

# Workplace learning in crowdwork

## Comparing microworkers' and online freelancers' practices

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### Abstract

**Purpose** – This paper aims to explore workplace learning practices within two types of crowdwork – microwork and online freelancing. Specifically, the paper scopes and compares the use of workplace learning activities (WLAs) and self-regulatory learning (SRL) strategies undertaken by microworkers (MWs) and online freelancers (OFs). We hypothesised that there may be quantitative differences in the use of WLAs and SRL strategies within these two types of crowdwork, because of the underpinning differences in the complexity of tasks and skill requirements.

**Design/methodology/approach** – To test this hypothesis, a questionnaire survey was carried out among crowdworkers from two crowdwork platforms – Figure Eight (microwork) and Upwork (online freelancing). Chi-square test was used to compare WLAs and SRL strategies among OFs and MWs.

**Findings** – Both groups use many WLAs and SRL strategies. Several significant differences were identified between the groups. In particular, moderate and moderately strong associations were uncovered, whereby OFs were more likely to report (i) undertaking free online courses/tutorials and (ii) learning by receiving feedback. In addition, significant but weak or very weak associations were identified, namely, OFs were more likely to learn by (i) collaborating with others, (ii) self-study of literature and (iii) making notes when learning. In contrast, MWs were more likely to write reflective notes on learning after the completion of work tasks, although this association was very weak.

**Originality/value** – The paper contributes empirical evidence in an under-researched area – workplace learning practices in crowdwork. Crowdwork is increasingly taken up across developed and developing countries. Therefore, it is important to understand the learning potential of this form of work and where the gaps and issues might be. Better understanding of crowdworkers' learning practices could help platform providers and policymakers to shape the design of crowdwork in ways that could be beneficial to all stakeholders.

**Keywords** Workplace learning, Self-regulated learning, Crowdwork, Online freelancing, Microwork, Learning strategies, Learning activities, Learning practices

**Paper type** Research paper

### Background

#### *Definition and types of crowdwork*

Over the past decade, new forms of work termed “digital work” have been emerging (Huws, 2014; Lehtonvirta and Ernkvist, 2011). A key practice underpinning these digital work practices is crowdsourcing – the use of Internet-based platforms to bring together people from across the world to carry out tasks (Howe, 2008). Crowdsourcing includes heterogeneous practices ranging from paid work to contest-based tasks, citizen science initiatives, barter or volunteering (Howcroft and Bergvall-Kareborn, 2018; 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 study reported in this paper 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 digital work. Crowdwork occurs within Internet-based platforms, which act as intermediaries between people or organisations who post tasks and workers who perform them (Srnicek, 2017). The crowdwork platforms manage the distribution, submission, quality-control and payment for the work tasks (Degryse, 2016; Irani, 2015). Some of the largest and best-known examples of crowdwork platforms are Amazon Mechanical Turk (MTurk), People Per Hour, Upwork and Figure Eight (previously CrowdFlower).

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 into small units of work (called micro-tasks) and posted on the platform for crowdworkers to carry out for pay. Microtasks 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 (Gadiraju *et al.*, 2014). Examples of microwork platforms are MTurk and Figure Eight. Microwork tasks are distributed and their completion and acceptance are monitored largely by algorithms rather than humans, in an emergent mode of supervision of work termed “algorithmic management” (Schmidt, 2017). Within microwork platforms, crowdworkers tend to be anonymous, generally 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. Upwork is one of the largest online freelancing platforms. 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 (Schmidt, 2017). Within OF platforms, task owners (clients) rather than algorithms monitor the quality of work.

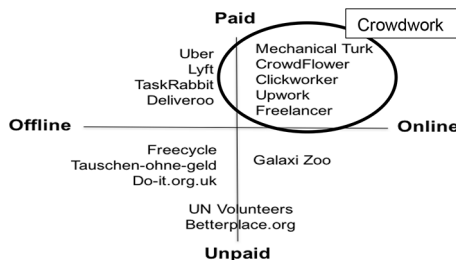


Figure 1. Types of crowdsourced labour

*Spread of crowdwork and characteristics of the workforce*

Crowdwork is a growing type of labour across the world, both in developing and developed countries. In 2015, there were an estimated 48 million crowdworkers worldwide, and the estimated gross revenue of the industry was about \$2 billion (Kuek *et al.*, 2015). Two recent surveys estimated that 5-9 per cent of the EU population and 5 per cent of the US population are involved in crowdwork (Huws *et al.*, 2016; Pew Research Centre, 2016). The crowdwork industry is growing fast: a recent analysis identified a 26 per cent growth in the year between July 2016-June 2017 (Lehdonvirta, 2017a). By 2020, the crowdwork industry is expected to generate gross services revenue of \$15-\$25 billion (Kuek *et al.*, 2015). A continued expansion in the adoption of crowdwork platforms over the next decade has been forecast, with the potential impacts estimated to include raising global annual GDP by up to \$2.7 trillion, with 540 million individuals worldwide – a number equivalent to the entire population of the EU – who could potentially benefit from participation in crowdwork (Manyika *et al.*, 2015).

The top five countries where the most demand for crowdwork originates in are the US, the UK, India, Australia and Canada (Ojanpera, 2016). Most clients of crowdwork platforms are sole entrepreneurs, start-ups or medium enterprises, as well as scholars who increasingly use the crowdwork platforms to collect research data (Eurofound, 2015; Kuek *et al.*, 2015; Manyika *et al.*, 2015, 2016; Schmidt, 2017). Also, some large companies are using crowdwork platforms to outsource work and to reach skills and expertise globally to supplement their in-house staff (Corporaal and Lehdonvirta, 2017). The largest supplier of crowdwork is India, followed by Bangladesh and the USA (Lehdonvirta, 2017b). Different countries' crowdworkers focus on different occupations, for example software development and technology is concentrated in India, while professional services such as accounting and business consulting are led by crowdworkers in the UK (*ibid.*). In 2015, the majority of crowdworker were estimated to be men and below 35 years old (Huws *et al.*, 2016; Kuek *et al.*, 2015). On average, online freelancers tend to be more highly educated than microworkers (Berg, 2016; Kuek *et al.*, 2015). For both types of crowdworkers, the main motivation to work on the platforms is to generate income; for microworkers, their earnings on crowdwork platforms tend to be supplementary income, but for online freelancers these tend to be their only source of income (Gupta, 2017; Kuek *et al.*, 2015).

*Workplace learning opportunities within crowdwork: Debates and empirical data*

Opportunities and challenges of crowdwork have been discussed in the literature. Analysts have highlighted the potential positive macroeconomic impact of crowdwork, in particular potential increase in labour force participation and productivity through easier access to overseas labour markets; better skills matching and enhanced transparency of outputs, qualifications and endorsements; reduction of public spending on unemployment benefits; increased flexibility of work and greater opportunities for exercising one's personal agency and for engaging in long-distance collaboration and knowledge sharing; and opportunities to harness data from crowdwork markets to inform education and career choices for long term (Degryse, 2016; Irani, 2015; Manyika *et al.*, 2015, 2016; Schmidt, 2017). The challenges include decreased quality and increased precariousness of work; lack of legal protection of crowdworkers; data ownership issues and increased workplace surveillance; power asymmetries in favour of platform providers and task owners; and crowdworkers' dishonest and malicious behaviours (Abraham *et al.*, 2017; Gadiraju, Fetahu and Kawase, 2015; Huws *et al.*, 2016; Scholz, 2015; Valenduc and Vendramin, 2016).

One key aspect crowdwork platforms have been criticised for is the "outsourcing" of the learning and development function to the workers (Schmidt, 2017). Critics have highlighted

that, because platforms typically do not provide support or infrastructure for training and development of crowdworkers, the workers do not have opportunities to apply or develop their skills; and that crowdwork tasks, especially in microwork platforms, are mundane and repetitive bringing about deskilling (Degryse, 2016; Irani, 2015). For example, Degryse (2016) characterised crowdworkers as “*digital galley slaves*” (p. 50) questioning “[...] in their role as tools of machines and algorithms, will not workers be increasingly less required to use their own know-how, their own skills and their own experiences?” (p. 47). Yet, as evidenced by a recent review of the literature, there has been paucity of empirical research on crowdworkers’ learning practices, the use and development of their skills through their work on the platforms, their use of workplace learning activities (WLAs) and self-regulatory learning (SRL) strategies, and their own views about their learning experiences and expectations within these platforms (Lehdonvirta *et al.*, 2019).

Within the nascent field of crowdwork research, only a few empirical studies have so far touched upon the theme of crowdworkers’ learning. At the macrotask end of the spectrum, Al-Ani and Stumpp (2016) analysed crowdworkers’ views about what is important for them in their work on the platforms and what measures could help improve crowdwork. Their study, based on a survey and interviews with online freelancers from Jovoto and an anonymized platform including IT professionals and creatives showed that “learning new skills” was a prominent motivating factor for the crowdworkers to take up this form of work. In another study focussed on macrowork, Barnes, Green and de Hoyos (2015) and Green *et al.* (2014a) analysed the challenges and opportunities of crowdwork labour for workers’ employability. Among other factors, they explored online freelancers’ accounts of skills they developed through their work on the platform (People Per Hour). The skills reported by online freelancers ranged from learning how to use the platforms and interaction etiquette to business development, marketing, negotiating, networking, customer relations and communication.

Interestingly and perhaps counterintuitively, similar findings are emerging from microwork settings as well. For example, in a recent study, Kost *et al.* (2018) analysed how microworkers from Amazon Mechanical Turk experience meaningfulness in their platform work. Among the four, key source of meaning they identified through a survey of these microworkers was “self-improvement”, including “the use and development of skills or a specific talent” and “the learning experiences” platform work provided. Similarly, three other studies of Amazon Mechanical Turk workers including survey, interview and ethnographic observation (Gupta, 2017; Martin *et al.*, 2016; Silberman *et al.*, 2010) showed that microwork requires a set of complex skills, for example learning how to use and navigate the often opaque and non-intuitive interfaces of the platforms and how to find stimulating and well-paid tasks. Furthermore, the study by Gupta (2017) identified a range of different skills that microworkers reported developing through their engagement in crowdwork, including honing email communication skills; improving their English or learning new languages (such as German) to communicate with clients; improving their digital literacy and enhancing technical skills such as software development, problem-solving, maths or writing skills.

#### *Focus of this paper*

Contributing to this emergent empirical literature on learning and skill development within crowdwork, the present paper examines inter-group differences in workplace learning practices of microworkers and online freelancers. We conceptualise “workplace learning practices” as a key mechanism through which skills are formed in the crowd workplace. More specifically, we define the scope of learning practices as a combination of four key

aspects. First, *what* crowdworkers learn as part of crowdwork, that is skills, knowledge, dispositions. Second, *how* they learn it, that is WLAs they undertake to develop their skills and the self-regulatory strategies they use to plan, implement and reflect on their learning activities. Third, *why* they learn it, comprising motivations, personal educational and professional trajectories and socio-economic factors, grounded in the understanding of the nature of crowdwork tasks and their learning intensity. And fourth, *with whom* they learn it, including crowdworkers' self-organisation practices, personal and professional networks and collaborations, and the role of these networks and collaborations in the learning process.

While the extant literature examining crowdworkers' learning we discussed earlier has focussed primarily on the "what" aspect (particularly on skills), the study reported in this paper sought to begin to uncover the "how" aspect, that is the WLAs and self-regulatory strategies of crowdworkers. In particular, the paper seeks to scope and compare the use of WLAs and SRL strategies by microworkers and online freelancers. *We hypothesise that there are quantitative differences in the patterns of use of WLAs and SRL strategies between microworkers and online freelancers.* In particular, we hypothesise that crowdworkers within microwork platforms where low-skill and routine tasks are said to prevail undertake a smaller number of WLAs and SRL strategies than workers within online freelancing platforms, where complex, high-skill and specialised tasks are said to be the norm.

This paper contributes empirical evidence to improve our understanding of this emergent and undertheorized domain of labour, as well as of the similarities and differences between microwork and online freelancing in particular. The comparison is important because it will help produce a more nuanced understanding of different types of crowdwork and how the different groups of platform workers learn and develop their skills. Improved understanding of the similarities and differences between these two types of crowdwork would inform the current debates and policymaking shaping the design of the crowdwork platforms and tasks and empowering individuals making a living through these platforms to foster their own learning and development.

### **Workplace learning: Prior research**

Despite a shortage of research on learning practices within crowdwork, the learning practices of employees in traditional occupations have been studied extensively, demonstrating that deep and powerful learning occurs in everyday working life (Billett *et al.*, 2008; Felstead *et al.*, 2009; Illeris, 2011; Malloch *et al.*, 2011). Although crowdworkers' learning practices and strategies cannot be assumed to simply mirror those of employees in traditional workplaces, because of the fundamental differences in the underpinning work practices, several key points from research on workplace learning and related research on organisational psychology could be brought to bear on the analysis of learning within crowdwork. First, research on workplace learning has highlighted the significance of *learning with and from other people*. Collaboration with and guidance by "significant others" such as more knowledgeable colleagues, mentors and clients, and incidental knowledge sharing opportunities in the workplace have been shown to be important stimuli for learning (Eraut, 2007). Similarly, previous research on work motivation has highlighted the important role of social factors such as knowledge of other people's performance and goals, observing others and receiving feedback from others, competition, persuasion and encouragement and group norms and goals in workplace learning (Klein *et al.*, 2008). In many conventional workplaces, workers have opportunities – deliberate and incidental – to benefit from proximity and availability of other people to learn from and with. Crowd workplaces are radically distributed and opportunities to establish such connections are typically not designed into the tasks and the workflows on crowdwork platforms. The

extent to which the learning processes within crowdwork incorporate a social dimension is not yet understood. Although it is plausible that crowdworkers connect to others for knowledge sharing and collaboration, the forms and processes of such crowdworker self-organisation for and self-regulation of learning are not understood (Lehdonvirta *et al.*, 2019).

Second, the workplace learning literature has emphasised the importance of the organisational factors in fostering learning processes in the workplace (Felstead *et al.*, 2009; Fuller and Unwin, 2004; Littlejohn and Margaryan, 2014). The demands of the productive systems within which workplaces, including crowdwork platforms, are positioned shape and affect workers' potential to develop and use their knowledge and skills (Felstead and Unwin, 2016). Specific jobs, economic sectors and workplaces have been shown to differ in their affordances for learning – their learning intensity (Skule, 2004), and there is a need to examine the learning intensity of crowdwork as increasing numbers of people across the world engage in this form of labour.

Furthermore, studies of adult participation in training have shown that employees tend to invest little of their time and money on work-related training (Kim *et al.*, 2004). In crowdwork, where workers have the sole responsibility for their learning, the decision to engage in training is a factor of their own volitional choice and intrinsic motivation rather than being stimulated by an external requirement. Research in organisational psychology has identified a range of factors that stimulate workers to engage in learning and development, including individual differences such as cognitive and physical abilities, personality traits and age; job content and context; the context of training and development such as place, timing and spacing; and the organisational and environmental context such as organisational strategy, feedback and appraisal, or the pace of technological change (Feldman and Ng, 2008). Specifically, it has been shown that self-efficacy, one's expectation that one can successfully complete a task, is positively related to the motivation to engage in training and development in the workplace (*ibid.*). Also, age and career-stage have been shown to correlate with the willingness to engage in training and development, with early-career individuals having longer time horizons to make new learning easier to absorb and more likely to pay off (Kanfer and Ackerman, 2004). Similarly, job empowerment, that is the extent to which a worker feels responsible for the outcomes of their work, has been suggested to increase motivation to engage in learning at one's own initiative (London, 1993). Finally, previous research suggested that the extent of technological intensity and technological change within a job is positively correlated with motivation to engage in learning because technologically intense environments, such as crowdwork platforms, force people to learn continuously to stay current (Feldman and Ng, 2008).

Importantly, prior research in workplace learning has emphasised that, in contrast to formal learning settings where learning goals and pathways to achieving these are explicitly defined, in workplace learning contexts professionals have to engage in self-regulation to advance their knowledge and skills (Gijbels *et al.*, 2012; Margaryan *et al.*, 2013; Sitzmann and Ely, 2011). Self-regulation is defined as self-modulation of thought, affect, behaviour or attention via conscious, deliberate or unconscious, automated use of specific mechanisms and meta-skills (Locke and Latham, 2013). A range of different self-regulatory theories exist focussing either on structure, phases, or content of self-regulation (Sitzmann and Ely, 2011). Zimmerman's three-phase SRL model (Zimmerman, 2005) has been especially influential in the analysis of learning. The model postulates that individuals self-regulate their learning through three cyclical phases of strategic planning, implementation and self-evaluation. Each of these phases incorporate a range of self-regulatory strategies and behaviours including identification of long-term and short-term goals, setting personal performance standards, monitoring and modifying goals and learning strategies, beliefs about

self-efficacy and intrinsic value of work tasks, reaching out to others for feedback and self-reflection. Prior research in psychology has shown that both the individual characteristics and factors of the socio-cultural and organisational environment determine the ability of individuals to exercise their self-regulatory skills (Frese *et al.*, 1996) suggesting that work design – the nature, the content, the complexity, the structure of work tasks and the autonomy and the interdependence they afford – is an important factor of motivation and effectiveness in the workplace, including learning (Parker and Ohly, 2008). For example, it has been shown that work tasks characterised by high work demands (responsibility) and high control over how the tasks are executed (discretion) lead to increased learning, self-efficacy, mastery and motivation (Karasek and Theorell, 1990). The importance of social characteristics in work design has also been highlighted in previous research, showing that social support and interdependences, feedback from others and contact with beneficiaries of work enhances motivation and performance (Morgenson and Humphrey, 2006). In crowdwork, the task design inherently lacks interdependence and, in microwork platforms, also feedback and contact with the beneficiaries of the work, because in these platforms the crowd is conceptualised as a set of autonomous, disconnected individuals (Schmidt, 2017). This could have negative consequence for performance, motivation and learning. Connecting the understanding of WLAs and self-regulatory strategies with the nature and design of crowdwork tasks is an important step in the analysis of learning processes within crowdwork.

## Methods

### *Crowdwork settings studied*

This paper draws on data from two platforms: Figure Eight (microwork) and Upwork (online freelancing). Founded in 2007 in San Francisco, Figure Eight specialises in serving e-commerce companies. Figure Eight pairs with partners including MTurk, Samasource, Gambit among others to provide over 5 million workers from 70 different countries (Lehdonvirta and Ernkvist, 2011). Figure Eight tasks focus on sentiment analysis, search, content moderation, data categorisation, data collection and transcription ([www.crowdflower.com/use-cases/](http://www.crowdflower.com/use-cases/)). Average compensation on Figure Eight is \$1-\$3 per hour (Kuek *et al.*, 2015).

Upwork includes larger units of work and more complex tasks in 12 categories: web, mobile and software development; design and creative; administrative support; IT and networking; writing; customer service; sales and marketing; data science and analytics; translation; accounting and consulting; engineering and architecture; legal ([www.upwork.com/o/profiles/browse/categories/](http://www.upwork.com/o/profiles/browse/categories/)). With 10 million registered freelancers and 4 million task owners (Degryse, 2016) and \$1 billion annual turnover (Schmidt, 2017), Upwork is one of the leading online freelancing platforms (Kuek *et al.*, 2015). In Upwork, task owners and crowdworkers can negotiate fees prior to entering into a transaction and workers' profiles are visible to task owners and other workers. The profiles contain information about their professional background, qualifications accredited by Upwork (e.g. Excel skills or comprehension of English), the projects they have completed, and the ratings and testimonials they have received from and given to the clients. Minimum compensation on Upwork is \$3 per hour; those with specialised skills command higher wages.

### *Data collection instrument*

Data were collected using a previously validated instrument, Self-Regulated Learning at Work Questionnaire, SRLWQ (Fontana *et al.*, 2015) that was adapted for crowdwork settings. The online questionnaire comprised the following key sections:

- *Personal details* – year of birth; gender; country; education; field of expertise; years of experience in the field of expertise; category in which the worker accepts the most jobs; length of experience on the platform; time per week working on the platform; employment status. Items were a mixture of multiple-choice and open-ended questions.
- *WLA* – 14 items, based on a typology of WLAs, derived from workplace learning literature (Fontana *et al.*, 2015) were included in this section. WLA were measured on a 4-point Likert scale (0 – never; 1 – rarely; 2 – frequently; 3 – very frequently).
- *SRL strategies* – This section included 34 items derived from Zimmerman’s three-phase model of SRL (Zimmerman, 2005): planning (goal setting, strategic planning, self-efficacy and intrinsic value of task); implementation (task strategies and techniques) and reflection (self-evaluation). These measures are detailed in Fontana *et al.* (2015). They were measured on a 4-point Likert scale (0 – not at all true for me; 1 – sometimes true for me; 2 – true most of the time for me; 3 – always true for me).

The specific workplace learning and self-regulated learning theories and relevant literatures underpinning the instrument are presented and discussed in detail in Fontana *et al.* (2015) and will not be reiterated here.

Since crowdworkers in the sample were considered likely to be employed in traditional jobs next to their platform work, be in education or work across different platforms, it was important to facilitate the identification of the specific WLAs and SRL strategies undertaken by workers in their crowdwork on these particular platforms rather than their learning activities more broadly. Therefore, the questionnaire items – particularly those in Sections 2 and 3 that scoped the WLAs and SRL strategies – were formulated with a specific reference to workers’ learning on each specific platform (Figure Eight and Upwork). For example, in the section scoping the WLAs the overarching question was worded as follows: within the last 3 months, how frequently have you undertaken the following learning activities as part of your work on CrowdFlower? (the name of the microwork platform before it was rebranded to Figure Eight). To further ensure the precision of the data obtained, the individual 14 items listed under this question were also worded with a direct reference to each specific platform. For example: “Acquiring new information to complete my CrowdFlower tasks”; “Collaborating with others to complete my CrowdFlower tasks”; or “Attending a training course/workshop to acquire knowledge/skills for CrowdFlower”. The same approach was used in formulating items for the “Self-regulated learning strategies” scale of the questionnaire.

The questionnaire was estimated to take 15 minutes to complete.

To ensure data quality and avoid grievances (Mason and Suri, 2012) in the survey instructions we specified that each crowdworker was allowed to do the survey only once and that incomplete survey responses would be unusable for research and therefore would not be paid for. Also, crowdworkers who did not have experience of completing at least one task on the platforms were asked not to participate.

#### *Data collection procedure*

The survey was implemented twice on each platform, in 2016 and 2017. The questionnaire was distributed in two ways. Firstly, for Upwork, the link to the survey alongside a short message explaining the purpose of the study was posted on six public and private groups for Upworkers on Reddit and Facebook. Secondly, the questionnaire was posted as a paid job on both Upwork and Figure Eight.



On Upwork, workers from across a range of job categories were invited to complete the survey. The selection criteria were:

- experience on the platform determined by number of hours worked as shown on profile; and
- positive evaluations from clients, with at least 80% success rate.

Upworkers were offered a fixed fee of \$5 per completed questionnaire, in line with the minimum rate allowed on the platform. On Figure Eight, microworkers were drawn from Level 3 workers, to ensure the quality of the data, as recommended by the platform. The platform does not disclose their criteria for assigning microworkers to levels; for a general explanation of the levels see <http://crowdfundercommunity.tumblr.com/post/80598014542/introducing-contributor-performance-levels> Microworkers were paid \$0.10 per survey, in line with the minimum rate for this type of task recommended by Figure Eight.

#### *Data analysis*

SPSS 24 was used to code and analyse the survey data. All data were anonymized prior to analysis. Data were split by type of platform and these sub-samples were compared and contrasted. The non-parametric *Chi-square* test of independence was used to compare online freelancers and microworkers. This test is independent of the data distribution, making it a robust method of comparison between sub-samples of unequal sizes (McHugh, 2013).

To enable comparison, the data from the WLAs and SRL Strategies sub-scales, each of which was measured on a 4-point Likert-scale in the questionnaire, were dichotomised. In particular, for each scale, two sub-groups for each of the four main groups were created:

- “No”, i.e. those who never used the particular WLAs or SRL strategies (1 – never/not at all true for me); and
- “Yes”, i.e. those who used any of the given WLAs and SRL strategies at least some times merging the Likert-scale responses 1 (sometimes true for me), 2 (true most of the time for me) and 3 (always true for me).

All the Chi-square test assumptions were observed. One chi-square test was conducted per item. Where a statistically significant Chi-square association was identified, the Phi coefficient was calculated to ascertain the strength of the association. In this analysis, we use the Phi measure instead of Cramer’s V, because both variables being compared here are nominal and each has only two categories. The threshold level of significance of  $p > 0.05$  is used.

#### *Sample*

The total final sample from both surveys is 295, including 260 microworkers and 35 online freelancers. The sample is detailed in Table I. At the time of the data collection, the majority of respondents on both platforms were men under the age of 37. In comparison with the sample of online freelancers, the microwork sample is somewhat more balanced in terms of gender distribution. This is in line with previous demographic surveys (Difallah *et al.*, 2018; Kuek *et al.*, 2015) suggesting that, although the sample is relatively small, it is representative of the overall age demographics of crowdwork.

The participants came from a large number of different countries from across the world. Among online freelancers, the four largest groupings of participants were based in the US (20 per cent), Serbia (17 per cent), India (14 per cent) and the Philippines (11 per cent). The largest groupings of microworkers were from Venezuela (19 per cent), Serbia (8 per cent),

Characteristic	Online freelancers (Upwork), <i>n</i> = 35	Microworkers (Figure Eight), <i>n</i> = 260
Age range	20 – 68 y.o.	18 – 67 y.o.
<i>Age groups</i>		
1980+	27 (77%)	187 (72%)
1965-1979	7 (20%)	60 (23%)
1946-1964	1 (3%)	13 (5%)
<i>Gender:</i>		
Women	14 (40%)	120 (46%)
Men	21 (60%)	140 (54%)
<i>Top countries</i>		
	USA – 7 (20%)	Venezuela – 49 (19%)
	Serbia – 6 (17%)	Serbia – 21 (8%)
	India – 5 (14%)	India – 19 (7%)
	Philippines – 4 (11%)	Russia and Indonesia – 14 each (5% each)
<i>Highest degree</i>		
Secondary	3 (9%)	38 (15%)
Some secondary but no diploma	–	12 (5%)
Vocational	1 (3%)	13 (5%)
Some university study but no diploma	–	36 (14%)
Undergraduate	17 (49%)	94 (36%)
Masters	13 (37%)	40 (15%)
Professional qualifications	1 (3%)	23 (9%)
Doctorate	–	4 (2%)
<i>Employment status*:</i>		
Freelancer/self-employed	28 (80%)	95 (37%)
Employed FT next to crowdwork	5 (14%)	87 (34%)
Employed PT next to crowdwork	3 (9%)	35 (14%)
Retired	1 (3%)	5 (2%)
Disabled/unable to work	–	6 (2%)
Student	6 (17%)	47 (18%)
Homemaker	1 (3%)	25 (10%)
<i>Experience on platform:</i>		
Up to 1 year	12 (34%)	155 (60%)
1-3 years	15 (43%)	85 (33%)
4-10 years	8 (23%)	18 (7%)
More than 10 years	–	2 (1%)
<i>Types of crowdwork tasks undertaken most often*:</i>		
Admin	18 (51%)	Sentiment analysis – 97 (37%)
Writing	15 (43%)	Search relevance – 104 (40%)
Sales and marketing	11 (31%)	Data categorisation – 117 (45%)
Design and creative	7 (20%)	Data validation – 95 (37%)
Data science and analytics	8 (23%)	Image annotation – 110 (42%)

(continued)

**Table I.**  
Demographic characteristics of the sample (*n* = 295)

Characteristic	Online freelancers (Upwork), Microworkers (Figure Eight),	
	<i>n</i> = 35	<i>n</i> = 260
Translation	7 (20%)	Transcription – 111 (43%)
Customer service	5 (14%)	Content moderation – 90 (35%)
Web, mobile, software development	8 (23%)	Missing (these data were not collected in the first survey) - 93 (36%)
	2 (6%)	
IT and networking	1 (3%)	
Engineering and architecture	1 (3%)	
Legal		
Hours worked on platform <u>per week</u> :	3 (9%)	
Less than 1 hr	8 (23%)	50 (19%)
1-8 hrs	7 (20%)	69 (27%)
9-20 hrs	10 (29%)	80 (31%)
21-40 hrs	3 (9%)	40 (15%)
41-60 hrs	2 (6%)	19 (7%)
More than 60 hrs	2 (6%)	2 (1%)
Missing		

**Table I.** Notes: \*More than one option could be selected; FT = full time, PT = part time

India (7 per cent), and Russia and Indonesia (5 per cent each). Other countries represented in the overall sample included Australia, Algeria, Angola, Argentina, Bangladesh, Bosnia, Brazil, Bulgaria, Canada, Chili, Colombia, Croatia, Czech Republic, Egypt, Estonia, France, Germany, Greece, Hungary, Italy, Lithuania, Kenya, Macedonia, Madagascar, Mexico, Moldova, Pakistan, Peru, Portugal, Romania, Slovakia, Slovenia, Spain, Sri Lanka, Tunisia, Turkey, Thailand, UK, Ukraine, Uruguay and Vietnam.

The crowdworkers in our sample were predominately well-educated, with 86 per cent of online freelancers and 53 per cent of microworkers reporting university degrees. This is also in line with previous surveys of crowdworkers (Berg, 2016) uncovering higher educational attainment levels among online freelancers relative to microworkers. In terms of the employment status, the four fifth of online freelancers reported themselves as self-employed, but only 37 per cent of microworkers reported being self-employed or a freelancer. Nearly half of the microworkers (48 per cent) reported working full-time or part-time in a regular employment in addition to their crowdwork. This is in line with the previously published surveys of the employment status of crowdwork populations such as those reported in Ipeirotis (2010) and Kuek *et al.* (2015), suggesting that our sample is broadly representative of the previously surveyed populations of crowdworkers.

In terms of the length of work experience on crowdwork platforms, the majority of microworkers (60 per cent) were novices, with up to a year's experience of work on the platform. In contrast, online freelancers were only 34 per cent novices, but 43 per cent had up to 3 years' work experience on the platform. Almost a quarter of online freelancers, but only 7 per cent of microworkers, had between 4 and 10 years' platform experience. This suggests that, compared to microworkers, online freelancers in our sample were overall more experienced in platform work.

With regards to the intensity of engagement on crowdwork platforms, there is a (balanced) variety in the number of hours per week reported: among online freelancers, the largest grouping (29 per cent) appears to work between 21-40 hours per week on the

platforms, whilst among microworkers the largest grouping (31 per cent) reported working between 41 and 60 hours per week on the platforms. Only 6 per cent of online freelancers but 15 per cent of microworkers reported working over 60 hours per week on the platforms.

Participants named a wide range of professional backgrounds. Many online freelancers were administrators or engineers (Figure 2); microworkers included also many economists, sales people and lawyers (Figure 3).

Finally, in terms of the types of the crowdwork tasks participants engaged in, the majority of online freelancers reported carrying out administrative tasks (51 per cent) and writing tasks (43 per cent); among microworkers, the categories of tasks that were selected by the largest groupings of workers were data categorisation (45 per cent), transcription (43 per cent) and image annotation (42 per cent).

**Results**

In this section, we report the findings on WLAs and SRL strategies undertaken by the participants in the course of their work on the platforms. In line with the hypothesis and the purpose of our study, we report the results on item-level rather than clustering them into the constructs underpinning the scales (e.g. collaborative WLAs, individual WLAs, SRL planning, SRL implementation, SRL reflection, etc.). In this study we seek to identify the scope of use of WLAs and SRL strategies. The reason is that we hypothesised that, compared to online freelancers, microworkers may be using a narrower range of WLAs and SRL strategies because microwork tasks are considered to be more routine and lower-skilled than online freelancing tasks are. Therefore, we summarise and compare the data for each WLA and SRL strategy reported.

*Workplace learning activities*

First, we compared online freelancers’ and microworkers’ survey responses regarding the WLAs they undertake in the course of their work on the platforms (Table II). Statistically significant results are highlighted in italics.

The survey findings showed that both types of crowdworkers regularly undertake a wide range of WLAs on these platforms. In particular, both groups of workers reported



**Figure 2.** Professional background of online freelancers



**Figure 3.** Professional background of microworkers

**Table II.**  
Comparison of  
patterns of use of  
WLAs among online  
freelancers and  
microworkers  
(*n* = 295)

Type of WLA	OF (Yes, N and %)	MW (Yes, N and %)	Chi-square results $\chi^2$ (1, <i>N</i> = 295)/ <i>p</i> /Phi (Phi reported only for significant results)
Acquiring new information to complete my CrowdFlower/Upwork tasks (e.g. by searching the web)	34 (97.1%)	249 (95.8%)	0.149/ <i>p</i> = 0.699
Working alone to develop solutions to my CrowdFlower/Upwork tasks	35 (100%)	257 (98.8%)	0.408/ <i>p</i> = 0.523
<i>Working with others to develop solutions to my CrowdFlower/Upwork tasks</i>	29 (82.9%)	153 (58.8%)	7.525/ <i>p</i> = 0.006/0.160
Following new developments in my field to facilitate my work on CrowdFlower/Upwork	31 (88.6%)	220 (84.6%)	0.380/ <i>p</i> = 0.537
Performing tasks that are new to me	34 (97.1%)	257 (98.8%)	0.669/ <i>p</i> = 0.413
Asking others for advice	28 (80%)	185 (71.2%)	1.203/ <i>p</i> = 0.273
Attending a training course in a face-to-face setting to acquire skills/knowledge for my CrowdFlower/Upwork tasks	13 (37.1%)	110 (42.3%)	0.338/ <i>p</i> = 0.561
<i>Participating in free online courses, tutorials or webinars (e.g. Coursera, Udacity, duolingo) to acquire skills/knowledge for my CrowdFlower/ Upwork tasks</i>	26 (74.3%)	91 (35%)	19.894/ <i>p</i> = 0.000/0.260
Using <u>paid</u> online tutorials or other <u>paid</u> learning resources (e.g. Lynda) to acquire skills/ knowledge for my CrowdFlower/Upwork tasks	9 (25.7%)	63 (24.2%)	0.037/ <i>p</i> = 0.848
<i>Self-studying professional literature to acquire skills/knowledge for my CrowdFlower/Upwork tasks</i>	31 (88.6%)	174 (66.9%)	6.819/ <i>p</i> = 0.009/0.152
Observing and replicating others' strategies to complete a task or solve a problem	28 (80%)	194 (74.6%)	0.480/ <i>p</i> = 0.488
Trial-and-error to find better ways to do my CrowdFlower/Upwork tasks	33 (94.3%)	222 (85.4%)	2.085/ <i>p</i> = 0.149
Reflecting deeply on my CrowdFlower/Upwork tasks to determine what I can do better next time	34 (97.1%)	247 (95.0%)	0.313/ <i>p</i> = 0.576
<i>Receiving feedback on my CrowdFlower/Upwork tasks from others</i>	34 (97.1%)	171 (65.8%)	14.322/ <i>p</i> = 0.000/0.220

regularly performing new tasks and learning something new through their crowdwork; seeking better ways to do their crowdwork tasks through trial-and-error; following new developments in the field; self-studying professional literature; regularly reflecting on their crowdwork; or taking courses and tutorials to improve their skills for their crowdwork, with considerable number of crowdworkers investing their own financial resources in these (e.g. 26 per cent of online freelancers and 24 per cent of microworkers report paying for online tutorials and learning resources to develop skills for their crowdwork). Furthermore, the survey findings revealed that the majority of both types of crowdworkers undertake social learning activities in the course of their work on the platforms, for example collaborating with others to complete their crowdwork tasks and develop solutions to problems (83 per cent of online freelancers and 59 per cent of microworkers) or reaching out to others for advice and feedback on their crowdwork tasks (80 per cent of online freelancers and 71 per cent of microworkers). Interestingly, for a distributed workplace such as crowdwork, significant proportions of both types of crowdworkers reported regularly engaging in

vicarious learning observing and replicating other people's strategies to complete their crowdwork tasks (80 per cent of online freelancers and 75 per cent of microworkers).

Chi-square tests showed some statistically significant differences in the patterns of use of WLAs between the different types of crowdworkers (Table II). First, online freelancers were more likely than microworkers to undertake free online courses or use free online tutorials and other online resources to support their learning (64 per cent vs 35 per cent), and this association was moderately strong ( $p = 0.000$ ,  $\phi = 0.260$ ). Second, online freelancers were statistically more likely to learn by receiving feedback on their tasks from others (97 per cent vs 66 per cent), and the association was moderate ( $p = 0.000$ ,  $\phi = 0.220$ ). Third, online freelancers were more likely than microworkers to report self-study of professional literature to develop their crowdwork skills (89 per cent vs 67 per cent), but the association was weak ( $p = 0.009$ ,  $\phi = 0.152$ ). Finally, online freelancers were statistically more likely to report collaborating with others to develop solutions to their crowdwork tasks (83 per cent vs 59 per cent), although this association was also weak ( $p = 0.006$ ,  $\phi = 0.160$ ).

### Self-regulated learning strategies

Second, we compared the patterns of use of SRL strategies between both groups, across three phases of SRL: planning, implementation and reflection. We found that both types of crowdworkers adopt a wide range of self-regulated learning strategies and motivation beliefs across all three phases of SRL (Table III).

#### *Planning*

Both types of crowdworkers regularly set personal performance standards for their crowdwork tasks, as well as articulating short-term and long-term learning goals; strategically monitor and modify their learning strategies and learning goals; explicate plans on how to achieve their learning goals. Furthermore, both types of crowdworkers appear to be self-efficacious and learning-oriented regularly reflecting on what they would need to learn to complete the work or indicating preference for challenging tasks that arouse their curiosity even if they had to learn a lot to complete these tasks.

The analysis did not uncover any statistically significant differences in the scope and frequency of use of SRL planning strategies between online freelancers and microworkers (Table III).

#### *Implementation*

The survey results suggest that the majority of crowdworker across both types of crowdwork use a range of different task strategies regularly (Table IV). For example, both online freelancers and microworkers reported regularly blocking time for learning in their diaries; writing reflective notes about what they have learned from their crowdwork tasks; explicitly relating their new knowledge and skills to what they already know and applying lessons learned from previous experiences to their new tasks. Furthermore, the majority of both types of crowdworkers used not only individual but also social SRL implementation strategies, for example reaching out to others for help, explicitly considering how their learning may be of interest to their peers and sharing their learning with peers.

Two statistically significant differences were identified between online freelancers' and microworkers' use of SRL implementation strategies (Table IV). In particular, online freelancers were statistically more likely to report making notes or diagrams to organise their thoughts during their on-the-job learning activities (83 per cent vs 64 per cent),

**Table III.**  
Comparison of  
patterns of use of  
SRL planning  
strategies among  
online freelancers  
and microworkers  
( $n = 295$ )

SRL planning strategies	OF (Yes, N and %)	MW (Yes, N and %)	Chi-square results $X^2(1, N = 295)/p$
I set personal standards for performance in my work on CrowdFlower/Upwork	35 (100%)	254 (97.7%)	0.824/ $p = 0.364$
I set my short-term learning goals (monthly or quarterly) to improve my crowdwork and develop professionally	31 (88.6%)	236 (90.8%)	0.173/ $p = 0.677$
I set my long-term learning goals (yearly or longer) to improve my crowdwork and develop professionally	31 (88.6%)	223 (85.8%)	0.202/ $p = 0.653$
I write down a plan to describe how I will achieve my learning goals	28 (80%)	207 (79.6%)	0.003/ $p = 0.958$
I use different strategies for different types of things I need to learn for my CrowdFlower/Upwork tasks	33 (94.3%)	243 (93.5%)	0.035/ $p = 0.852$
I change learning strategies when I don't make progress while learning	33 (94.3%)	245 (94.2%)	0.000/ $p = 0.990$
I change my learning goals	31 (88.6%)	227 (87.3%)	0.045/ $p = 0.832$
Before I begin each CrowdFlower/Upwork task I ask myself what I might need to learn to be able to do the task	32 (91.4%)	245 (94.2%)	0.423/ $p = 0.516$
I think of several ways to reach my learning goal and choose the best one	30 (85.7%)	240 (92.3%)	1.729/ $p = 0.189$
When learning for my CrowdFlower/Upwork tasks, I use strategies that have worked in the past	34 (97.1%)	247 (95%)	0.313/ $p = 0.576$
I adapt my learning strategies to each specific CrowdFlower/Upwork task/problem I am working on	34 (97.1%)	249 (95.8%)	0.149/ $p = 0.699$
I think I will be able to use what I learn in my work on CrowdFlower/Upwork in my future jobs	35 (100%)	248 (95.4%)	1.684/ $p = 0.194$
It is important for me to learn new things in my crowdwork	33 (94.3%)	254 (97.7%)	1.357/ $p = 0.244$
I feel I am able to handle most of the demands in my crowdwork	34 (97.1%)	254 (97.7%)	0.040/ $p = 0.841$
I prefer work opportunities that require me to learn something new	34 (97.1%)	247 (95%)	0.313/ $p = 0.576$
I prefer tasks that arouse my curiosity, even if I need to learn a lot to achieve them	33 (94.3%)	234 (90%)	0.660/ $p = 0.417$

although the association was very weak ( $p = 0.026$ ,  $\phi = 0.130$ ). In contrast, microworkers were more likely to report making notes about what they have learned in their crowdwork tasks, which they have then kept private rather than sharing with others (e.g. in a private diary) (31 per cent vs 17 per cent). However, this association, similar to the previous one, was also very weak ( $p = 0.044/0.146$ ).

*Reflection*

Similarly, a wide range of reflection strategies across both types of crowdworkers were evidenced in the survey data (Table V). For example, the majority of both microworkers and online freelancers reported that they regularly thought deeply about what they had learned after they completed their tasks; what better ways there were to do the tasks; and how what they had learned through crowdwork fitted into the “bigger picture” of their long-term professional development. No statistically significant differences in the use of SRL reflection strategies were identified between microworkers and online freelancers (Table V).

SRL implementation strategies	OF (Yes, N and %)	MW (Yes, N and %)	Chi-square results $X^2 (1, N = 113)/p/\Phi$ (phi reported only for significant results)
I monitor my progress towards my learning goals	30 (85.7%)	231 (88.8%)	0.297/ $p = 0.586$
When faced with a challenge in my crowdwork I try to understand the problem as thoroughly as possible	35 (100%)	256 (98.5%)	0.546/ $p = 0.460$
<i>When learning during my crowdwork I make notes or diagrams to help organise my thoughts</i>	29 (82.9%)	166 (63.8%)	4.976/ $p = 0.026/0.130$
I block time in my calendar to work on my learning goals	24 (68.6%)	155 (59.6%)	1.037/ $p = 0.309$
When learning, I collect information from many different sources	34 (97.1%)	245 (94.2%)	0.510/ $p = 0.475$
I try to apply lessons learned from my previous experience to my crowdwork where appropriate	34 (97.1%)	252 (96.9%)	0.005/ $p = 0.943$
I ask myself how what I am learning through crowdwork is related to what I already know	32 (91.4%)	240 (92.3%)	0.033/ $p = 0.855$
When learning I treat the information resources I find as a starting point and try to develop my own ideas from them	34 (97.1%)	242 (93.1%)	0.846/ $p = 0.358$
When I have difficulty learning something I ask others for help	30 (85.7%)	198 (76.2%)	1.606/ $p = 0.205$
I share my learning with colleagues, peers and others in my network	27 (77.1%)	190 (73.1%)	0.262/ $p = 0.609$
<i>I make private notes about what I have learned (e.g. in a private diary)</i>	6 (17.1%)	81 (31.2%)	6.252/ $p = 0.044/0.146$
I make notes on what I have learned which I then publicly share (e.g. in a blog)	20 (57.1%)	132 (50.8%)	0.502/ $p = 0.479$

**Table IV.**  
Comparison of microworkers' and online freelancers' use of SRL implementation strategies ( $n = 295$ )

SRL reflection strategies	OF (Yes, N and %)	MW (Yes, N and %)	Chi-square results $X^2 (1, N = 113)/p/\Phi$
I meet the learning goals that I set for myself in my crowdwork	34 (97.1%)	248 (95.4%)	0.226/ $p = 0.634$
I ask myself if there were other ways to do the crowdwork tasks after I finish them	31 (88.6%)	241 (92.7%)	0.729/ $p = 0.393$
I think about what I have learned after I finish my crowdwork tasks	33 (94.3%)	247 (95%)	0.033/ $p = 0.857$
I think about how what I have learned through crowdwork fits in to the "bigger picture" of my own professional development	33 (94.3%)	230 (88.5%)	1.082/ $p = 0.298$
I consider how what I've learned may be of interest to my peers	26 (74.3%)	212 (81.5%)	1.041/ $p = 0.308$
I try to understand how what I have learned impacts my other tasks/projects for CrowdFlower/Upwork	33 (94.3%)	232 (89.2%)	0.863/ $p = 0.353$

**Table V.**  
Comparison of microworkers' and online freelancers' SRL reflection strategies ( $n = 295$ )



## Discussion

Taken together, our findings suggest that, within both types of crowdwork, intensive on-the-job learning appears to occur, as measured by the scope of WLAs and strategies reported. Also, our findings suggest that, despite the differences in the complexity and skill requirements underpinning the crowdwork tasks they undertake, both types of crowdworkers are largely learning-oriented and self-regulated. Importantly, in both types of crowdwork, workers undertake social – rather than only individual – learning activities and strategies, despite the autonomous and fragmented nature of crowdwork tasks and workflows.

More specifically, the findings suggest that microworkers as well as online freelancers undertake a variety of WLAs out of their own volition, as evidenced by considerable majorities among both sub-samples reporting regular use of these activities in their crowdwork. This is similar to recent findings from employee samples within conventional knowledge work settings (Littlejohn *et al.*, 2011; Margaryan, 2018). Furthermore, both types of crowdworkers in this sample appear to be highly self-efficacious, reflective and intrinsically motivated. Significant majorities of both microworkers and online freelancers report setting long- and short-term learning goals, dynamically adapting their learning strategies using a wide repertoire of SRL techniques. This is in line with Barnes *et al.* (2015) and Martin *et al.* (2016) who found several similar attributes of self-regulatory orientation among crowdworkers including proactivity, self-motivation, initiative, self-efficacy and self-awareness. In crowdwork, initiating and funding learning activities is the workers' responsibility and, in our sample, many crowdworkers reported investing the time and their own financial resources in improving their skills. This contrasts with the findings from conventional employment settings where workers tend not to make such investment (Kim *et al.*, 2004). The age factor may have contributed to the reported breadth of adoption of workplace learning activities and SRL strategies – the sample is relatively young and early-career, which is one possible explanation for workers' willingness to invest effort and financial resources in their training, in line with previous research by Kanfer and Ackerman (2004). In the future, mixed-method research (survey, interviews, fieldwork) with a larger sample of crowdworkers is warranted to further explore the role of such factors and to refine, validate and explain these findings.

Importantly, sociality appears to form a considerable dimension of workplace learning practices in crowdwork. The majority of crowdworkers appear to collaborate and learn with others, sharing their learning with their networks. These findings complement and extend those reported in Gray *et al.* (2016), Martin *et al.* (2014; 2016) and Gupta *et al.* (2014) further dispelling the idea that crowdworkers are atomised and disconnected in their work and learning behaviours. Despite structural constraints such as the lack of organisationally provided scaffolds for learning and knowledge sharing, the sociality and cooperation appear to be part of learning practices within crowdwork just as much as they permeate learning within conventional workplaces (Billett *et al.*, 2008; Eraut, 2007). The survey does not tell us who these crowdworkers collaborate with, through what channels and to what specific purposes. A further, in-depth exploration and contextualisation of these findings on the social learning practices in crowdwork through interviews and fieldwork is required.

However, next to the similarities across these two types of crowdwork, our survey also uncovered some statistically significant differences in the patterns of use of WLAs and self-regulated learning strategies between online freelancers and microworkers. In particular, two *significant and moderate or moderately strong* associations were uncovered. First, compared to microworkers, online freelancers were statistically more likely to report undertaking free online courses or use free online tutorials and other online resources to support their learning. This could be due to online freelancing tasks requiring more complex skills than microwork does, skills which cannot be obtained only through on-the-job learning activities such as through

trial-and-error or self-study necessitating the use of more structured learning experiences such as online courses. Second, online freelancers were significantly more likely to learn by receiving feedback on their tasks from others. This is most likely to be due to the way in which the workflow underpinning these two types of crowdwork is designed, as we explained in the Background section. Namely, compared to microworkers, online freelancers typically have much more contact with clients who outsource tasks through these platforms and who negotiate, monitor and quality-control their work. Online freelancers typically get feedback – formative and summative – on their tasks from the clients, whilst microworkers tend to be anonymous and often have no contact with the client or the platform, their work being distributed and quality-controlled by an algorithm.

In addition, four *significant but weak or very weak associations* were identified. Namely, compared to microworkers, online freelancers were more likely to collaborate with others to develop solutions to their crowdwork tasks; self-study professional literature to develop their crowdwork skills; and make notes or diagrams to organise their thoughts during their on-the-job learning activities. In contrast, microworkers were statistically more likely to report making private notes about what they have learned in their crowdwork tasks, although this association was also very weak.

The difference in the reported use of collaboration could also be due to online freelancers' contact with clients which typically is not the norm in microwork platforms. It could also be because online freelancers deal with more complex, less minute tasks that they carry out over longer periods of time that require and afford them time to tap into the expertise of others in their professional or personal networks. From this survey alone we do not know who exactly the crowdworkers collaborate with and to what particular end, therefore to explore and understand these finding further qualitative research is required. Similarly, the differences in the self-study of professional literature and the use of notes and diagrams may be due to the differences in the complexity of tasks undertaken by these different types of crowdworkers and the timeframes in which these tasks are undertaken. However, because these four associations were found to be weak and marginally acceptable, albeit significant, in terms of statistics criteria, we could conclude that there is not enough data in this survey to ascertain these particular associations and that a larger sample is required to further explore and validate them.

Overall, the findings of this survey challenge the notion expressed by [Degryse \(2016\)](#) and others who have characterised crowdwork as necessarily preventing workers from developing their skills. Our findings suggest that the practice of crowdwork may be more nuanced than these critics allow. Furthermore, our findings suggest that characterising microworkers as low-skill lacks nuance contributing to the growing empirical evidence refuting claims about crowdworkers, and specifically microworkers, being low-skilled ([Berg, 2016](#); [Gupta, 2017](#)). Whilst some crowdwork tasks – especially in microwork platforms – may not require advanced skills to complete, it is misleading to suggest that workers performing these tasks are themselves low-skilled and have no opportunities to develop skills when working on the platforms. There are a range of life course factors, trajectories and motivations that could lead individuals to take up crowdwork that may or may not closely fit their extant skill levels ([Margaryan and Hofmeister, 2017](#)), and these broader factors should be investigated in future research.

### Conclusions and implications

This paper set out to, first, scope WLAs and self-regulated learning strategies undertaken by crowdworkers from two types of crowdwork platforms – online freelancing (represented by Upwork) and microwork (represented by Figure Eight, previously CrowdFlower) and, second, to test if there were quantitative differences in the patterns of use of these activities and

strategies between these two types of crowdworkers. The findings suggest that considerable majorities of both types of workers undertake a wide range of WLAs and self-regulated learning strategies, both individual and autonomous as well as social and collaborative. Several statistically significant differences were identified between the different types of crowdworkers. In particular, two *moderate and moderately strong* associations were uncovered, whereby online freelancers were statistically more likely to report:

- undertaking free online courses or use free online tutorials and other online resources to support their learning; and
- learning by receiving feedback on their tasks from others.

In addition, some *significant but weak or very weak associations* were identified, namely that online freelancers were more likely to:

- collaborate with others to develop solutions to their crowdwork tasks;
- self-study professional literature to develop their crowdwork skills; and
- make notes or diagrams to organise their thoughts during their on-the-job learning activities.

In contrast, microworkers were statistically more likely to report making private notes about what they have learned in their crowdwork tasks, although this association was also very weak.

Key limitations of the study are the relatively small sample size and skewness towards microworkers. However, despite being relatively small, the sample is representative of the population of these platforms, in line with previous demographic surveys. Also, although the sample is skewed towards one group of workers, the statistical test we used to analyse the findings is independent of the data distribution so it is a robust method of comparison between sub-samples of unequal sizes. A further limitation is that, being a survey study, this research is decontextualised, in that a survey alone does not allow us to collect in-depth and rich data and examples about the exact ways in which the different WLAs and SRL strategies are used and what the different collaborative and social interdependences reported are. Therefore, further interviews and fieldwork with workers, platform providers and clients are needed to understand the crowdworkers' learning practices in more detail, and to contextualise, triangulate and validate these findings developing rich descriptions and case studies. Another limitation of the study is the potential selection bias: the respondents may have been limited only to those crowdworkers who have preference for survey-type tasks and are motivated to contribute to scientific research and these types of crowdworkers may be more highly learning-oriented, introspective and reflective. To avoid this potential bias, in future research a survey task could be embedded within other types of crowd tasks, such as categorisation or image recognition, in line with a technique used by [Kingsley et al. \(2015\)](#). Finally, social desirability bias ([Lavrakas, 2008](#)) may have played a role in the way in which respondents answered the questionnaire items on WLAs and SRL strategies. Some of these items represent socially desirable learning behaviours and traits, and these may have been overreported by some of our respondents. However, social desirability bias is considered more of an issue in data collection methods that involve the presence of an interviewer or third persons such as in interviews, observation or focus groups and when researching socially sensitive topics such as political beliefs, religion, or personal issues such as drug use or infidelity ([Grimm, 2010](#)). Workplace learning is less of a sensitive topic; also this study is an online survey research in which an interviewer or any other party were not present and the majority of the respondents, particularly microworkers, were largely anonymous. Importantly, to help avoid a potential social desirability bias, in our survey instructions for these specific items we explicitly

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explained to the respondents that there were no right, wrong or desirable answers to these questions and explicitly encouraged them to choose the options that best reflected how they typically behaved rather than how they thought they should behave.

The study is significant for at least three reasons. First, it contributes empirical evidence in a hitherto under-researched area – workplace learning practices in crowdwork. Opportunities for workplace learning and continuous professional development are essential to workers' productivity and well-being. Crowdwork is a growing type of employment, in both developed and developing countries. Therefore, it is important to understand how workers function within this type of work, what its learning potential is, and where the gaps and issues might be. Second, better understanding of crowdworkers' learning practices could help platform providers to shape crowdwork platforms and the design of crowdwork tasks in ways that could be beneficial to all stakeholders as well as improving crowd workplaces for current and future workers. Third, better understanding of workplace learning practices in crowdwork is essential to the enhancement of the developmental potential of crowdwork. Economists have highlighted the importance of assisting countries in creating jobs and generating wealth from opportunities provided by the digital economy (Lehdonvirta and Ernkvist, 2011). Fostering crowdworker learning could help countries achieve these policy aims.

A number of implications for design of crowdwork platforms to foster learning and development may be proposed. First, platform providers should be aware that learning and professional development is a key motivation and outcome of crowdwork for workers. Current design of crowdwork tasks and workflows overlooks the fact that self-regulated workplace learning occurs as part of crowdwork. For example, most crowdwork tasks are designed to be carried out autonomously; the complex interdependences inherent in work are quite deliberately designed out of platform workflows. Yet, our study shows that, despite this structural limitation, crowdworkers nevertheless appear to adopt social learning activities and strategies when learning and developing skills for their platform work. We would therefore argue that learning and professional development should be incorporated as an explicit dimension of task design on the platforms, conceptually and practically. If task design is aligned with crowdworkers' learning goals and career aspirations, if workers have an opportunity to select tasks that fit their developmental aspirations and if they are structurally supported in engaging in social learning and knowledge sharing interactions with other crowdworkers, clients and platform owners, then they are likely to be more motivated producing better-quality work as a result.

Second, to enable knowledge sharing and learning, it would be beneficial to enable workers on microwork platforms to create profiles and give options to make these visible to allow them to display and advertise their qualifications and skills and experiences, including those obtained through the platform. Gupta (2017) outlines such a potential portfolio-based system for workers. Increasing the transparency of qualifications and skills would be beneficial both to the workers as well as clients, who, as argued by Catalo *et al.* (2017), often want to be able to identify and target specific workers, but are not able to do so because of the restrictions imposed by the microwork platforms. Such portfolio-based systems would enable microworkers to better market themselves as well as supporting them in managing their learning.

Third, platforms could integrate tools to support crowdworkers in finding other workers who have similar learning goals and career development aspirations helping workers self-organise for learning and development. Previously, systems have been developed to support workers in sharing knowledge and tips about clients, platforms practices or finding interesting and high paying tasks, such as, for example, the Turkoicon, Dynamo and Faircrowdwork (Irani and Silberman, 2013; Salehi *et al.*, 2015). However, these tools are not

specifically focussed on learning. A set of prototype tools was previously developed to support the articulation and sharing of learning goals to assist knowledge workers in managing and optimising their connections with other people and knowledge resources to support their learning on the job (Milligan *et al.*, 2012). Such a toolset could be integrated within crowdwork platforms to enable crowdworkers to expand their professional and learning networks and find others to learn with and from.

Finally, crowdwork platforms would benefit from more research into workers' actual work and learning processes, within which to ground their technological and task-design decisions. This would help optimise the design of crowdwork platforms and shape the practice of crowdwork that is likely to continue growing for years to come fostering workers' learning, development, productivity and well-being.

### References

- Abraham, K., Sandusky, K., Haltiwanger, J. and Spletzer, J. (2017), "Measuring the gig economy: current knowledge and open issues", US Census Bureau, available at: [www.ntanet.org/wp-content/uploads/proceedings/2016/195-haltiwanger-measuring-gig-economy-paper.pdf](http://www.ntanet.org/wp-content/uploads/proceedings/2016/195-haltiwanger-measuring-gig-economy-paper.pdf)
- Al-Ani, A. and Stumpp, S. (2016), "Rebalancing interests and power structures on crowdworking platforms", *Internet Policy Review*, Vol. 5 No. 2, pp. 1-20.
- Barnes, S.-A., Green, A. and de Hoyos, M. (2015), "Crowdsourcing and work: individual factors and circumstances influencing employability", *New Technology, Work and Employment*, Vol. 30 No. 1, pp. 16-31.
- Berg, J. (2016), "Income security in the on-demand economy: findings and policy lessons from a survey of crowdworkers", *Conditions of Work and Employment Series*, Vol. 74, International Labour Office.
- Billett, S., Harteis, Ch. and Etelapelto, A. (Eds), (2008), *Emerging Perspectives of Workplace Learning*, Sense Publishers, Rotterdam.
- Catalo, I. and Martinenghi, D. (2017), "The dimensions of crowdsourcing task design", in Cabot, J., De Virgilio, R. and Torlone, R. (Eds), *Proceedings of International Conference on Web Engineering (ICWE) 2017*, LNCS 10360, pp. 394-402.
- Corporaal, G. and Lehdonvirta, V. (2017), *Platform Sourcing: How Fortune 500 Firms Are Adopting Online Freelancing Platforms*, Oxford Internet Institute, Oxford, available at: <http://ilabour.oii.ox.ac.uk/how-the-worlds-largest-companies-use-online-freelancing-platforms/>
- Degryse, C. (2016), "Digitalisation of the economy and its impact on labour markets", Working paper 2016.02, European Trade Union Institute.
- Difallah, D., Filatova, E. and Ipeirotis, P. (2018), "Demographics and dynamics of mechanical turk workers", *Proceedings of WSDM 2018: The Eleventh ACM International Conference on Web Search and Data Mining, Marina Del Rey, 5-9 February, 2018, CA, USA, (WSDM 2018)*, p. 9. available at: <https://doi.org/10.1145/3159652.3159661>
- Eraut, M. (2007), "Learning from other people in the workplace", *Oxford Review of Education*, Vol. 33 No. 4, pp. 403-422.
- Eurofound (2015), *New Forms of Employment*, Publications Office of the European Union, Luxembourg.
- Feldman, D. and Ng, T. (2008), "Motivation to engage in training and career development", in Kanfer, R., Chen, G. and Pritchard, R. (Eds), *Work Motivation: Past, Present, and Future*, Routledge, New York, NY/London, pp. 401-431.
- Felstead, A., Fuller, A., Jewson, N. and Unwin, L. (2009), *Improving Working as Learning*, Routledge, London.
- Felstead, A. and Unwin, L. (2016), Learning outside the formal system: what learning happens in the workplace, and how is it recognised? Evidence review for future of skills and learning. Foresight,

- UK Government Office for Science, London, available at: [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/590493/skills-lifelong-learning-workplace.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/590493/skills-lifelong-learning-workplace.pdf)
- Fontana, P., Milligan, C., Littlejohn, A. and Margaryan, A. (2015), "Measuring self-regulated learning in the workplace", *International Journal of Training and Development*, Vol. 19 No. 1, pp. 32-52.
- Frese, M., Kring, W., Soose, A. and Zempel, J. (1996), "Personal initiative at work: differences between east and west Germany", *Academy of Management Journal*, Vol. 39, pp. 37-63.
- Fuller, A. and Unwin, L. (2004), "Expansive learning environments", in Fuller, A., Munro, A. and Rainbird, H. (Eds), *Workplace Learning in Context*, Routledge, London, pp. 126-144.
- Gadiraju, U., Fetahu, B. and Kawase, R. (2015), "Training workers for improving performance in crowdsourcing microtasks", in Conole, G., Klobučar, T., Rensing, C., Konert, J. and Lavoué, E. (Eds), *Proceedings of EC-TEL 2015 Conference*, pp. 100-114, LNCS 9307.
- Gadiraju, U., Kawase, R. and Dietze, S. (2014), "A taxonomy of microtasks on the web", in Ferres, L., Rossi, G., Almeida, V. and Herder, E. (Eds), *Proceedings of HT 2014 Conference, 1-4 September, 2014*, pp. 218-223, *Santiago, Chile*.
- Gijbels, D., Raemdonck, I., Verweken, D. and van Herck, J. (2012), "Understanding work-related learning: the case of ICT workers", *Journal of Workplace Learning*, Vol. 24 No. 6, pp. 416-429.
- Gray, M., Suri, S., Ali, S. and Kulkarni, D. (2016), "The crowd is a collaborative network", *Proceedings of CSCW 2016 Conference*, pp. 134-147, *ACM, San Francisco*.
- Green, A., de Hoyos, M., Barnes, S.-A., Baldau, B. and Behle, H. (2014), *Exploratory Research on Internet-Enabled Work Exchanges and Employability*, EC Institute for Prospective Technological Studies.
- Grimm, P. (2010), "Social desirability bias", in Sheth, J. and Malhotra, N. (Eds), *Wiley International Encyclopaedia of Marketing*, Vol. 2. Wiley, Hoboken, NJ.
- Gupta, N. (2017), *An ethnographic study of crowdwork via Amazon Mechanical Turk in India*, PhD thesis, University of Nottingham.
- Gupta, N., Crabtree, A., Rodden, T., Martin, D. and O'Neill, J. (2014), "Understanding Indian crowdworkers", *Proceedings of 2014 CSCW Conference, ACM, Baltimore*.
- Howcroft, D. and Bergvall-Kareborn, B. (2018), "A typology of crowdwork platforms", *Work, Employment and Society*, Vol. 33 No. 1, pp. 21-38.
- Howe, J. (2008), *Crowdsourcing*, Random House, London.
- Huws, U. (2014), *Labor in the Global Digital Economy*, Monthly Review Press, New York, NY.
- Huws, U., Spencer, N. and Joyce, S. (2016), "Crowd work in Europe", University of Hertfordshire, Hatfield, available at: [www.feps-europe.eu/en/publications/details/463](http://www.feps-europe.eu/en/publications/details/463)
- Illeris, K. (2011), *The Fundamentals of Workplace Learning*, Routledge, London.
- Ipeirotis, P. (2010), "Demographics of mechanical turk", available at: [www.ipeirotis.com/wp-content/uploads/2012/02/CeDER-10-01.pdf](http://www.ipeirotis.com/wp-content/uploads/2012/02/CeDER-10-01.pdf)
- Irani, L. (2015), "The cultural work of microwork", *New Media and Society*, Vol. 17 No. 5, pp. 720-739.
- Irani, L. and Silberman, S. (2013), "Turkopticon: interrupting worker invisibility in amazon mechanical turk", in *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Paris*.
- Kanfer, R. and Ackerman, P. (2004), "Aging, adult development, and work motivation", *The Academy of Management Review*, Vol. 29 No. 3, pp. 440-458.
- Karasek, R. and Theorell, T. (1990), *Healthy Work: Stress, Productivity, and the Reconstruction of Working Life*, Basic Books, New York, NY.
- Kim, K., Collins Hagedorn, M., Williamson, J. and Chapman, C. (2004), "Participation in adult education and lifelong learning: 2000-01 (NCES 2004-050)", US Department of Education, National Center for Education Statistics. US Government Printing Office, Washington, DC.

- Kingsley, S., Gray, M. and Suri, S. (2015), "Accounting for market frictions and power asymmetries in online labor markets", *Policy and Internet*, Vol. 7 No. 4, pp. 383-400.
- Klein, H., Austin, J. and Cooper, J. (2008), "Goal choice and decision processes", in Kanfer, R., Chen, G. and Pritchard, R. (Eds), *Work Motivation: Past, Present, and Future*, pp. 101-150, Routledge, London.
- Kost, D., Fieseler, C. and Wong, S.I. (2018), "Finding meaning in a hopeless place? The construction of meaningfulness in digital microwork", *Computers in Human Behavior*, Vol. 82 No. 2, pp. 101-110.
- Kuek, S.C., Paradi-Guilford, C., Fayomi, T., Imaizumi, S., Ipeirotis, P., Pina, P. and Singh, M. (2015), *The Global Opportunity in Online Outsourcing*, World Bank, Washington, DC.
- Lavrakas, P. (2008), (Ed.), *Encyclopaedia of Research Methods: Social Desirability Bias*, Sage, Thousand Oaks, CA.
- Lehdonvirta, V. (2017a), "The online gig economy grew 26% over the past year", available at: [www.oii.ox.ac.uk/blog/the-online-gig-economy-grew-26-over-the-past-year/](http://www.oii.ox.ac.uk/blog/the-online-gig-economy-grew-26-over-the-past-year/)
- Lehdonvirta, V. (2017b), "Where are the online workers located? The international division of digital gig work", available at: [www.oii.ox.ac.uk/blog/where-are-online-workers-located-the-international-division-of-digital-gig-work/](http://www.oii.ox.ac.uk/blog/where-are-online-workers-located-the-international-division-of-digital-gig-work/)
- Lehdonvirta, V. and Ernkvist, M. (2011), *Converting the Virtual Economy into Development Potential*, infoDev/World Bank, Washington, DC.
- Lehdonvirta, V., Margaryan, A. and Davies, H. (2019), "Skills formation and skills matching in online platform work: policies and practices for promoting crowdworkers' continuous learning. Literature review report", European Centre for the Development of Vocational Training (CEDEFOP), available at: [www.cedefop.europa.eu/files/crowdlearn\\_literature\\_review.pdf](http://www.cedefop.europa.eu/files/crowdlearn_literature_review.pdf)
- Littlejohn, A. and Margaryan, A. (2014), (Eds) *Technology-Enhanced Professional Learning: Practices, Processes and Tools*, Routledge, London.
- Littlejohn, A., Milligan, C. and Margaryan, A. (2011), "Collective learning in the workplace: important knowledge sharing behaviours", *International Journal of Advanced Corporate Learning*, Vol. 4 No. 4, pp. 26-31.
- Locke, E. and Latham, G., (Eds) (2013), *New Developments in Goal Setting and Task Performance*, Routledge, London.
- London, M. (1993), "Relationships between career motivation, empowerment, and support for career development", *Journal of Occupational and Organizational Psychology*, Vol. 66 No. 1, pp. 55-69.
- McHugh, M. (2013), "The chi-square test of independence", *Biochemia Medica*, Vol. 23 No. 2, pp. 143-149.
- Malloch, M., Cairns, L., Evans, K. and O'Connor, B. (Eds), (2011), *The SAGE Handbook of Workplace Learning*, sage, London.
- Manyika, J., Lund, S., Bughin, J., Robinson, K., Mischke, J. and Mahajan, D. (2016), *Independent Work: Choice, Necessity and the Gig Economy*, McKinsey Global Institute, available at: [www.mckinsey.com/global-themes/employment-and-growth/independent-work-choice-necessity-and-the-gig-economy](http://www.mckinsey.com/global-themes/employment-and-growth/independent-work-choice-necessity-and-the-gig-economy)
- Manyika, J., Lund, S., Robinson, K., Valentino, J. and Dobbs, R. (2015), "A labour market that works: connecting talent with opportunity in the digital age", McKinsey Global Institute, available at: [www.mckinsey.com/global-themes/employment-and-growth/connecting-talent-with-opportunity-in-the-digital-age](http://www.mckinsey.com/global-themes/employment-and-growth/connecting-talent-with-opportunity-in-the-digital-age)
- Margaryan, A. (2018), Comparing crowdworkers' and conventional knowledge workers' self-regulated learning strategies in the workplace, *Human Computation*.
- Margaryan, A. and Hofmeister, H. (2017), "Using the life course perspective to understand learning practices within crowdwork", *Proceedings of 'Research Methods for Digital Work: Innovative Methods for Studying Distributed and Multi-modal Working Practices' conference, 25-26 May, University of Surrey*.

- Margaryan, A., Littlejohn, A. and Milligan, C. (2013), "Self-regulated learning in the workplace", *International Journal of Training and Development*, Vol. 17 No. 4, pp. 245-259.
- Martin, D., O'Neill, J., Gupta, N. and Hanrahan, B. (2016), "Turking in a global labour market", *Computer Supported Cooperative Work (CSCW)*, Vol. 25 No. 1, pp. 39-77.
- Mason, W. and Suri, S. (2012), "Conducting behavioural research on amazon's mechanical turk", *Behavior Research Methods*, Vol. 44 No. 1, pp. 1-23.
- Milligan, C., Margaryan, A. and Littlejohn, A. (2012), "Supporting goal formation, sharing and learning of knowledge workers", in Ravenscroft, A., Lindstaedt, S., Kloos, C.D. and Hernández-Leo, D. (eds), *Proceedings of the European Conference on Technology-Enhanced Learning (EC-TEL)*, LNCS 7563, Springer, Heidelberg, pp. 519-524.
- Morgenson, F. and Humphrey, S. (2006), "The work design questionnaire (WDQ): developing and validating a comprehensive measure for assessing job design and the nature of work", *Journal of Applied Psychology*, Vol. 91, pp. 1321-1339.
- Ojanpera, S. (2016), *Mapping the Availability of Online Labour*, University of Oxford, available at: <http://geonet.oi.ox.ac.uk/blog/mapping-the-availability-of-online-labour/>
- Parker, S. and Ohly, S. (2008), "Designing motivating jobs: an expanded framework for linking work characteristics and motivation", in Kanfer, R., Chen, G. and Pritchard, R. (Eds), *Work Motivation: Past, Present, and Future*, Routledge, London, pp. 233-284.
- Pew Research Centre (2016), "Gig work, online selling and home sharing", available at: [www.pewinternet.org/2016/11/17/gig-work-online-selling-and-home-sharing/](http://www.pewinternet.org/2016/11/17/gig-work-online-selling-and-home-sharing/)
- Salehi, N., et al. (2015), "We are dynamo: overcoming stalling and friction in collective action for crowd workers", *Proceedings of 2015 CHI Conference, ACM, New York, NY*.
- Schmidt, F. (2017), *Digital Labour Markets in the Platform Economy: Mapping the Political Challenges of Crowd Work and Gig Work*, Friedrich-Ebert Foundation, Bonn, available at: <http://library.fes.de/pdf-files/wiso/13164.pdf>
- Scholz, T. (2015), "Think outside the boss", available at: [www.publicseminar.org/2015/04/think-outside-the-boss/#.V6-W165rX-m](http://www.publicseminar.org/2015/04/think-outside-the-boss/#.V6-W165rX-m)
- Silberman, S., Irani, L. and Ross, J. (2010), "Ethics and tactics of professional crowdwork", *Xrds: Crossroads, the Acm Magazine for Students*, Vol. 17 No. 2, pp. 39-43.
- Sitzmann, T. and Ely, K. (2011), "A Meta-analysis of self-regulated learning in work-related training and educational attainment: what we know and where we need to go", *Psychological Bulletin*, Vol. 137 No. 3, pp. 421-442.
- Skule, S. (2004), "Learning conditions at work", *International Journal of Training and Development*, Vol. 8 No. 1, pp. 8-20.
- Srnicek, N. (2017), *Platform Capitalism*, Polity, Cambridge.
- Valenduc, G. and Vendramin, P. (2016), "Work in the digital economy: sorting the old from the new", European Trade Union Institute Working Paper 2016.03.
- Zimmerman, B., (2005), "Attaining self-regulation", in Boekaerts, M., Pintrich, P. and Zeidner, M. (Eds), *Handbook of Self-Regulation*, Academic Press, San Diego, pp. 13-39.

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