

This is an Open Access document downloaded from ORCA, Cardiff University's institutional repository:<https://orca.cardiff.ac.uk/id/eprint/168838/>

This is the author's version of a work that was submitted to / accepted for publication.

Citation for final published version:

Bunwaree, Teshan , Stawarz, Katarzyna , Collins, Philippa and Gould, Alexander 2024. How well do people understand work monitoring terminology? Presented at: CHIWORK 2024, Newcastle, UK, 25-27 June 2024.

Publishers page:

Please note:

Changes made as a result of publishing processes such as copy-editing, formatting and page numbers may not be reflected in this version. For the definitive version of this publication, please refer to the published source. You are advised to consult the publisher's version if you wish to cite this paper.

This version is being made available in accordance with publisher policies. See <http://orca.cf.ac.uk/policies.html> for usage policies. Copyright and moral rights for publications made available in ORCA are retained by the copyright holders.



How well do people understand work monitoring terminology?

TESHAN S. BUNWAREE, Cardiff University, Wales, UK

KATARZYNA STAWARZ, Cardiff University, Wales, UK

PHILIPPA COLLINS, University of Bristol, England, UK

SANDY J. J. GOULD, Cardiff University, Wales, UK

While digital work monitoring has been on the rise for years, it is unclear whether the same could be said about workers' awareness. If the developments in work monitoring practices have outpaced public awareness and understanding, workers and their representatives may not be able to develop informed perspectives on what is happening in workplaces. Furthermore, laws and policies may fall short of securing the rights of workers if the way that law and policy talks about workplace monitoring is inaccessible. To gauge workers' awareness of the topic, we conducted an online survey to assess workers' understanding of eight work monitoring terms. Respondents (N=100) were not accurate in providing definitions of these terms, despite having indicated that they were familiar with seven out of the eight terms. This suggests that workers are likely not well-informed about the subject. The results highlight the importance of a more nuanced and informed approach by decision-makers in crafting laws and policies related to work monitoring. Researchers investigating workplace monitoring need to pay particular attention to how they communicate with participants – a shared understanding of terminology cannot be taken for granted.

Additional Key Words and Phrases: bossware, work monitoring, surveillance, tracking, privacy

ACM Reference Format:

Teshan S. Bunwaree, Katarzyna Stawarz, Philippa Collins, and Sandy J. J. Gould. 2024. How well do people understand work monitoring terminology?. 1, 1 (May 2024), 8 pages. <https://doi.org/10.1145/nnnnnnnn.nnnnnnnn>

1 INTRODUCTION

The use of software designed to monitor and manage employees has grown in popularity over the last few years in tandem with the emergence of remote work as the predominant mode of working [8]. Often marketed as an Electronic Performance Monitoring (EPM) tool to monitor employee performance at scale, it also allows for continuous, random, or intermittent tracking that can be done without warning or gaining the consent of the employee [1, 5, 13]. Some common examples include: internet activity tracking, email monitoring, video and call monitoring, GPS tracking, keylogging applications, and face recognition software [7, 16].

The management and psychological literatures have reported negative effects associated with intensive work monitoring practices, including worsening performance and wellbeing, and the emergence of counterproductive work behaviours [9–11]. Legal scholars have criticised the way that companies pass off their intrusive monitoring practices as being legitimate and have also highlighted the employee-employer power differential which does not allow employees to have their concerns about such practices to be taken in consideration prior to their deployment [2, 4]. Human-Centred Computing (HCC) research has kept up with advances in technology used for monitoring at work and has explored

Authors' addresses: Teshan S. Bunwaree, School of Computer Science and Informatics, Cardiff University, Abacws, Senghennydd Road, Cardiff, CF24 4AG, Wales, UK, BunwareeTS@cardiff.ac.uk; Katarzyna Stawarz, School of Computer Science and Informatics, Cardiff University, Abacws, Senghennydd Road, Cardiff, CF24 4AG, Wales, UK, StawarzK@cardiff.ac.uk; Philippa Collins, Law School, University of Bristol, Wills Memorial Building, Queen's Road, Bristol, BS8 1RJ, England, UK, philippa.collins@bristol.ac.uk; Sandy J. J. Gould, School of Computer Science and Informatics, Cardiff University, Abacws, Senghennydd Road, Cardiff, CF24 4AG, Wales, UK, goulds@cardiff.ac.uk.

© 2024 Copyright held by the owner/author(s). Publication rights licensed to ACM.
Manuscript submitted to ACM

the possible privacy and ethical issues which arise from sensitive data collection [12, 14, 15]. However, employees' knowledge, understanding and attitudes towards work monitoring have received less attention.

The magnitude of employees' resistance to monitoring might be a product of how knowledgeable they are about the terminology used to describe different aspects of workplace monitoring practices [3]. A lack of challenge to monitoring practices may lead –inadvertently or consciously– to employers' monitoring policies falling short of protecting individuals' rights. We can extrapolate this beyond workplace policies to national laws and regulations on work monitoring practices. In research, since participants may not be properly informed, it is also important for researchers to consider providing operationalised terms as part of pre-study briefing. This is vital to mitigate bias and confusion arising from the assumption that participants' understanding matches that of researchers (i.e., it is important to avoid talking at cross purposes). Our paper contributes to this research area by exploring people's understanding of work monitoring terminology and their attitudes towards the topic.

2 METHOD

2.1 Participants and Recruitment

Through Prolific, a crowdsourcing platform, we recruited 100 adult United Kingdom residents who were fluent in English and had experience working in-office, remotely, or both. Following Prolific's standard guidelines, they were remunerated at a rate of £10.80 per hour amounting to £3.60 for the approximate 20-minute runtime of the study [6]. Women comprised 33% of the sample. Participants were 18-67 years old ($M = 38$ years). Thirty-six percent had a hybrid work arrangement where they sometimes worked from a central workplace and sometimes remotely, 32% always worked from a central place, 28% always worked remotely, and 4% indicated that their place of work changed regularly.

2.2 Term Selection

After a review of the literature, news articles, and relevant laws and regulations, we selected eight terms related to work monitoring to capture a diverse range of understanding of the subject. To achieve this, we included terms with possible overlap in meanings (*monitoring, tracking, surveillance*) and varying degrees of prevalence and technicality (*remote work, consent, GDPR, keylogging, data minimisation*). For each term we developed a comprehensive definition based on workplace monitoring literature from HCC, Management, Psychology, and Law, as well as dictionary definitions, to ensure that they appropriately reflect the selected terms (see Appendix).

2.3 Survey design

The survey was hosted on LimeSurvey and consisted of three sections. The first part gauged the respondents' familiarity with each term through a 1-5 Likert scale (1="Never came across the term", 5="Very familiar with the term"). Next, on the following pages, participants were asked to provide their definitions for each term. The order of the terms was randomised. The final section of the study (not discussed in this work-in-progress paper) presented participants with a set of attitudinal questions designed by the lead researcher for each of the terms. This study received favourable ethical opinion from the authors' institution.

2.4 Analysis

To aid the analysis, each definition was broken down into smaller "building blocks", which were then used to score definitions provided by participants. For example, keylogging was defined as "*one of the types of monitoring software or*

Table 1. Keylogging example

Participant Definitions	Building Blocks					Score
	Piece of software or Hardware.	Used to collect/ record/ track data.	Data processed are key presses on employee's keyboard.	Purpose is to track general computer use, as a measure of productivity.	Purpose is company security/ policy related.	
"where the computer records your keyboard activity"	1	1	1	0	0	3
"i am guessing its to do with logging of key information"	0	0	0	0	0	0

hardware that records every keystroke made on a keyboard. It may be used by employers to track employee computer use, prevent unauthorized access to company systems, or investigate suspected security breaches or policy violations." Table 1 shows examples of how the blocks were used to rate each definition. Each building block present in the definition received one point. Each block was counted only once, even if it appeared more than once in the same definition.

Each participant definition was rated independently by three researchers. Next, the scores were compiled and compared to identify any disagreements. Blocks which had been given a score by two researchers were taken as endorsed by all three researchers. Blocks that received a score from only one researcher were discussed by the research team and a collective decision was made on whether to keep or change the score. The data was analysed using descriptive statistics, including mean, median, and standard deviation, to provide a comprehensive assessment of the results. Mean accuracy was calculated as a way to mitigate the highest achievable scores being different across the eight terms.

3 PRELIMINARY RESULTS AND DISCUSSION

The aim of the study was to understand participants' awareness of work monitoring terms. The analysis of familiarity scores (see Table 2) indicated high ratings of familiarity for six terms out of eight, with the remaining two terms with lower familiarity scores being keylogging ($M= 3.15$) and data minimisation ($M= 2.39$). Remote work was the most familiar for the participants with an average familiarity score of 4.80 out of five (i.e, highly familiar). The definition scores were low for all terms with means ranging from 0.87 (Tracking) to 1.84 (Monitoring). The mean of definition scores were consistently lower than the corresponding average familiarity ratings. Mean accuracy scores were also low, with the highest being for keylogging (33%), and the lowest for surveillance (13%).

Data minimisation and keylogging were technical terms. Their low familiarity scores indicate their low prevalence in general employees' experiences. Mean accuracy for data minimisation was low (16%) while it was highest for keylogging at 33%. This suggests that participants had better chances of inferring the meaning for keylogging rather than data minimisation. Nevertheless, attention should be paid to the low definition scores which are due to unsatisfactory participant definitions. GDPR was also a technical term but participants rated themselves as familiar with the term and provided definitions, despite low scores, with 25% mean accuracy, the third highest accuracy score in this dataset. Therefore, participants must have had some experience of the term 'GDPR' at some point in time. Familiarity scores were high for the five remaining terms. Listed in increasing levels of accuracy these were surveillance, tracking, consent, monitoring, and remote work. Those five terms were more prevalent and as expected scored high on familiarity. As for surveillance, tracking, and monitoring, which are related terms in nature, there is a gradient in the levels of understanding of these terms evident from their differences in accuracy, with monitoring being the most accurate (20%), followed by tracking (15%), and surveillance (13%). The cause of this discrepancy could be either from the prevalence of

Table 2. Descriptive statistics

	Familiarity			Response Score				
	Mean	Median	SD	Mean	Median	Highest possible score	Mean Accuracy (%)	SD
Monitoring	4.45	5.00	0.90	1.84	2.00	9	20	1.13
Keylogging	3.15	3.00	1.53	1.66	2.00	5	33	1.17
Tracking	4.06	4.00	1.11	0.87	1.00	6	15	0.88
Surveillance	4.23	5.00	1.05	1.65	1.00	13	13	1.02
Remote work	4.80	5.00	0.67	1.57	2.00	5	31	0.64
GDPR	4.12	5.00	1.22	1.78	1.00	7	25	1.55
Data minimisation	2.39	2.00	1.10	1.31	1.00	8	16	1.38
Consent	4.74	5.00	0.65	1.28	1.00	7	18	0.95

these terms not being the same, or this may suggest a more fundamental problem in the discernment between those three terms. While participants were familiar with the concept of consent, they did not manage to provide satisfactory definitions leading to an accuracy of 18%. Participants had better attempts at defining remote work, being a highly prevalent term, though their responses were at most 33% accurate on average.

Our results show that employees may greatly overestimate their knowledge and understanding about work monitoring. This highlights the need for work monitoring research to communicate operationalised definitions prior to conducting user research. It is likely for misunderstandings to occur, given the possibility of participants overestimating their knowledge on the topic. Furthermore, employees' lack of awareness and understanding may lead to a lack of resistance against intrusive or excessive work monitoring. Without such resistance, workplace policy may support monitoring practices which do not protect individuals' rights.

We decided to present the quantitative part of the results for this work-in-progress submission as the knowledge overestimation is an insightful theme in itself and useful for consideration by researchers in the area. The next steps for this research are to complete the quantitative and qualitative analyses. We have coded data at the level of a block (i.e., an item against which participant definitions were scored), allowing us to understand both the variation within definitions and their overall quality. This will reveal how participants choose to interpret these terms. Furthermore, data from the attitudinal questions will indicate how much participants cared about the topic.

4 CONCLUSION

There is a lot of terminology surrounding workplace monitoring. These terms have been developed in the academic literature (e.g., surveillance) and by regulators (e.g., data minimisation), and underpin thinking about the topic. To explore whether these terms were meaningful to workers, we surveyed 100 participants to gauge their understanding. Although workers are generally quite familiar with the terminology of workplace monitoring (excepting data minimisation), when asked to define these terms, they found it challenging. The vast majority of definitions provided by participants were missing essential characteristics, hence the low definition scores. Our results show that no one engaged in this issue – whether researchers, workers' representatives, employers, legislators or policymakers – should take for granted that workers have accurate working definitions of these terms. Developing a shared understanding of terminology should be an immediate priority in all interactions with workers over workplace monitoring.

REFERENCES

- [1] Ifeoma Ajunwa, Kate Crawford, and Jason Schultz. 2017. Limitless Worker Surveillance. *California Law Review* 105 (2017), 735–776. <https://doi.org/10.15779/Z38BR8MF94> Publisher: California Law Review.
- [2] Kirstie Ball. 2010. Workplace surveillance: an overview. *Labor History* 51, 1 (Feb. 2010), 87–106. <https://doi.org/10.1080/00236561003654776>
- [3] Richard Ballard. 2022. Everyday Resistance: Theorising how the ‘Weak’ change the World. In *The Routledge Handbook of Social Change*. Routledge. Num Pages: 12.
- [4] Philippa Collins and Stefania Marassi. 2021. Is That Lawful? Data Privacy, Monitoring and Fitness Trackers in the Workplace. *International Journal of Comparative Labour Law* 37(1) (2021), 65–94.
- [5] Bennett Cyphers and Karen Gullo. 2020. Inside the Invasive, Secretive “Bossware” Tracking Workers. <https://www.eff.org/deeplinks/2020/06/inside-invasive-secretive-bossware-tracking-workers>
- [6] George Denison. 2023. How much should you pay research participants? <https://www.prolific.com/resources/how-much-should-you-pay-research-participants>
- [7] ICO. 2022. Employment practices: monitoring at work draft guidance. <https://ico.org.uk/media/about-the-ico/consultations/4021868/draft-monitoring-at-work-20221011.pdf>
- [8] Debora Jeske. 2022. Remote workers’ experiences with electronic monitoring during Covid-19: implications and recommendations. *International Journal of Workplace Health Management* 15, 3 (Jan. 2022), 393–409. <https://doi.org/10.1108/IJWHM-02-2021-0042> Publisher: Emerald Publishing Limited.
- [9] Debora Jeske and Alecia M. Santuzzi. 2015. Monitoring what and how: psychological implications of electronic performance monitoring. *New Technology, Work and Employment* 30, 1 (2015), 62–78. <https://doi.org/10.1111/ntwe.12039>
- [10] Thomas Kalischko and René Riedl. 2021. Electronic Performance Monitoring in the Digital Workplace: Conceptualization, Review of Effects and Moderators, and Future Research Opportunities. *Frontiers in Psychology* 12 (May 2021). <https://doi.org/10.3389/fpsyg.2021.633031> Publisher: Frontiers Media SA.
- [11] Angela J. Martin, Jackie M. Wellen, and Martin R. Grimmer. 2016. An eye on your work: How empowerment affects the relationship between electronic surveillance and counterproductive work behaviours. *The International Journal of Human Resource Management* 27, 21 (Nov. 2016), 2635–2651. <https://doi.org/10.1080/09585192.2016.1225313> Publisher: Routledge _eprint: <https://doi.org/10.1080/09585192.2016.1225313>.
- [12] Wendy Martinez, Johann Benerradi, Serena Midha, Horia A. Maior, and Max L. Wilson. 2022. Understanding the Ethical Concerns for Neurotechnology in the Future of Work. In *Proceedings of the 1st Annual Meeting of the Symposium on Human-Computer Interaction for Work (CHIWORK ’22)*. Association for Computing Machinery, New York, NY, USA, 1–19. <https://doi.org/10.1145/3533406.3533423>
- [13] Daniel M. Ravid, David L. Tomczak, Jerod C. White, and Tara S. Behrend. 2020. EPM 20/20: A Review, Framework, and Research Agenda for Electronic Performance Monitoring. *Journal of Management* 46, 1 (Jan. 2020), 100–126. <https://doi.org/10.1177/0149206319869435>
- [14] Kat Roemmich, Florian Schaub, and Nazanin Andalibi. 2023. Emotion AI at Work: Implications for Workplace Surveillance, Emotional Labor, and Emotional Privacy. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI ’23)*. Association for Computing Machinery, New York, NY, USA, 1–20. <https://doi.org/10.1145/3544548.3580950>
- [15] Shruti Sannon, Billie Sun, and Dan Cosley. 2022. Privacy, Surveillance, and Power in the Gig Economy. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (CHI ’22)*. Association for Computing Machinery, New York, NY, USA, 1–15. <https://doi.org/10.1145/3491102.3502083>
- [16] Luke Stark, Amanda Stanhaus, and Denise L. Anthony. 2020. “I Don’t Want Someone to Watch Me While I’m Working”: Gendered Views of Facial Recognition Technology in Workplace Surveillance. *Journal of the Association for Information Science and Technology* 71, 9 (Sept. 2020), 1074–1088. <https://doi.org/10.1002/asi.24342>

A DEFINITIONS

Table 3 comprises the terms used in the study, the researchers' definitions (RDs) used as a baseline for scoring participants' definitions (PDs). It also includes the sources that were used as part of developing these definitions.

Table 3. The Researchers' Definitions, with sources used in developing them.

Term	Researchers' Definitions	Resources
Monitoring	<p>Monitoring is a general term that can encompass both tracking and surveillance, as well as other methods of collecting data about employees' work activities.</p> <p>Monitoring can be done through a variety of means, including software applications, network logs, and direct observation, and can serve a range of purposes, such as identifying inefficiencies or improving performance.</p>	<p>"monitoring, v." OED Online, Oxford University Press, March 2023, Retrieved 7 Mar. 2023, https://www.oed.com/view/Entry/121253.</p>
Keylogging	<p>Keylogging is one of the types of monitoring software or hardware that records every keystroke made on a keyboard. It may be used by employers to track employee computer use, prevent unauthorized access to company systems, or investigate suspected security breaches or policy violations.</p>	<p>Keylogging (2010).. In Stevenson, A., & Lindberg, C. (Eds.), <i>New Oxford American Dictionary</i>. Oxford University Press. Retrieved 7 Mar. 2023, from https://www.oxfordreference.com/view/10.1093/acref/9780195392883.001.0001/m_en_us1440270.</p>
Tracking	<p>Tracking in the context of work refers to the collection and analysis of data about an employee's work-related activities, such as the time spent on different tasks, or the websites they visited. This information can be used to monitor productivity and identify areas for improvement, but it might not necessarily involve the direct observation of an employee's work or communications.</p>	<p>Chandler, D., & Munday, R. tracking. In <i>A Dictionary of Social Media</i>. : Oxford University Press. Retrieved 7 Mar. 2023, from https://www.oxfordreference.com/view/10.1093/acref/9780191803093.001.0001/acref-9780191803093-e-1626.</p>

Surveillance

Surveillance involves the direct observation of an employee’s work or communications. This may include monitoring an employee’s email or instant messages, listening in on phone conversations, or using video cameras to monitor the workplace. The goal of surveillance is typically to identify inappropriate or illegal behaviour, rather than simply monitoring productivity or performance.

Gooch, G., & Williams, M. (2007). surveillance. In A Dictionary of Law Enforcement. : Oxford University Press. Retrieved 7 Mar. 2023, from <https://www.oxfordreference.com/view/10.1093/acref/9780192807021.001.0001/acref-9780192807021-e-2966>.

Remote work

Remote work refers to a work arrangement where an employee is not physically present in a traditional office or workplace, but instead works from a remote location such as a home office, co-working space, or other remote location. This arrangement is made possible by technology such as video conferencing, remote desktop software, and other collaborative tools that allow employees to communicate and work together from different locations.

“[S]ituations where the work is fully or partly carried out on an alternative worksite other than the default place of work.” Retrieved 7 Mar. 2023, https://www.ilo.org/global/statistics-and-databases/publications/WCMS_747075/lang--en/index.htm

GDPR

The GDPR (General Data Protection Regulation) is a comprehensive data privacy law that regulates the collection, processing, and storage of personal data for individuals located within the European Union (EU). The UK has retained the GDPR in its domestic law since Brexit. It therefore applies to all UK businesses that handle personal data, regardless of their size or industry sector.

General Data Protection Regulation. In Ince, D. (Ed.), A Dictionary of the Internet. : Oxford University Press. Retrieved 7 Mar. 2023, from <https://www.oxfordreference.com/view/10.1093/acref/9780191884276.001.0001/acref-9780191884276-e-4754>.
“A part of European Union privacy law on the processing and storage of, and access to, personal data. Usually referred to as GDPR.”

Data minimisation	Data minimisation refers to the practice of limiting the collection, storage, and use of personal data to only what is necessary for a specific business purpose. This involves ensuring that only relevant and essential data is collected, and that it is not kept longer than necessary or used for purposes other than those for which it was collected.	As per Article 5 of the GDPR, "1. Personal data shall be: (c) adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed (data minimisation)"
Consent	In the context of work and personal data, consent refers to the voluntary and informed agreement given by an individual for their personal data to be collected, processed, and stored by a business for a specific purpose.	Voluntary agreement to a proposal, request, demand, etc.; acquiescence; an instance of this. Frequently in official or legal contexts: permission or approval for something. "consent, n." OED Online, Oxford University Press, March 2023, www.oed.com/view/Entry/39517 . Accessed 7 March 2023. "Consent must be given freely, without duress or deception, and with sufficient legal competence to give it." Gooch, G., & Williams, M. consent. In A Dictionary of Law Enforcement. : Oxford University Press. Retrieved 7 Mar. 2023, from https://www.oxfordreference.com/view/10.1093/acref/9780191758256.001.0001/acref-9780191758256-e-693 .