Measured Enough: How Academic Knowledge Workers Negotiate Data Sharing and Control

Nouran Abdalazim
Faculty of Informatics
Università della Svizzera italiana, USI
Lugano, Switzerland
nouran.abdalazim@usi.ch

Irene Zanardi
Faculty of Informatics
Università della Svizzera italiana, USI
Lugano, Switzerland
irene.zanardi@usi.ch

Lidia Alecci
Faculty of Informatics
Università della Svizzera italiana, USI
Lugano, Switzerland
lidia.alecci@usi.ch

Maike Elisabeth Debus
Université de Neuchâtel
Neuchâtel, Switzerland
maike.debus@unine.ch

Monica Landoni
Faculty of Informatics
Università della Svizzera italiana, USI
Lugano, Ticino, Switzerland
monica.landoni@usi.ch

Silvia Santini
Faculty of Informatics
Università della Svizzera italiana, USI
Lugano, Switzerland
silvia.santini@usi.ch

Abstract

Personal informatics (PI) systems support self-tracking and reflection, yet their adoption in work settings remains limited due to concerns about surveillance, loss of control, and misinterpretation of data. We present an exploratory vignette-based interview study with 20 academic knowledge workers that examines how PI systems can support work-related activities while preserving workers' autonomy. We compare two scenarios: individual use of PI systems for productivity and well-being, and an employer-provided PI system that allows optional sharing of anonymized and aggregated performance reports. Using reflexive thematic analysis, we identify three conditions shaping acceptance: (1) clear boundaries between work and private contexts and careful control over data modalities; (2) autonomy over system interventions, including their timing and content; and (3) control over if, how, and with whom performance reports are shared. Our findings contribute design insights for workplace PI systems that balance organizational awareness with worker-centered control and autonomy.

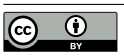
CCS Concepts

• **Human-centered computing → Empirical studies in HCI**.

Keywords

Personal informatics systems, academic knowledge workers, self-tracking, productivity, well-being

ACM Reference Format:
Nouran Abdalazim, Irene Zanardi, Lidia Alecci, Maike Elisabeth Debus, Monica Landoni, and Silvia Santini. 2026. Measured Enough: How Academic Knowledge Workers Negotiate Data Sharing and Control. In *Extended Abstracts of the 2026 CHI Conference on Human Factors in Computing Systems (CHI EA '26), April 13–17, 2026, Barcelona, Spain.* ACM, New York, NY, USA, 7 pages. https://doi.org/10.1145/3772363.3798965



CHI EA '26, Barcelona, Spain

ACM ISBN 979-8-4007-2281-3/26/04
https://doi.org/10.1145/3772363.3798965

1 Introduction

Personal informatics (PI) systems enable individuals to collect, monitor, and reflect on personal data *"for the purpose of self-reflection and gaining self-knowledge"* [18], as well as to support behavior change. Typically designed to help users track aspects of their daily lives, PI systems provide mechanisms for data capture, integration, visualization, and interpretation that facilitate ongoing self-reflection. Prior work on Human-Computer Interaction (HCI) conceptualizes PI systems as tools that support a cyclical process of self-tracking, sense-making, and action, emphasizing that their value lies not only in the data they gather but in how users engage with that data to understand themselves and make informed decisions [11, 18].

Despite the widespread adoption of consumer PI systems — particularly monitors for health and well-being based on smartphones and wearables [12, 19]—similar tools in the workplace remains underutilized [10]. Digital productivity monitors raise concerns about data visibility, interpretation, and secondary use by employers, which can erode trust and deter adoption [4, 29, 31]. As a result, even when tools for tracking and improving work practices are available, perceived risks often outweigh perceived benefits [16, 31].

Building on these considerations, we conducted a vignette-based interview study (n=20) to explore how acceptance of PI technologies for work activities is shaped by users' ability to exercise fine-grained control over what data are collected, who can access them, and how sharing benefits them as primary users. We carried out the study with academic knowledge workers (AKWs) in a within-subjects design. Participants reflected on PI use for supporting daily productivity and well-being, and on a variant scenario in which anonymized, aggregated insights were shared with managers. Through thematic analysis, we identified three themes that characterize how AKWs perceive the value of PI systems at work and the conditions under which sharing derived insights can support organizational awareness without compromising employee primacy.

2 Related Work

A large body of research examines the use of PI systems for tracking work-related activities, exploring user experiences, opportunities, and challenges [9, 14, 17, 23]. Guillou et al. [14] propose a

time-well-spent metric to measure performance and productivity of knowledge workers (KWs). Using a one-week in-situ study, they show that notion of productivity vary across individuals and that the metric can capture constructs such as workers' feelings and well-being. Kim et al. [17] examine how the framing of productivity-related interventions influences the performance of KWs. In their study, they use the RescueTime [26] tool to collect applications' usage data and monitor periods of productivity and distraction. They study the effects of positive framing (productivity) and negative framing (distraction) on performance improvement and find that performance improvements are observed only among participants exposed to negatively framed feedback. Epstein et al. [9] conduct a survey study followed by a two-week in-situ study to examine KWs' perceptions of work breaks and their relationship to productivity. Their findings show an association between the type of break and pre-break productivity levels; for example, KWs were more likely to take digital breaks (e.g., avoiding emails) when feeling less productive. They also report a positive correlation between break length and feeling refreshed and that breaks that make KWs' feel refreshed are associated with improved subsequent productivity. Together, these studies highlight the potential of PI systems to support the productivity of KWs, while consistently positioning workers as the primary beneficiaries of PI systems and excluding managerial involvement.

Other researchers focus on the *"quantified workplace"* (QS) [20, 21] construct, which positions organizational stakeholders as the primary beneficiaries of PI systems, focusing on the collection of aggregated data to evaluate and optimize performance and productivity at the organizational level. Several studies confirm the positive influence of the QS practice on overall productivity and performance [21, 24]. Moore [25] conducts a mixed-methods study to examine QS practices. Their findings indicate that participants perceive improvements in their productivity following these practices. At the same time, participants raise concerns about the comfort of the wearable devices used in the study and expressed privacy-related concerns regarding the collected data. Mathur et al. [20] examine KWs' perceptions of QS systems that capture a range of workplace data — noise, air quality, mood, and activity — over a four-month study. Their findings show that participants were interested in the actionable insights generated by such systems and expressed a preference for real-time visualizations of collected data. At the same time, they emphasize that anonymous data collection is a key condition for system acceptance.

Taken together, previous studies show the potential positive effects of PI systems on KWs' productivity and sense of involvement with the organization, while at the same time highlight that a widespread adoption of such systems requires outmost careful consideration of workers' privacy concerns [2, 21] and individual preferences [8, 30]. Gerdenitsch et al. [13] further observe that workplaces are characterized by inherent power imbalances between organizational authorities and workers, and that the deployment of PI systems at work can reinforce principles of *"Taylorism or scientific management"*, emphasizing organizational-level measurement and optimization at the expense of individual differences. Moore [25] also highlights the risk of *"self-exploitation"*, whereby workers may push themselves beyond healthy limits, acting as exploiter and exploited in response to organizational expectations. These challenges hinder the broader adoption of PI systems in real-world work settings [15], despite their potential benefits.

We contribute to this ongoing debate through an exploratory study investigating how AKWs track work-related activities with PI systems, positioning the worker as the primary beneficiary. Unlike prior work that either focuses solely on individual self-tracking [14, 17] or adopts manager-centric QS approaches [2], our study examines an AKW-controlled model in which managerial stakeholders may be involved without undermining AKWs' agency. To this end, we conducted a vignette-based study with two scenarios: the first examines individual use of PI systems for self-tracking, while the second explores the controlled sharing of performance reports with managerial stakeholders, where decisions about what is shared, with whom, and in what form remain with the AKW.

3 Methods

3.1 Interview Study and Participants

We conduct a vignette-based interview study [22] as part of a larger study [1]. The vignette-based interview followed an open-ended interview aimed at understanding AKWs daily routines and work practices. Twenty AKWs with different roles (professors, post-docs, PhD students, and R&D engineers) were recruited for the study. The demographics of the participants are presented in Appendix A.

The vignette-based interview uses a within-subjects design and two scenarios. We ask participants to reflect on both scenarios. The first scenario focuses on PI systems to track work-related activities and support AKWs' daily routines, with the worker positioned as a self-motivated user and primary interpreter of the data. The second scenario focuses on PI systems provided to the AKWs by their employer, with AKWs' freedom to choose whether to share or not performance reports with the organization. Across both scenarios, the knowledge worker is positioned as the primary beneficiary of the PI system. We present both scenarios in Appendix B.

3.2 Data Analysis

We chose reflexive analysis [5, 6] as analytical framework to process the interview data [27]. We follow the same pre-processing steps as [1]: non-English interviews are first translated, then all transcribed interviews are anonymized by removing personal information, and cleaned, by correcting errors introduced by the transcription software. After data pre-processing, two authors code the data supported by the *ATLAS.ti* application [3]. Both are young academic workers: one has a computer science background; the other has a communication and interaction design background.

We use an inductive bottom-up method for theme generation, without relying on a pre-defined codebook [5]. During analysis, two authors independently code the interviews and develop initial themes with brief summaries and quotes. The coders then revisit the data to refine these themes and share their interpretations. Through discussion, overlapping themes were merged or refined, and in cases of partial overlap, the most relevant themes were broadened.

4 Results

4.1 Building Trust Through Data Collection Practices

Data collection context. We find that participants recognize the value of PI systems in supporting productivity in work-related activities. They express trust-related concerns regarding which data PI systems can access and the contexts in which data is collected. Across both scenarios, participants express preference for collection of data within work-related contexts only (*P09: "I don't want to be tracked during the night for instance the way I sleep, it feels like it's a bit interfering. But I have no concern in the way some someone tracks the way I work or what I do during the day, so for me, it's more like a public space and at night it's more of a private space."*). They highlight that this distinction creates a boundary between private and work contexts (*P15: " I don't feel I'm relaxing, if I need to track my time relaxing, or if some something is tracking my off time. So I like to move away from work is just disable anything that can even remind me of work."*).

Trade-off between data access and the utility derived from it. Regarding which type of data PI systems may access, participants describe an implicit trade-off between the data they are willing to share and the support they expect from the system (*"P09: I don't have big issues about what kind of information I gave about myself, my performance, my activities to a smartphone, for instance, if it gives something useful for me."*). Participants note that certain data types are perceived as more sensitive, particularly audio and video recordings. Some participants describe these modalities as *"showstoppers"* (*P04: "Camera and microphone objectively are a little sensitive.", P19: "No, that [giving access to camera and microphone] is a deal breaker."*). Others express a preference for one modality over the other, highlighting differing comfort levels (*P18:"I'm not really happy with the idea of the application seeing me like on the camera all the time, that would bother me. But the microphone is yes."*).

Trust and transparency. Participants emphasize the importance of trust and transparency between users and PI system designer and maintainer entities. They highlight how trust can encourage them to grant access to more sensitive data (*P04:"I believe that to give access to the camera and the microphone, I should really trust those who programmed Delphi application [name of the PI system presented in the scenarios]."*). They highlight that transparency around the entities' business model shapes their willingness to adopt PI systems (*P07: "if I know that it's done by a company like Google or Facebook, who use it to sell my data and to basically target ads more and get me to buying stuff, that's what I would be concerned about."*). In the second scenario, some participants express a preference for PI systems handled by independent third parties rather than their employer, which creates a separation between personal data and the organization and reduces concerns of data misuse or misinterpretation (*P03: "I would prefer an external company. I think there is a conflict of interest. In that case there is an extra layer of separation between the two [the employer and the employees' data] that gives me a little extra confidence."*).

4.2 Autonomy and Control Over System's Interventions

Users' control versus interventions. Participants emphasize how contemporary work practices vary daily in tasks and schedules. This flexibility poses challenges for the effective use of PI systems (*P03: "The only disadvantage I imagine is the flexibility, having to do tasks that are not extremely repetitive. Maybe, it [PI system] is calibrated on a certain program, or a certain habit, therefore this is a bit of a disadvantage, which maybe tends more to distract than to bring immediate benefits."*). In particular, participants highlight how they sometimes judge better their own needs than the PI systems (*P19:"I wouldn't want an application to tell me what to do. I wouldn't mind reports and some suggestions, but not prompting me to do this now and then do that in an hour, and so on.", P18: "Sometimes it might be that the person knows better than the application about themselves, for example, if I know that in 10 minutes I have will have to finish the task and the application tells me take a break now, I would say no. I know that in 10 minutes I will have to finish and I prefer to take a longer break afterwards."*). In these instances, system-generated recommendations are perceived more distracting than supportive (*P02: "Disadvantages might be that it [PI system] is a bit invasive. If I'm focused on a problem, I don't want to take a break at that moment, even if I'm getting tired, but if at that moment the concentration is high, I prefer to keep it."*).

Users' autonomy and personalized interventions. Participants value the autonomy enabled by PI systems when they are offered by their employer (*P19:"I think it [PI system in the second scenario] is okay, as long as it is optional, and it is opt in, then it sounds great. The employees are given the agency to choose whatever they want to do with it.", P11: "I would like boss to give me the opportunity to use such an app for my own benefit."*). They appreciate system-generated personalized recommendations to support productivity and well-being during long work routines (*P09: "I like that it collects data from different platforms on which was which I'm interacting and then it merges all those all those pieces of data together. I like that it provides personalized feedback and recommendations for myself when I need them."*).

4.3 Supporting Self-awareness, Self-reflection, and Sharing

Self-awareness using performance reports. Our analysis indicates that participants emphasize the value of self-awareness and self-regulation, and describe the performance report feature of PI systems in both scenarios as particularly useful for reflecting on their behaviors and everyday routines. (*P05: " I would use it [PI system] much more to look at the reports, that part is the one I would be interested in."*).

Sharing performance reports under conditions. While participants value the reporting feature provided by the PI systems in both scenarios, they emphasize the importance of retaining control over whether and how such reports are shared with the organization. Some participants express a willingness to share these reports with the organization in an anonymized and aggregated form (*P19:"if it [performance reports] were centralised, and all the reports ended up in one central place, and it wouldn't be able to track where each report came from, yes."*). Others raise concerns about sharing such reports

with direct supervisors, citing fears of data misinterpretation that could lead to inappropriate decisions (*PI234:"if I want to give this data [performance reports] to an HR manager, to my own manager, I'm not sure they are have the right tools or the right understanding of what's happening to myself and to the level of my stress and then they are able to make the right managerial decisions based on this."*). Finally, some participants support sharing these reports with domain experts, to gain deeper insights into their own experiences and to seek expert guidance when needed (*P09:"I would say no concerns and sharing this with with someone who has an ability to help me. In case I find it difficult to manage my situation myself, I will give this data to a specialist who knows how to handle it."*).

5 Discussion

User control over data modalities and contextual boundaries. We find that participants support the use of PI systems for tracking work-related activities when data collection is limited to work context. They emphasize the importance of maintaining boundaries between work-related data accessible to the PI system and inaccessible private data. These findings contrast with Guillou et al. [14], who propose a metric for evaluating KWs' productivity. Their results suggest that this metric should encompass work-related activities and personal activities. In contrast, our participants emphasize the importance of separating work-related data from personal activities. Moreover, we observe that participants perceive certain data types collected by PI systems — audio and video — as sensitive. They express a willingness to grant access to these data when they trust the system's data handling practices and the transparency of the underlying business model of the entities responsible for the system. Similar trust concerns are raised by Mathur et al. [21] in their study, where audio and video data were described as intrusive and anonymous data collection was identified as a key requirement for system acceptance. Our findings complement prior work, by showing that AKWs foreground trust and transparency as central conditions for the acceptance of PI systems, even in the absence of anonymous data collection.

User control over interventions: timing, content, and context. Our analysis reveals the challenges that contemporary work practices pose for PI systems. They note that PI systems are more effective when work routines are relatively stable, compared to flexible and irregular schedules. Participants emphasize the importance of full user autonomy in deciding when and how PI systems are used, including control over interventions and prompts, to avoid notifications delivered at inappropriate or unsuitable times, which are often perceived as distracting. These observations complement existing findings in the literature that show that in workplace settings, the interventions generated from PI systems can support productivity and self-regulation, but also risk becoming disruptive or stressful when delivered at inappropriate times or without sufficient user control [9, 17]. For instance, Kim et al. [17] examine self-tracking of computer usage behavior at the workplace and show that interventions generated by PI systems can interrupt workflow and negatively affect productivity. They recommend triggering interventions only when productivity falls below a certain threshold.

User control over sharing performance reports: content, and recipients. Participants express appreciation for the self-reflection functionality offered by PI systems, particularly for performance reports. They describe using these reports to better understand their behavior. Also, participants emphasize the importance of retaining control over these reports, expressing a willingness to share them only under conditions where they could decide what information is shared, with whom, and in what form. In particular, participants indicate a preference for sharing these reports with domain specialists rather than the organization, to seek expert guidance when needed. Some participants support sharing such reports with the organization when presented in aggregated and anonymized form. The practice of sharing performance reports with the employing organization is widely explored in the literature of QS [20], e.g., [13, 28]. Previous studies highlight the negative consequences of these practices for workers' mental health [13, 28]. Gerdenitsch et al. [13] emphasize that the relationship between organizational authorities and workers plays a critical role in shaping how PI systems are deployed and used in work context. In particular, studies argue that the use of PI systems in the workplace can increase the risk of reinforcing employer control over workers, echoing principles of *"Taylorism"* to serve organizational objectives [13, 28]. Moreover, Moore [25] notes that deploying PI systems in the workplace can lead workers to adapt their behavior in response to collected data, resulting in *"self-exploitation"*. This is described as an *"inner manager exploiting an inner worker"*[13, 25]. Our findings extend prior work by demonstrating that AKWs are willing to share performance reports when they retain control over what is shared (content), how (format), and with whom it is disclosed.

Our study indicates that AKWs can leverage PI systems to track work-related activities, despite variable and often unpredictable daily tasks and schedules. However, participants emphasize the need for user agency, articulated through fine-grained control over the type of data PI systems can access, the context in which data is collected, and the timing and content of system-generated interventions.

6 Limitations and Future Work

This study focuses on AKWs, which may limit the generalizability of our findings. Also, while our sample size is in line with research recommendations [7], it may nonetheless not be representative of the entire sub-population. As future work, we aim to explore the applicability of our findings by replicating the study with other sub-populations of KWs.

7 Conclusion

Our vignette-based interview study with 20 AKWs shows that PI systems used for tracking work-related activities are accepted when AKW primacy is preserved through fine-grained user control. Participants valued PI systems for supporting self-awareness and reflection via performance reports, but stressed that trust depends on limiting data collection to work contexts, controlling sensitive modalities, and ensuring transparency. They also emphasize that system interventions should remain optional and user-governed to avoid disrupting work routines. While some support sharing performance insights with organizations, this was acceptable mainly

under worker control, pointing to a model of organizational awareness that preserves autonomy and privacy for KWs.

Acknowledgments

This work is partially supported by the Swiss National Science Foundation (SNSF) through the grant 205121_197242 for the project "PROSELF: Semi-automated Self-Tracking Systems to Improve Personal Productivity".

Generative AI technologies were utilized to assist the optimization or editing of selected parts of this work, in particular text paragraphs. The generated materials have always been post-processed by the authors.

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A Demographics of Interviewees

In Table 1, we summarize the demographic characteristics of the academic knowledge workers (AKWs) who participated in the interview study. We recruit 20 AKWs from two faculties in the STEM field (75%) and the Humanities field.

B Interview Script

Scenario (1): Don Wright

Don is an independent writer and illustrator for various newspapers He is successful in his job, but often feels overworked and struggles to find time for sports and other free time activities. To improve his situation, he decides to use Delphi a full fledged application that runs on his laptops, smartphones and other personal devices (e.g. smartwatches, earbuds). Delphi collects different types of data,

Table 1: Demographic information about study participants. The information shows the diversity in the work experience and the number of working groups. (M) stands for male, (F) stands for female, (N) stands for not disclosed. (Exp.) stands to the working experience in years. (STEM) stands for a faculty in the STEM field, (HUM) stands for a Faculty in the Humanities field. (n.a.) stands for not available because the interviewee do not respond to the survey.

No.	Sex	Age	Exp.	Faculty	Occupation
P01	M	30-39	4-6	STEM	Post-Doc
P02	F	30-39	4-6	STEM	Post-Doc
P03	M	30-39	4-6	STEM	Post-Doc
P04	M	30-39	7-10	STEM	Post-Doc
P05	M	30-39	>10	STEM	Senior R&D engineer
P06	M	30-39	7-10	STEM	PhD student
P07	F	20-29	1-3	STEM	Junior R&D engineer
P08	M	30-39	>10	STEM	Junior developer
P09	F	30-39	1-3	HUM	Professor
P10	M	40-49	4-6	STEM	Senior R&D engineer
P11	F	50-59	>10	STEM	Professor
P12	N	20-29	1-3	STEM	R&D engineer
P13	M	30-39	>10	STEM	PhD student
P14	F	30-39	7-10	HUM	Post-Doc
P15	M	20-29	1-3	STEM	PhD student
P16	M	30-39	7-10	STEM	researcher
P17	M	30-39	4-6	HUM	Post-Doc
P18	F	30-39	4-6	HUM	Post-Doc
P19	M	30-39	4-6	STEM	Post-Doc
P20	F	30-39	n.a.	HUM	Post-Doc

including application usage on the laptop, smartphone activities, and heart rate and movement data through the smartwatch. Delphi also allows Don to enter some data manually, e g indicate whether he felt productive on a specific day or during a specific activity. The collected data is reported to Delphi's databases and processed to create daily, weekly, and monthly reports on Don's activities e.g., which applications have been used, for how long, the number of physical breaks during the day, the amount of interaction with co workers, personal stress levels and concentration throughout the day, and more. Delphi also suggests interventions immediately, such as recommendations on when to take a break, suggestions on how to schedule tasks and how much time to allocate to them, and personalized advice on how to improve one's productivity. Overall, Delphi allows Don to identify his own behavioral patterns that are related to less productive days, and to actively engage into correcting them. After a few months using the Delphi app, Don feels much less overworked, does sports more regularly, and he is still able to deliver on his work commitments on schedule.

Interview Questions for Scenario 1.

- If not very explicitly addressed by the interviewee, please ask the following questions:
  - What do you think the advantages or the disadvantages of the proposed Delphi application?
  - Do you think you can use the Delphi application?
    - If yes, why? How do you think the application could be useful to you?
    - If no, why?
    - In both cases: Are there any specific features that you think such an application could have would consider particularly useful for yourself or others?
  - Are you concerned about the specific data that is collected? Why or why not?
    - Which devices would you be willing to grant access to the application?
      - Laptop, smartphone, smartwatch, earbuds. Why or why not?
    - Would you accept the option to also let the application use camera and microphone? [This would give several more services]

Scenario (2): AVANTREX

The software development company AVANTREX, as part of a strategy to improve employees' satisfaction with the company, promotes several initiatives to empower its employees. One of these initiatives is the purchase of licenses for the Delphi application AVANTREX employees can request a Delphi license to be allocated to them at no cost and use the Delphi application as it suits best to them. The Delphi app collects and processes all data on a centralized server, which is fully in compliance with all applicable laws and uses industry standard security. In particular, data is anonymized, and results of the data analysis are provided only to the employee. Delphi can also be used in a "device only" mode, in which no data is uploaded to the servers. However, in this mode, the app can only provide a limited set of services. AVANTREX's employees can also decide to make anonymized and aggregated data reports available to managers who can, e.g., see the overall level of stress of the employees over specific days or periods.

Interview Questions for Scenario 2.

- If not very explicitly addressed by the interviewee, please ask the following questions:
  - What do you think the advantages or the disadvantages of the proposed Delphi application?
    - Do you think you can use the Delphi application?
    - Are you interested in sending your anonymized reports to your manager?
  - Are you concerned about the privacy and security aspects of your data?
  - Does it matter to you if the data collected by Delphi application is stored and processed by AVANTREX or by another company?
    - Which option (AVANTREX or other company) do you believe would be better in terms of data privacy and security?

- Are you concerned about how the data is stored and handled?
- Are you concerned about others (e.g., your co-workers) accidentally seeing the detailed reports produced by the application?