridging communication gaps in microwork marketplaces

Microwork marketplaces have been recognised to exhibit power asymmetry between workers and task requesters, and there are often issues related to communication that manifest due to the absence of open and fluid channels of communication (McInnis et al., 2016). In this study we found that face-to-face interaction with other online workers was reported to be slightly higher among microworkers, with 18,2% reporting at least weekly interactions, compared to only 16,5% of online freelancers. In contrast, communication via online channels was higher by seven percentage points in the online freelancer sample, due to a greater reliance on communication and relatively lesser power asymmetry on most online freelance platforms. The least frequently developed category of skills by microworkers in our study was found to be 'communication skills' (reported by 26,2% of the workers), which could be attributable to the autonomous and fragmented nature of microwork and the bare-bones

communications between task requesters and workers that is mediated through minimalist platform features. In contrast to microworkers, most online freelancers (74,1%) reported frequently developing communication skills during the past three months. 39,9% of online freelancers also reported frequently asking others for help "when having difficulty learning something", compared to only 21% of microworkers, once again hinting at the potential lack of a network of peers to rely on in case of microworkers. Our findings in this study corroborate this well-known characteristic of microwork marketplaces and call platforms and policymakers to action with respect to bridging the communication gaps between task requesters and workers, in an attempt to build a sustainable microwork labour market.

4.5 Microwork as an opportunity to facilitate labour market integration and skill development for refugees and other special groups

The broadening landscape of crowd work in Europe over the last decade has coincided with an influx of refugees across EU member states, with first-time asylum applicants going up by 12% in Q3 of 2019 when compared with Q2 of 2019. Recent studies have found that over 30% of online workers in Europe are immigrants (Cedefop, 2020). Although online work opportunities have provided migrants and refugees with viable means of earning a livelihood, few efforts have focused on optimising learning-related outcomes in online work and helping with the integration of migrants into the local population through sharing online workspaces and offline communities. Prior studies have highlighted the ambivalent implications of digital labour platforms for work and employment (Pesole et al., 2018). On one hand, they have the potential to lower the entry barriers to the labour market, facilitate work participation through effective matching mechanisms and improve the working conditions of workers (for example, people with disabilities or health conditions, youth, older workers, unemployed individuals, people with a migrant background). On the other hand, digital labour platforms such as microwork platforms typically rely on a workforce of independent workers whose conditions of work, representation and social protection are unclear or unfavorable. Drawing on a balanced assessment of these opportunities and challenges, policymakers could consider initiatives to help engage refuges and other special groups in microwork platforms as a temporary measure to help facilitate labour market integration and skill development. In doing so, they can draw on examples and experiences from crowdwork platforms with a social mission such as Samasource (www.samasource.com) which provide work opportunities to low-income workers in developing countries at the same time training the workers in digital skills necessary to engage in crowdwork.

4.6. Educational institutions to focus on developing people's' self-regulatory learning skills

An implication of our study is the importance of self-regulatory learning skills for microwork. Workers need a baseline level of self-regulatory skills to plan, implement and evaluate their own learning and development in order to find better-paid and stimulating tasks, understand the complex and sometime opaque platforms interfaces, workflows and rules, identify trustworthy clients, and overall succeed in platform work. Our study suggests that workers who are more highly self-regulated learners engage in more creative and complex tasks and more workplace learning. The importance of SRL skills was highlighted in the policy recommendations of the original CrowdLearn study (Cedefop, 2020) and it

stands here as well. Therefore, educational institutions, including vocational training colleges, should help people develop self-regulated learning skills. This can be achieved through designing educational and training experiences in such a way that the SRL behaviours are fostered and rewarded.

5. Abbreviations

CEDEFOP	European Centre for the Development of Vocational Training
EU	European Union
SRL	Self-regulated learning
SRLWQ	Self-regulated learning at work questionnaire
UK	United Kingdom
WA	Work assignment
WLA	Workplace learning activities

6. References

Barbosa, N. M., & Chen, M. (2019). Rehumanized crowdsourcing: A labeling framework addressing bias and ethics in machine learning. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, 1–12.

Billett, S. (2001). *Learning in the workplace: Strategies for effective practice*. Allen & Unwin.

Cedefop. (2020). *Developing and matching skills in the online platform economy: Findings on new forms of digital work and learning from Cedefop's CrowdLearn study.* (No. (forthcoming); Cedefop Reference Series). Publications Office.

Chilton, L. B., Horton, J. J., Miller, R. C., & Azenkot, S. (2010). Task search in a human computation market. *Proceedings of the ACM SIGKDD Workshop on Human Computation*, 1–9.

Demartini, G., Difallah, D. E., Gadiraju, U., & Catasta, M. (2017). An introduction to hybrid human-machine information systems. *Foundations and Trends in Web Science*, *7*(1), 1–87.

Difallah, D., Filatova, E., & Ipeirotis, P. (2018). Demographics and Dynamics of Mechanical Turk Workers. *Proceedings of the Eleventh ACM International Conference on Web Search and Data Mining*, 135–143. https://doi.org/10.1145/3159652.3159661

Doroudi, S., Kamar, E., Brunskill, E., & Horvitz, E. (2016). Toward a learning science for complex crowdsourcing tasks. *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*, 2623–2634.

Fontana, R. P., Milligan, C., Littlejohn, A., & Margaryan, A. (2015). Measuring self-regulated learning in the workplace: Measuring SRL in the workplace. *International Journal of Training and Development*, *19*(1), 32–52. https://doi.org/10.1111/ijtd.12046

Gadiraju, U., Checco, A., Gupta, N., & Demartini, G. (2017). Modus operandi of crowd workers: The invisible role of microtask work environments. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*, *1*(3), 1–29.

Gadiraju, U., & Demartini, G. (2019). Understanding worker moods and reactions to rejection in crowdsourcing. *Proceedings of the 30th ACM Conference on Hypertext and Social Media*, 211–220.

Gadiraju, U., & Dietze, S. (2017). Improving learning through achievement priming in crowdsourced information finding microtasks. *Proceedings of the Seventh International Learning Analytics & Knowledge Conference*, 105–114.

Gadiraju, U., Fetahu, B., & Hube, C. (2016). Crystal clear or very vague? Effects of task clarity in the microtask crowdsourcing ecosystem. *1st International Workshop on Weaving Relations of Trust in Crowd Work: Transparency and Reputation Across Platforms, Co-Located With the 8th International ACM Web Science Conference*.

Gadiraju, U., Kawase, R., & Dietze, S. (2014). A taxonomy of microtasks on the web. *Proceedings of the 25th ACM Conference on Hypertext and Social Media - HT '14*, 218–223. https://doi.org/10.1145/2631775.2631819

Gadiraju, U., Yang, J., & Bozzon, A. (2017). Clarity is a worthwhile quality: On the role of task clarity in microtask crowdsourcing. *Proceedings of the 28th ACM Conference on Hypertext and Social Media*, 5–14.

Haas, D., Ansel, J., Gu, L., & Marcus, A. (2015). Argonaut: Macrotask crowdsourcing for complex data processing. *Proceedings of the VLDB Endowment*, *8*(12), 1642–1653.

Han, L., Maddalena, E., Checco, A., Sarasua, C., Gadiraju, U., Roitero, K., & Demartini, G. (2020). Crowd worker strategies in relevance judgment tasks. *Proceedings of the 13th International Conference on Web Search and Data Mining*, 241–249.

Han, L., Roitero, K., Gadiraju, U., Sarasua, C., Checco, A., Maddalena, E., & Demartini, G. (2019). All those wasted hours: On task abandonment in crowdsourcing. *Proceedings of the Twelfth ACM International Conference on Web Search and Data Mining*, 321–329.

Hara, K., Adams, A., Milland, K., Savage, S., Callison-Burch, C., & Bigham, J. P. (2018). A data-driven analysis of workers' earnings on Amazon Mechanical Turk. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, 1–14.

Hube, C., Fetahu, B., & Gadiraju, U. (2019). Understanding and mitigating worker biases in the crowdsourced collection of subjective judgments. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, 1–12.

Irani, L. C., & Silberman, M. S. (2013). Turkopticon: Interrupting worker invisibility in amazon mechanical turk. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 611–620.

Kanfer, R., Chen, G., & Pritchard, R. D. (2008). *Work motivation: Past, present and future*. Routledge.

Kaufmann, N., Schulze, T., & Veit, D. (2011). More than fun and money. Worker Motivation in Crowdsourcing-A Study on Mechanical Turk. *Amcis*, *11*(2011), 1–11.

Kuek, S. C., Paradi-Guilford, C., Fayomi, T., Imaizumi, S., Ipeirotis, P., Pina, P., & Singh, M. (2015). *The Global Opportunity in Online Outsourcing*. World Bank, Washington, DC. http://hdl.handle.net/10986/22284

Le Ludec, C. L., Tubaro, P., & Casilli, A. A. (2019). How many people microwork in France? Estimating the size of a new labor force. *ArXiv:1901.03889 [Econ, q-Fin]*. http://arxiv.org/abs/1901.03889

Lehdonvirta, V., & Ernkvist, M. (2011). *Converting the Virtual Economy into Development Potential: Knowledge Map of the Virtual Economy.* infoDev / World Bank. http://www.infodev.org/publications

Lehdonvirta, V., Kässi, O., Hjorth, I., Barnard, H., & Graham, M. (2019). The Global Platform Economy: A New Offshoring Institution Enabling Emerging-Economy Microproviders. *Journal of Management*, *45*(2), 567–599. https://doi.org/10.1177/0149206318786781

Lykourentzou, I., Khan, V.-J., Papangelis, K., & Markopoulos, P. (2019). Macrotask Crowdsourcing: An Integrated Definition. In *Macrotask Crowdsourcing* (pp. 1–13). Springer.

Margaryan, A. (2019a). Workplace learning in crowdwork: Comparing microworkers' and online freelancers' practices. *Journal of Workplace Learning*, *31*(4), 250–273. https://doi.org/10.1108/JWL-10-2018-0126

Margaryan, A. (2019b). Comparing crowdworkers' and conventional knowledge workers' self-regulated learning strategies in the workplace. *Human Computation*, *6*(1). https://doi.org/10.15346/hc.v6i1.5

McInnis, B., Cosley, D., Nam, C., & Leshed, G. (2016). Taking a HIT: Designing around rejection, mistrust, risk, and workers' experiences in Amazon Mechanical Turk. *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*, 2271–2282.

Pesole, A., Urzí Brancati, M. C., Fernández-Macías, E., Biagi, F., & González Vázquez, I. (2018). *Platform workers in Europe evidence from the COLLEEM survey*. Publications Office of the European Union. https://doi.org/10.2760/742789

Qiu, S., Gadiraju, U., & Bozzon, A. (2020a, May 8). *Remote Work Aided by Conversational Agents*. New Future of Work. https://www.microsoft.com/en-us/research/publication/remote-work-aided-by-conversational-agents/

Qiu, S., Gadiraju, U., & Bozzon, A. (2020b). Just the Right Mood for HIT! *International Conference on Web Engineering*, 381–396.

Saito, S., Chiang, C.-W., Savage, S., Nakano, T., Kobayashi, T., & Bigham, J. P. (2019). Turkscanner: Predicting the hourly wage of microtasks. *The World Wide Web Conference*, 3187–3193.

Savage, S., Chiang, C. W., Saito, S., Toxtli, C., & Bigham, J. (2020). Becoming the Super Turker: Increasing Wages via a Strategy from High Earning Workers. *Proceedings of The Web Conference 2020*, 1241–1252.

Sawyer, S., Dunn, M., Munoz, I., Stephany, F., Raheja, R., Vaccaro, G., & Lehdonvirta, V. (2020, August). *Freelancing Online During the COVID-19 Pandemic*. New Future of Work. https://www.microsoft.com/en-us/research/publication/freelancing-online-during-the-covid-19-pandemic/

Schmidt, F. (2017). *Digital Labour Markets in the Platform Economy: Mapping the Political Challenges of Crowd Workand Gig Work*.

Schmidt, F. A. (2019). Crowdproduktion von Trainingsdaten: Zur Rolle von Online-Arbeit beim Trainieren autonomer Fahrzeuge. In *Study / edition der Hans-Böckler-Stiftung* (Vol. 417). Hans-Böckler-Stiftung, Düsseldorf. https://ideas.repec.org/b/zbw/hbsedi/417.html

Surowiecki, J. (2005). *The wisdom of crowds*. Anchor.

Tang, J. (2020, August). *Early Indicators of the Effect of the Global Shift to Remote Work on People with Disabilities*. New Future of Work. https://www.microsoft.com/en-us/research/publication/early-indicators-of-the-effect-of-the-global-shift-to-remote-work-on-people-with-disabilities/

Tubaro, P., & Casilli, A. A. (2019). Micro-work, artificial intelligence and the automotive industry. *Journal of Industrial and Business Economics*, *46*(3), 333–345. https://doi.org/10.1007/s40812-019-00121-1

Valentine, M. A., Retelny, D., To, A., Rahmati, N., Doshi, T., & Bernstein, M. S. (2017). Flash organizations: Crowdsourcing complex work by structuring crowds as organizations. *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*, 3523–3537.

Wagner, T. (2014). *The global achievement gap: Why even our best schools don't teach the new survival skills our children need-and what we can do about it*. Hachette UK.

Xu, L., Zhou, X., & Gadiraju, U. (2019). Revealing the role of user moods in struggling search tasks. *Proceedings of the 42nd International ACM SIGIR Conference on Research and Development in Information Retrieval*, 1249–1252.

Yin, M., Gray, M. L., Suri, S., & Vaughan, J. W. (2016). The Communication Network Within the Crowd. *Proceedings of the 25th International Conference on World Wide Web*, 1293–1303. https://doi.org/10.1145/2872427.2883036

Zhang, Z., Singh, J., Gadiraju, U., & Anand, A. (2019). Dissonance between human and machine understanding. *Proceedings of the ACM on Human-Computer Interaction*, *3*(CSCW), 1–23.

Zhuang, M., & Gadiraju, U. (2019). In What Mood Are You Today? An Analysis of Crowd Workers' Mood, Performance and Engagement. *Proceedings of the 10th ACM Conference on Web Science*, 373–382.

Zimmerman, B. J. (2006). Development and Adaptation of Expertise: The Role of Self-Regulatory Processes and Beliefs. In *The Cambridge handbook of expertise and expert performance* (pp. 705–722). Cambridge University Press. https://doi.org/10.1017/CBO9780511816796.039

Zimmerman, B. J., & Kitsantas, A. (2005). The Hidden Dimension of Personal Competence: Self-Regulated Learning and Practice. In *Handbook of competence and motivation* (pp. 509–526). Guilford Publications.

7. Annexes

Annex 1. Questionnaire survey

Please answer the following questions to the best of your ability.

Read this carefully before filling out the questionnaire please!
This questionnaire is about your learning and professional development as part of your work on Amazon Mechanical Turk (MTurk). The questions are about the work you carry out on the MTurk platform, the skills you develop through this work, and your interactions with other workers, and the platform. When thinking about your answers, it is useful to think about a concrete task during which you had to learn new skills. Learning can happen through means such as self-study, seeking feedback from the task requester or your peers when applicable, solving problems, keeping up to date with developments in your field, or taking an online tutorial or attending a training workshop. Please keep this broad view of learning in mind when considering your responses.

There are no right or wrong responses to these questions. Please tell us how you typically behave, rather than how you feel you should behave.

Your individual data will not be shared with MTurk.

Questionnaires with missing responses will be unusable for research and therefore ineligible for payment.

Informed consent

By selecting 'Yes' below you consent to participating in this study.
All information you provide will be treated as confidential. Your responses will be shared only with the research team at the Leibniz University of Hannover and Copenhagen Business School, and with representatives of CEDEFOP, the European Centre for the Development of Vocational Training, which is funding the research. Any personally identifiable data will be securely deleted once the study is completed and the data no longer needed. Overall findings from the survey will be published in research reports and articles, but you or your responses will not be identified individually.
For further information on CEDEFOP contact details and how your personal data is protected during CEDEFOP-funded projects, please refer to their website.
If you have any other questions about this research, please contact Ujwal Gadiraju (gadiraju@L3S.de).

(1). I AGREE TO PARTICIPATE IN THIS STUDY:
☐ Yes

---

(2). Which country do you live in?
Select

---

(3). What types of HITs (human intelligence tasks) listed below most closely describe the types of tasks you complete on Amazon Mechanical Turk? Check all options that apply.
☐ My HITs on MTurk are mostly routine (i.e. ordinary pieces of work that follow a regular, unvarying, habitual, unimaginative, or rote pattern)
☐ My HITs on MTurk are highly reliant on formal processes (e.g., clear definition of input and output, structured interactions with clients, etc.)
☐ My HITs on MTurk don't give me freedom to decide what should be done in any particular situation
☐ My HITs on MTurk are mostly systematically repeatable
☐ My HITs on MTurk are highly reliant on formal standards (e.g., standards of minimum quality, technical standards)
☐ My HITs on MTurk rely on the combination of knowledge from different fields of expertise or disciplines
☐ My HITs on MTurk are improvisational/creative
☐ My HITs on MTurk are highly reliant on my deep and specific expertise/personal judgement
☐ My HITs on MTurk are dependent on collaborating with others
☐ My HITs on MTurk are highly reliant on my general expertise/individual experiences
☐ My HITs on MTurk involve solving problems that have no obvious correct answer
☐ My HITs on MTurk involve dealing with problems I have not met before
☐ My HITs on MTurk require unique ideas/solutions to problems
☐ My HITs on MTurk require me to use a variety of skills to complete the work
☐ My HITs on MTurk require me to use a number of complex, high-level skills

---

(4). Which types of HITs do you typically complete on Amazon Mechanical Turk? Please select all that apply.
☐ Content Access: these HITs require you to simply access some content. For example, '*Click on the link and watch the video*', or '*Read the information by following the website link*'. In these HITs the workers are merely asked to consume some content by accessing it, but do nothing further.
☐ Content Creation: such HITs usually require you to generate new content for a document or website. They include authoring product descriptions or producing question-answer pairs. For example, '*Suggest names for a new product*', or '*Translate the following content into German*'.
☐ Information Finding: such HITs delegate the process of searching to satisfy one's information need to you. For example, '*Find information about a company in the UK*', or '*Find the cheapest air fare for the selected dates and destinations*'.
☐ Interpretation and Analysis: such HITs rely on your interpretation skills during task completion. For example, '*Choose the most suitable category for each URL*', or '*Categorize reviews as either positive or negative*'.
☐ Survey: these HITs are typically designed as a set of questions that need to be answered by you, often taking the form of a questionnaire.
☐ Verification and Validation: these are HITs that require you to either verify certain aspects as per the given instructions, or confirm the validity of various kinds of content. For example, '*Is this a Spam Bot? : Check whether the twitter usersare either real people or organisations, or merely spam twitter user profiles*', or '*Match the names of personal computers and verify corresponding information*'.

---

(5). Thinking about the HITs you completed on Amazon Mechanical Turk over the last three months, to what extent have you developed the skill categories listed below through your work on the platform?

Please keep a broad definition of learning in mind. You can develop a skill category through various learning activities ranging from on-the-job learning to formal educational courses.

Through my work on MTurk ...	Never (I have not developed this skill category)	Rarely (I have developed this skill category on a few occasions)	Frequently (I have developed this skill category weekly)	Very frequently (I have developed this skill category daily)
I developed core skills in my area of specialty (e.g., searching and finding information on the Web, content creation or validation, writing reviews, image transcription, annotation, etc.)	○	○	○	○
I developed foreign language skills (eg., through completing HITs in different languages)	○	○	○	○
I developed skills in obtaining work on platforms like MTurk (e.g., building and maintaining a high reputation, learning to use MTurk and complete HITs effectively, etc.)	○	○	○	○
I developed my learning skills	○	○	○	○
I developed skills in being an online worker (e.g., how to earn a livelihood online, taxation, working alone, etc.)	○	○	○	○
I developed my communication skills (e.g., conversational exchanges with HIT requesters, conversing on MTurk related forums, handling cultural differences, email etiquette, etc.)	○	○	○	○
I developed my personal dispositions (e.g., confidence, creativity, resilience, independence, flexibility, etc.)	○	○	○	○
I developed my organisational skills (e.g., time management, project management, discipline)	○	○	○	○
I developed my analytical skills	○	○	○	○
I developed my computer literacy	○	○	○	○

Please list any other skills which you may have developed through your work on Amazon Mechanical Turk below.

---

(6). Thinking about the HITs you completed on Amazon Mechanical Turk over the last three months, which of the skills listed below did you already have before joining Amazon Mechanical Turk and have been useful for your work on the platform? Please select all that apply.

☐Core skills in my area of specialty (e.g., searching and finding information on the Web, content creation or validation, writing reviews, image transcription, annotation, etc.)
☐Foreign language skills
☐Skills in obtaining work on platforms like MTurk (e.g., building and maintaining a high reputation, learning to use MTurk and complete HITs effectively, etc.)
☐Learning skills
☐Skills in being an online worker (e.g., how to earn a livelihood online, taxation, working alone, etc.)
☐Communication skills (e.g., conversational exchanges with HIT requesters, conversing on MTurk related forums, handling cultural differences, email etiquette, etc.)
☐Personal dispositions (e.g., confidence, creativity, resilience, independence, flexibility, etc.)
☐Organisational skills (e.g., time management, project management, discipline)
☐Analytical skills
☐Computer literacy

---

(7). During the last month, which of the discussed skill categories have you spent time on to further develop/improve? Please select all options that apply

☐Core skills in my area of specialty (e.g., searching and finding information on the Web, content creation or validation, writing reviews, image transcription, annotation, etc.)
☐Foreign language skills
☐Skills in obtaining work on platforms like MTurk (e.g., building and maintaining a high reputation, learning to use MTurk anc complete HITs effectively, etc.)
☐Learning skills
☐Skills in being an online worker (e.g., how to earn a livelihood online, taxation, working alone, etc.)
☐Communication skills (e.g., conversational exchanges with HIT requesters, conversing on MTurk related forums, handling cultural differences, email etiquette, etc.)
☐Personal dispositions (e.g., confidence, creativity, resilience, independence, flexibility, etc.)

☐Organisational skills (e.g., time management, project management, discipline)
☐Analytical skills
☐Computer literacy

(8). I enjoy working on Amazon Mechanical Turk
○Not at all true
○Sometimes true
○True most of the time
○Always true

(9). Within the last 3 months, how frequently have you undertaken the following learning activities as part of your work on Amazon Mechanical Turk?

	Never (I have not undertaken this learning activity)	**Rarely (I have undertaken this learning activity on a few occasions)**	**Frequently (I have undertaken this learning activity weekly)**	**Very frequently (I have undertaken this learning activity daily)**
Acquiring new information to complete my HITs on MTurk	○	○	○	○
Working alone to complete my HITs on MTurk	○	○	○	○
Collaborating with others to complete my HITs on MTurk	○	○	○	○
Following new developments on MTurk	○	○	○	○
Performing HITs that are new to me on MTurk	○	○	○	○
Asking others for advice regarding work on MTurk	○	○	○	○
Attending a training course/ workshop to acquire knowledge/ skills for my work on MTurk	○	○	○	○
Taking free online courses or webinars (e.g., Coursera, edX) to acquire knowledge/ skills for my work on MTurk	○	○	○	○
Using paid online tutorials (e.g., Lynda) to acquire knowledge/ skills for my work on MTurk	○	○	○	○
Reading articles/ books to acquire knowledge/ skills for my work on MTurk	○	○	○	○
Observing/ replicating other people's strategies for my work on MTurk	○	○	○	○
Finding a better way to do a HIT by trial and error on MTurk	○	○	○	○
Thinking deeply about my work on MTurk (e.g., what I could do better next time)	○	○	○	○
Receiving feedback on my work on MTurk (e.g., from task requesters or other workers)	○	○	○	○
Learning from online community forums (e.g., mturkforum.com, or other MTurk community forums)	○	○	○	○

(10). Please tell us about the **specific strategies** you use to **plan, carry out and reflect on your learning** for your work on Amazon Mechanical Turk. There are no right or wrong answers to these questions. Tell us how you typically behave, rather than how you think you should behave.
Please indicate how well the following statements describe your typical behaviour on Amazon Mechanical Turk:

	Not at all true	**Sometimes true**	**True most of the time**	**Always true**

	Not at all true	Sometimes true	True most of the time	Always true
I set my own performance standards for my work on MTurk	○	○	○	○
I set short-term learning goals (i.e. monthly or quarterly) for my work on MTurk	○	○	○	○
I set long-term learning goals (i.e. yearly or longer) for my work on MTurk	○	○	○	○
I make a plan of how I'll achieve my learning goals for my work on MTurk	○	○	○	○
I regularly review progress towards my learning goals for my work on MTurk	○	○	○	○
Before I begin a HIT on MTurk I ask myself what I need to learn to complete it	○	○	○	○
I come up with several strategies to reach my learning goals for my work on MTurk and choose the best strategy	○	○	○	○
To reach my learning goals, I use strategies that have worked in the past for my work on MTurk	○	○	○	○
I adapt my learning strategies to each type of HIT on MTurk	○	○	○	○
I change my strategies when I don't make progress with my learning (e.g., how I am learning a necessary skill) for my work on MTurk	○	○	○	○
I change my learning goals (e.g., what specific skill I would like to learn next) for my work on MTurk	○	○	○	○
I use different strategies for each thing I need to learn for my work on MTurk	○	○	○	○
I think I will be able to use what I learn through my HITs on MTurk in my future jobs	○	○	○	○
It is important for me to learn new things in through my HITs on MTurk	○	○	○	○
I ask myself how what I am learning for my work on MTurk is related to what I already know	○	○	○	○
I make notes or diagrams to help organise my thoughts for my work on MTurk	○	○	○	○
I block time in my calendar to work on my learning goals for my work on MTurk	○	○	○	○
When learning, I collect information from many different sources for my work on MTurk	○	○	○	○
I apply lessons learned from my previous work to my HITs on MTurk where appropriate	○	○	○	○
When learning for my work on MTurk, I treat the new information I find as a starting point and develop my own ideas from it	○	○	○	○
When having difficulty learning something for my work on MTurk, I ask others for help	○	○	○	○
I meet my learning goals for my work on MTurk	○	○	○	○
I am confident I can meet all demands in my work on MTurk	○	○	○	○
When faced with a challenge I try to understand the problem as thoroughly as possible	○	○	○	○
I prefer HITs on MTurk that require me to learn something new	○	○	○	○
I prefer challenging HITs on MTurk, even if I need to learn a lot to complete them	○	○	○	○
After I finish a HIT on MTurk, I ask myself if there were better ways to do it	○	○	○	○
I think about what I have learned once I've finished a HIT on MTurk	○	○	○	○
I think about how what I've learned on MTurk fits into the bigger picture of my professional development	○	○	○	○
I consider how what I've learned on MTurk may be of interest to others (e.g., other workers, colleagues)	○	○	○	○
I share what I have learned on MTurk with others	○	○	○	○
I think about how what I have learned through a HIT impacts my work in other HITs on MTurk or my other jobs	○	○	○	○
I write up private notes about what I have learned on MTurk that I don't share with others	○	○	○	○
I write up notes about my learning on MTurk and share these with other people (e.g., by posting in a public blog, etc.)	○	○	○	○
Before joining MTurk, I signed up to other platforms to test and learn how to be successful in online work	○	○	○	○

This is an attention check question. Please select the second option here.

- ○ Figure8
- ○ MTurk
- ○ Prolific
- ○ Upwork
- ○ Clickworker

(11). How often do you do the following activities?

	Never	Rarely	Once a week	Several times a week	Once a day	Several times a day
Participate in an online forum related to online work	○	○	○	○	○	○
Communicate with other online workers face-to-face	○	○	○	○	○	○
Communicate with other online workers via online social networks, instant messaging, SMS or email	○	○	○	○	○	○
Use online social networks to communicate with friends and family	○	○	○	○	○	○

(12). How do you feel about the potential to work for yourself? Please read the statements below and indicate how much you agree or disagree with each.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I want to be my own boss	○	○	○	○	○
I consider working for myself to be a better option than formal employment with a company	○	○	○	○	○
I would be proud to tell my friends and family that I am an entrepreneur	○	○	○	○	○
There is not a lot of risk involved in working for yourself	○	○	○	○	○
I see myself as a freelancer	○	○	○	○	○

(13). Are you a member of a community, forum, or group related to your online work or Amazon Mechanical Turk?
○ Yes
○ No

If yes, please specify which community(ies), forum(s), or group(s). Enter 'No' if you are not a member.

(14). What is your year of birth (please enter in the format YYYY; for example '1980')?

(15). What is your gender?
○ Female
○ Male
○ Other

(16). What was your nationality at birth?

(17). What is your current full-time profession and the corresponding job title? If you have more than one profession list all that apply.

(18). What is your main employment status? Select all that apply.
☐ Freelancer/self-employed
☐ Employed full-time in a regular job next to my work on MTurk
☐ Employed part-time in a regular job next to my work on MTurk
☐ Retired
☐ Disabled/Not able to work
☐ Student
☐ Homemaker

☐Unemployed
Other (please specify) :

---

(19). How many years of work experience do you have in total, including work on Amazon Mechanical Turk? This question is about all of your work experience, including in traditional jobs, on online platforms or apps.
○1 year or less
○Between 13 months and 3 years
○Between 37 months and 10 years
○More than 10 years

---

(20). How long have you been working on Amazon Mechanical Turk?
○ 6 months or less
○Between 7 and 12 months
○Between 1 and 2 years
○Between 2 and 3 years
○Between 3 and 10 years
○More than 10 years

This is an attention check question. Please select the fourth option.
○ MTurk was founded in 1987.
○ MTurk was founded in 2010.
○ MTurk was founded in 2016.
○ MTurk was founded in 2005.
○ MTurk was founded in 1999.

---

(21). How many HITs have you completed on Amazon Mechanical Turk?
○I have not completed any HITs so far
○Between 1 and 250 HITs
○Between 251 and 500 HITs
○Between 501 and 750 HITs
○Between 751 and 1000 HITs
○Over 1000 HITs

---

(22). Last week, about how many hours have you worked on completing HITs on Amazon Mechanical Turk?
○I did not work on MTurk last week
○I worked less than 4 hours
○I worked between 4 and 8 hours
○I worked the equivalent of 2 work days (9 - 16 hours)
○I worked the equivalent of 3 work days (17 - 24 hours)
○I worked the equivalent of 4 work days (25 - 32 hours)
○I worked the equivalent of 5 work days (33 - 40 hours)
○I worked more than the equivalent of 5 work days (>40 hours)

---

(23). What share of your income over the past month came from working on Amazon Mechanical Turk?
○0-20%
○21-40%
○41-60%
○61-80%
○81-100%

---

(24). Why do you work on Amazon Mechanical Turk? Select all that apply.
☐MTurk is my primary source of income
☐MTurk is my secondary source of income
☐I am unable to find traditional work
☐I am unable to perform traditional work (e.g., because of a health condition)
☐To kill time
☐HITs on MTurk are fun
☐MTurk is a fruitful way to spend time and earn money
☐Being my own boss
☐Following my passion

☐No commute/can work from anywhere
☐Control over my schedule
☐More choice over the types of HITs I can do
☐No office dress code
☐I can earn money while fulfilling social obligations my family expects of me (e.g., caring for children or elderly family members)
☐I can earn more income on MTurk than I could in traditional work
☐I can gain extra technical skills in my hobby area while maintaining the stability and regular income of my traditional job

Other (please specify) :

---

(25). Do you consider yourself an entrepreneur?

Definition: 'Entrepreneur' means a person who organises and manages their own business exercising considerable personal initiative and taking on financial risk. Entrepreneurs include people who are self-employed, those who are a sole owner, partner or a majority shareholder of a small, medium, or large company.

○Yes, I am an entrepreneur
○No, I don't think I am an entrepreneur

Other (please specify) :

---

(26). Do you intend to continue working on Amazon Mechanical Turk in the future?
○Yes
○No

---

(27). What other platforms, websites or apps have you earned income from? Please enter all that apply in the space below.

---

(28). What is the highest level of education you have completed?
○I have had no formal schooling
○Secondary education/high school diploma or equivalent school-leaver certificate
○Some high school/secondary school, but no diploma
○Technical/trade/vocational college
○Some university/college study, but no diploma
○Undergraduate degree (e.g., Bachelor's or Associate's)
○Master's degree
○Professional qualifications (e.g., chartered accountant)
○Doctorate (e.g., PhD)

---

(29). Do you have any comments about this survey or anything else to say about your learning on Amazon Mechanical Turk? Please elaborate.

Thank you very much for responding to the survey!

Submit