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Digital work practices that promote informal workplace learning: digital ethnography in a knowledge work context

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ABSTRACT

Informal workplace learning is an essential part of lifelong learning. In recent years, digital technology has come to play an increasingly important role in enabling informal learning at work through various tools and resources. However, as little empirical research exists on informal learning in this context, more knowledge of digital work practices that promote informal workplace learning is needed. This paper describes a digital ethnography that was conducted to investigate informal learning in authentic work settings. The data were collected from a public sector workplace during the years 2020–2022 and included observations, interviews, and participant diaries, which were analysed using qualitative ethnographic content analysis. This study draws on practice theories to further understand digital work practices and how they are formed in people's daily activities and interactions in the social and material environments of digital technology and work. We present our findings in terms of five practice categories – work-related communication, relational communication, sharing, following and listening, and controlling the use of digital technology – to illustrate how informal learning takes place in everyday work. The detailed accounts of these practices contribute to understanding how digital technology can be used to foster informal learning in work.

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Workplace learning; informal learning; technology-enhanced learning; digital work practices; digital ethnography

Introduction

Informal learning at work refers to the spontaneous, often unconscious, implicit learning that occurs in different situations during everyday work, triggered by multiple factors, such as individual needs or available opportunities (Eraut 2004; Kyndt, Govaerts, and Dochy 2018; Manuti, Pastore, and Scardigno 2015). Informal learning can lead to changes in competences, knowledge, skills, performance, and attitudes (Baert 2018; Cerasoli et al. 2018). It is individual process integrated with everyday work activities, such as work tasks, interaction, and experimentation (Eraut 2011; Jeong et al. 2018). It

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is also collective by nature, as it often involves interaction with others and is embedded in the sociocultural context of the workplace (Watkins et al. 2018). Informal learning is a prominent concept as it promotes lifelong learning and can be a key to competitiveness and employment (Kyndt, Govaerts, and Dochy 2018).

A significant portion of workplace learning takes place by participating in work practices (Billett 2014). Work practices are established understandings and ways of acting (Byström 2023), covering work activities, personal and social relations, positions and tools, and artefacts used (Illeris 2011). Practices are collective, situated, and co-produced by a range of actors, both human and non-human (Hager, Lee, and Reich 2012). Ley et al.'s (2020) knowledge appropriation model explains how individual and collective learning takes place within work practices involving creation, sharing, and application of knowledge. Since technology plays a crucial role in several work processes, the support for learning can be embedded within the technology and processes themselves (Ley 2020; Treasure-Jones et al. 2019).

Technology provides several possibilities for workplace learning with various environments, tools, resources and practices that it enables (Littlejohn and Pammer-Schindler 2022; Tynjälä, Häkkinen, and Hämäläinen 2014). The ubiquitous digital technology supports the integration of working, learning, and living, thus diversifying opportunities for informal learning (Clark et al. 2018). Digital technology can facilitate just-in-time learning, for instance, by connecting individuals with experts and providing the necessary resources, allowing them to acquire new knowledge or skills for immediate work tasks (Littlejohn and Pammer-Schindler 2022). Emotions shape social interaction and everyday practices at work (Hökkä, Vähäsantanen, and Paloniemi 2020), and given that close proximity and daily interaction during work assignments enable learning from others (Crans et al. 2021), workplace practices should also facilitate this kind of interaction in digital environments. Digital technology provides new possibilities for relational communication – that is, for building and maintaining relationships in the workplace (Jämsen, Sivunen, and Blomqvist 2022). For instance, enterprise social media can offer support and platforms for informal learning and building social capital (Sharma et al. 2022). Tools specifically designed for informal learning can support structured ways of working and increase active discussions and the engagement of wider networks (Treasure-Jones et al. 2019). However, technology is not yet viewed by all to be a natural tool for informal learning, because face-to-face presence is considered necessary (Amenduni et al. 2022). As the COVID-19 pandemic restrictions closed offices, it forced many to engage in fully digital work options, and thus new practices for work and communication were developed (see Byström 2023; Jämsen, Sivunen, and Blomqvist 2022; Karatuna, Jönsson, and Muhonen 2022). Consequently, informal learning does take place, and perhaps should increasingly take place, in digital environments.

While the importance of work practices for learning has been acknowledged (see Billett 2014), little is known about how digital work practices can support informal learning in everyday work. In this regard, the need for further studies on the use of technology for informal learning has been recognised (see, e.g. Littlejohn and Pammer-Schindler 2022; Nygren et al. 2019). More specifically, there is a need to understand the distinctive practices that emerge in digital work and how they affect learning processes (Lemmetty et al. 2022; Vallo Hult and Byström 2022). To address this need, this paper focuses on the digital work practices and draws on practice theories that provide valuable ways to

examine informal workplace learning (Hager, Lee, and Reich 2012; Nicolini 2012). We share Nicolini's (2012) understanding of practice theories as a complex web of theories, rather than as a single unified theory. Through practice theories, practices can be seen in a new way, not merely as the activities of people, but as sayings, doings, and relating that are enabled and constrained by cultural-discursive, material-economic, and social-political arrangements (Kemmis et al. 2013). With this approach, we can investigate the activities, practices, and socio-material arrangements in which informal learning is embedded at work (Boud and Rooney 2018) and the digital technologies that serve as artefacts and tools within these practices (Nicolini 2012). As Kemmis (2021) points out, learning happens in practice, but learning itself is not a practice. Therefore, it is crucial to examine the actual practices of digital work to understand how they can promote informal learning.

We use the concept of informal learning to refer to the learning that takes place in everyday work. We leave formal training outside of this study, although we acknowledge that both formal and informal learning are essential parts of workplace learning and complement each other (see Marsick et al. 2017). In knowledge work, digital technologies are fundamental tools, and thus, the work practices of knowledge work are often digital. The term digital technology is used in this study to refer to the digital services, resources, and tools the participants used at work or in work-related learning. One of the first tasks of this study was to investigate the kinds of digital technologies used when learning informally at work. We did not define in advance the kinds of digital technologies that would be included in the study but instead focused on those the work community was using in their day-to-day activities. By investigating the practices of digital work we can better understand how digital technology can be used to support informal learning. To do so, in this study, we asked the following question: what kinds of digital work practices promote informal workplace learning?

Methodology

This research applied the digital ethnography approach (Hine 2015; Pink et al. 2016) to study informal learning within digital work practices. Today, in knowledge work, the physical workplace is only one part of the work environment, due to the fact that digital environments now form a substantial part of it. Thus, it is essential that researchers find ways to participate in these digital environments. The ethnographic approach thus provides particularly suitable tools for studying the complex phenomenon of informal workplace learning by engaging with these digital environments (Lemmetty et al. 2022) and capturing the mundane activities within them, through which it is possible to understand the relevant social and material activities – that is, the practices (Nicolini 2012). The use of digital technology is often routine, embedded in the everyday (Hine 2015), as is informal learning. Therefore, digital ethnography as a methodology and the concept of practice as an analytical construct were particularly useful for capturing and researching digital practices that promote informal learning.

In the present study, digital ethnography was conducted as an open-ended and flexible process, in which digital methods were developed in relation to the research question (see Pink et al. 2016). Initially, the first discussions, interviews, and observations served to outline the digital environments used in the target organisation, while also illuminating

the ways in which the researcher could engage in them. As the research progressed, it was possible to specify the inquiries and focus in more detail on the everyday actions taking place in these environments. Data collection methods included observations, interviews, and participant diaries. In addition, discussions were held with informants in online meetings or emails that allowed for entrance into the work community and provided information about the work practices studied. Each dataset enriched the others, provided depth to the accounts of practices, and assisted the researchers in reflecting on their interpretations.

Research setting

The workplace studied had 70 staff members and comprised one unit of a public sector training organisation in Finland. Because of the COVID-19 restrictions, the research participants worked remotely during a large part of the data collection period. It is worth noting that the staff were accustomed to using digital technology for their distributed work prior to the imposition of COVID-19 restrictions. Many had worked remotely a few days a week, and as the offices and thus other colleagues were located in two cities, collaborating online was an everyday practice. A large part of the daily interactions took place via digital technologies. During data collection, there was ongoing development of the digital work environments, which included the implementation of Microsoft Teams. This tool became a workspace for storing shared files, collaborating and communicating, reorganising knowledge management into various digital channels, developing the social aspects of their work environment, and organising teams.

Data

The research data were collected online from 2021–2022. The first author had the main responsibility for the data collection and analysis. Entering the versatile digital environments and effectively capturing the work practices and the informal learning taking place within them required time. Long-term engagement in the research setting enabled the researcher to identify and record the perspectives and understandings of the work community (Coffey 2018) and thus recognise instances of informal learning. There were some quiet periods in the online activity in the workplace, such as during the summer vacation season (1.5 months), during which the data collection was paused and thus its duration lengthened. The data were recorded in Finnish. The first author translated the quotations presented in this paper into English. A detailed description of the data is presented in [Table 1](#).

The data collection process began by negotiating the entrance to the work community and its digital environments. Ethical consideration was needed to determine how to enter the community online, how to take fieldnotes from diverse online environments, and what data were ethically sustainable to use (Schrooten 2016). All members of the work community were informed about the research, and participation was voluntary. Information about who participated in the interviews and wrote in the diaries was only available to the first author. The researcher obtained permission from the workplace's management to observe the digital work environments. The employees had the option of excluding

Table 1. Research data.

Type of data	N	Data collection period	Number of pages
Observations in:			
<ul style="list-style-type: none"> • Online meetings and gatherings (official/team/informal meetings focusing on topical issues, and virtual coffees) 	23	March 2021–September 2022	Fieldnotes: 24 pages and two screenshots
<ul style="list-style-type: none"> • Online forums and chats (2 Yammer groups, 2 Teams group channels, and 2 Teams chat threads) 	6	March 2021–September 2022	Fieldnotes: 33 pages and three screenshots
Interviews	11	March 2021–June 2022	123 pages of transcript
Participant diaries	7	Two weeks during March 2021–June 2022	35 pages text and pictures

themselves from observations. The researchers omitted certain discussions and digital channels from the study to avoid handling the data of persons outside the research. Ethnographic fieldwork was conducted as openly as possible (Hammersley and Atkinson 2019), even though in online environments, the researcher's presence easily remains unnoticed. Therefore, the researcher always announced her presence in online meetings and posted reminders about the ongoing research on the online forums used by the target organisation. She attended online meetings and followed online discussions to observe employees in their everyday work and produced accounts of these ongoing interactions in field notes (see, e.g. Wåsterfors 2018). In addition, the online forums and chats served as documents to which the researcher could return to. The researcher focused on observing the ways in which digital technology was used and the possibilities for learning that were present in these situations and environments. The online discussion was very active; daily conversations took place on multiple channels.

Interviews and diary collection were planned to support the online observations. To ensure a representative sample, the interviewees were selected from all sectors of professions in the workplace, including training officers, secretaries, and managers. Work experience was also considered, and both newcomers and more experienced employees were interviewed. The interviews were initiated by the researcher, who contacted employees via online forums and emails and asked for volunteers to participate. While the researcher had predefined themes (e.g. the use of digital technology at work and the experiences of the employees) that provided a framework for the interviews, the discussions otherwise proceeded openly, allowing for free-flowing conversation and enabling the interviewees to bring forward issues they considered relevant. In some interviews, the researcher used observation data as material to stimulate, promote, and focus the discussion (Gaskell 2000). Discussing online activities with the interviewees offered deeper insight into the experiences of the informants. In addition to individual interviews, one group interview was conducted with the management team, which provided a more comprehensive view of the use of digital technology at the target workplace and the related practices. The interviews were conducted via Microsoft Teams, which was in everyday use in the target organisation and thus familiar to the participants. Therefore, online interaction was easy and natural. The interviews were recorded and transcribed non-verbatim.

Diaries were collected from employees who volunteered to participate in this part of the process ($n = 7$). The researcher informed the work community about the collection of diaries, and volunteers signed up. The participants reported and reflected on their everyday learning and the use of technology in their diaries for two weeks. The diaries were written on online Word documents that were shared with the researcher. Writing diaries online allowed for easy access and fluent use throughout the research process, thus enabling interaction; for instance, the researcher asked the participant to write about a meeting or a discussion she had observed to get more information. Online diaries offered the possibility of studying environments and events that would have otherwise been difficult to access (Pöysä, Mäkitalo, and Häkkinen 2003). The diaries enriched the observation data and provided further access to the experiences of the employees (Kozinets 2015). Specifically, they provided valuable insights into the use of digital technology, the learning opportunities it provided, and detailed information about the activities and experiences that arose in these situations.

Analysis

Ethnographic fieldwork is a flexible and exploratory process in which data gathering and analysis are concurrent processes (see, e.g. Hammersley and Atkinson 2019). The data served to facilitate new ideas and develop those arising from earlier research and the researchers' experiences. After the data collection was complete, the data were analysed using ethnographic content analysis (Coffey 2018). First, the primary researcher carefully read transcribed interviews, field notes, and diaries, to familiarise herself with the data. Then the data was coded using Atlas.ti analysis software (Friede 2014). This helped manage and combine the versatile data. The analysis started by inspecting the actions and speech of people in digital environments in their everyday work. The researcher used open coding and initially focused on identifying the kinds of digital technologies that were used, then explored in more detail how they were used and for what purposes. The researcher began to recognise actions and patterns in the use of digital technology related to informal learning, such as using the chat function to ask colleagues questions. Data triangulation (Hammersley and Atkinson 2019) assisted the researchers in confirming their interpretations, for instance, by comparing observation notes of an online discussion with an interview or a diary that covered the same incidents. Next, the initial findings were interpreted in light of the notions of practice theories (Nicolini 2012), which assisted in developing an understanding of the structures and processes behind these everyday actions and routines. The researchers identified several digital work practices. Some of the practices were more individual-oriented, while others were shared workplace practices. The researchers grouped the shared practices into categories that serve to illustrate how they promote informal workplace learning.

Ethnographic research requires reflexivity throughout the research process (Coffey 2018). In this study, the primary researcher kept a research diary that assisted in documenting the evolving research process and encouraged reflection on the researcher's position, data collection, and emerging analytical ideas. In addition, the researcher reflected on how technology, as both the target and tool of this research, affected the knowledge produced (Pink et al. 2016).

Findings: digital work practices that promote informal workplace learning

The workplace studied was accustomed to using digital technology for everyday work, thus they had settled digital work practices. Based on the analysis, we describe our findings by presenting accounts of shared practices of the workplace that were found to promote informal learning. These were (1) work-related communication, (2) relational communication, (3) sharing, and (4) following and listening, and (5) controlling the use of digital technology. The practices are complex, and the categories overlap to some extent, thus a practice can relate to more than one category. Figure 1 illustrates the connection of the categories. In addition to the shared workplace practices that form the main categories of our results, the digital work practices included individual activities and practices that promoted informal learning. For instance, in diaries employees described how they used digital technology to seek information or learned to use digital technology through trial and error. To be noted, we do not aim to give an exhaustive description of digital work practices; rather, these categories serve as representations of shared work practices and illustrate their meaning for informal learning. Table 2 summarises and gives examples of digital work practices and informal learning intertwined in them. Next, we introduce these categories in more detail.

Work-related communication via digital technology

The work community used actively various digital channels such as Yammer or Teams for work-related communication. Formally structured practices, such as creating designated Yammer and Teams channels for teams, work tasks, or topics, coexisted with more informal practices, such as chat discussion threads that originated spontaneously in response to needs arising from everyday work. During the data collection period, Teams replaced Yammer to a certain degree, bringing forth the need to reconsider the

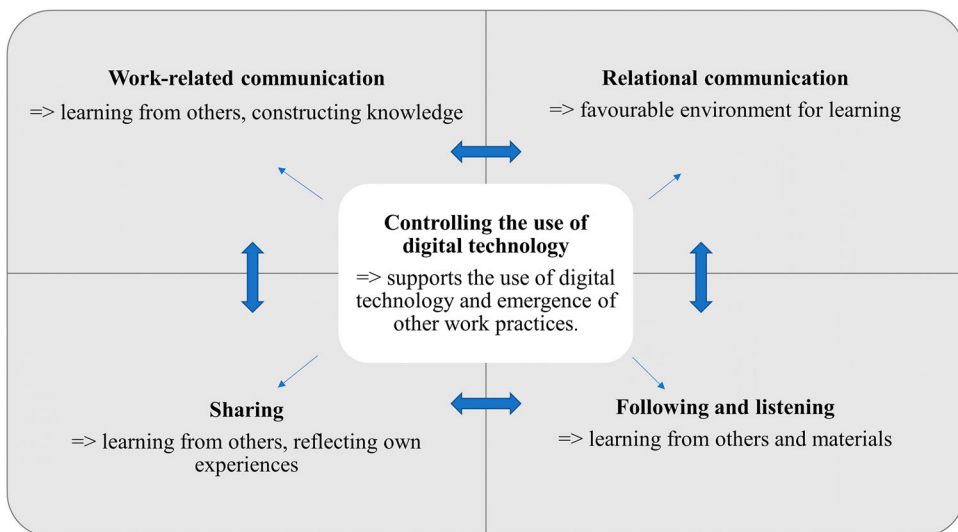


Figure 1. Categories of digital work practices that promote informal learning. The arrows signify that practices are connected to each other. Controlling practices are central to the existence of other practices.

Table 2. A summary of practices.

Practice category	Examples of digital work practices	Informal learning
Work-related communication via digital technology.	Using Teams chat to ask help from a colleague.	Peer learning.
	Using Yammer forum for a discussion of the whole work community.	Knowledge construction. Learning by doing.
Relational communication via digital technology.	Sharing personal news in Yammer.	Learning about the work community and colleagues.
	Using reaction function and emojis in an online meeting to express opinions and emotions.	Favourable environment for learning.
Sharing knowledge and experiences.	Posting material to online forum.	Learning from others and materials.
	Sharing an experience in a chat discussion.	Learning through reflection.
Following and listening.	Saving files to shared folders.	Learning from others and diverse content sources.
	Reading Yammer forum regularly.	
	Browsing social media.	
Jointly controlling the use of digital technology.	Listening and observing in online meeting.	Supports the use of digital technology and other work practices, and thus informal learning.
	Creating structures and guidelines, e.g. named channels, using tags, adjusting notifications.	

established practices of online communication. As Teams chat provided better possibilities for discussion, it increased online engagement and thus provided more opportunities to ask for help and learn from others. Both online forums continued to have their relevance, and the practices of discussion started to become more specific and versatile. In addition to solving problems in everyday work, employees discussed online broader or more complex topics, such as values, or ideas for development.

Employees actively used digital channels to ask for help or information. Asking often initiated shared knowledge construction because there were no ready-made answers. It was important that there were people who answered or were willing to try to solve problems together, as this excerpt from field notes on observing Yammer discussions demonstrates:

Employee frustrated with the new IT system seeks peer support. She states that she doesn't have enough time to familiarise herself with the available materials and asks if she could receive hands-on guidance. She tags a person whom she believes has a better grasp of the system and inquires if anyone else also needs guidance. The tagged person acknowledges that she sometimes feels the same way and mentions that others have also expressed a desire for workshops on this topic. She offers to organise one, mentioning that even though she may not know much more than others, together, they can try. (Field notes)

Communicating via an online forum made this discussion visible to everyone, enabled the tagging of a person with knowledge, and conveyed a communal attitude towards learning together.

One new emerging practice was to use the chat function for spontaneous group discussions, which could form long threads. For instance, one chat discussion thread was related to the ongoing IT system change causing urgent problems in everyday work. Several dozen people were actively engaged in this chat discussion, and it continued for months. One informant described how it promoted informal learning: 'It is so active because people are desperate [laughter] and information is transferred constantly in there, and it isn't based on any guidelines but on asking from others: help, what should we do?' (I3).

Employees considered these group chat discussions a safe place to which they resorted when they needed help from peers. After the most problematic phase of the IT implementation was over, the need for support decreased, and the thread gradually faded away.

Teams chat was seen as a flexible and easy way to communicate and keep in touch. Using the chat function was described in an interview as ‘more like the exchange of information that takes place during a lunch break and coffee, and in a discussion in the network’ (I6). Discussion via chat was seen as more flexible than face-to-face communication in the workplace. One employee explained how the chat function enabled discussion more freely than face-to-face interaction at the workplace: ‘I discuss things more with co-workers than I would in the workplace; I would not dare to constantly be knocking on their door or shouting out something’ (I3). The discussion of everyday work enriched by digital technology, as in the case of sharing screenshots, was useful because it provided concrete examples of how to apply formal guidelines, as this excerpt from an interview revealed:

The reason that this communication channel [Teams chat thread] has been important is precisely because it brings forth instructions and agreed-upon practices to a practical level and shows how to use these guidelines in your work [...] on that channel, a concreteness has emerged, for example, through screenshots or explanations of how to perform certain actions by clicking on this or that button. (I7)

One participant described in a diary how online meetings fostered learning: ‘I feel that the discussion in joint meetings increases knowledge even though nothing really new would always come up. We also agree on shared practices, which makes work easier’ (D4). The chat function was actively used to comment on and ask questions in the online meetings, which increased interaction.

The digital work practices of work-related communication fostered opportunities for discussion, seeking and receiving help, resolving problems, and constructing knowledge together. This provided several opportunities to learn in the processes of work, communication and knowledge construction. Everyday online communication about work issues supported performance at work by allowing employees to ask for help whenever needed, promoted peer learning, and facilitated learning by doing. Digital technology encouraged to active and flexible communication. In addition, it made information and processes more visible, and thereby increased learning opportunities.

Relational communication via digital technology

Apart from work-related communication, digital work practices assisted on building and maintaining relationships in the workplace. For example, when new employees entered the workplace, they were asked to introduce themselves to the Yammer forum. The newcomers wrote about their work experiences, skills, and personal lives, such as hobbies, often adding a picture of themselves. Others welcomed them with warm comments and reactions. Sharing personal matters in online forums, such as happy news and sorrows, was one way to build relationships. This provided others with knowledge about them and increased the profundity of communication. In addition to the above-mentioned examples, some informants mentioned that in online meetings, they often discovered information about other meeting attendees simply by looking at the background information on their Teams profile. The work community also had regular

virtual coffee breaks, which were intended to offer a break from work and a chance to talk with colleagues. These discussions were mostly unrelated to work, but sometimes employees used this opportunity to discuss work-related questions.

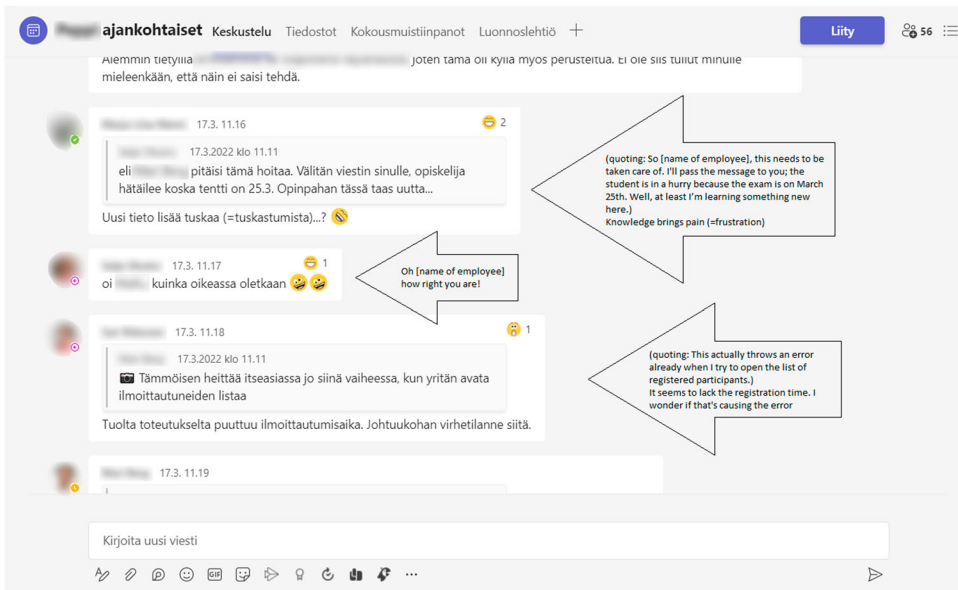
Using Teams chat had become an ordinary way to communicate. It was used actively, and not only for work issues but also for staying in touch and exchanging news. Regular communication in the work teams was valued, as this excerpt reveals:

It is really important for us that we have a connection to colleagues in everyday work, in other ways than just calling or emailing. And for us, for example in [our] team, this is put into practice via Teams, and we use the chat constantly. (I3)

The ability to reach others quickly via digital technology created a positive and safe atmosphere, as the following extract reveals:

It helps in creating a good atmosphere, and that sort of thing, and doing the work. I don't know if it could be described as a sense of security, but it's kind of like knowing there's someone you can ask. It's nice. (I2)

Emotions were expressed in many ways in digital environments through writing, reaction buttons, emojis, and pictures. There was humour, as demonstrated by the jokes made in the online discussions. During busy and perhaps even stressful IT system changes, online meetings and chat discussions were used as a channel to express frustration and let off steam. These digital expressions of emotions served as feedback to others (e.g. reactions to chat messages) and created a favourable environment for learning, which increased the confidence to ask for help. The following screen capture illustrates



Picture 1. A screen capture from Teams chat discussion. The capture includes work-related discussion enriched with relational communication including emojis and reactions (translations from Finnish added next to the message).

how emojis and reaction functions were used when discussing a work problem (Picture 1).

While meeting people face-to-face at the workplace was considered valuable, learning from others was not limited to these physical meetings within the workplace. One informant even stated that meetings online ‘are equally face-to-face meetings’ (I6). Thus, a connection to others can be established via digital technology. The relational communication practices through digital technology enabled socialising with colleagues and maintaining a sense of community in a multi-located workplace in which people had limited opportunities to meet face-to face. This allowed individuals and groups to establish connections and share thoughts and feelings. This promoted learning about the work community and getting to know the colleagues. In addition, this created favourable environment for learning.

Practices of sharing knowledge and experiences

It was a common practice for employees to share knowledge and experiences in online forums and meetings. There were formally guided practices, such as the obligation to share the lessons learned in formal training, that guided knowledge sharing, but such provision was often unprompted and initiated by the employees themselves. Experiences were shared to answer a question but also spontaneously to provide others with the possibility to learn from them. One interviewee explained why she shared a tip in a chat: ‘I tried [something], and it started to work, so I thought it could save someone else time if I shared that this is the trick with it’ (I7). In online meetings, opportunities for multi-channel interaction were used for sharing, such as screen sharing and the chat function. During presentations, others added their experiences by writing on the chat. While one person was talking, chat comments were fluently combined with the same discussion. The multiple viewpoints enriched the communication, as this excerpt from the field notes for an online meeting shows:

It turns out the task discussed was done a little differently, with everyone doing it in the way they saw best. One employee writes about her way on the chat, while another one explains through the microphone how she did it.

Shared practices for saving and using information are essential for maintaining shared knowledge. Especially within the implementation of Teams, the organisation made efforts to further develop practices for storing and sharing information. However, the constant changes and new digital technology brought a sense of fluctuation to these practices and sometimes caused uncertainty about how to save, share, and find information. An interviewee explained uncertainty related to sharing: ‘I put it here on Yammer and thought, then, that does it belong here, is this a suitable topic?’ (I3). People experienced that the knowledge was scattered across various digital channels and environments and that there was no shared logic for it. In addition, working in a hurry made it difficult to find the right place to store or share information. These issues posed challenges to maintaining shared knowledge and learning from others.

The idea of sharing was ingrained in the work culture and evident in everyday actions. Digital technology enabled and promoted sharing. It concretised and visualised the shared information, for instance, with screen sharing or screen captures, which further

enriched the learning. Knowledge and experience shared in everyday discussions promoted informal learning, as demonstrated in this excerpt how an informant described chat discussion, 'It is a kind of informal learning also because we share professional knowledge there all the time' (I3). The practices of sharing fostered learning from others and materials. In addition, sharing promoted learning through reflection, as it provoked to reflect the information shared.

Practices of following and listening

It was crucial that others actively followed and listened to the shared information for it to have an effect. The participants described how they followed various digital channels to keep up-to-date and learn new things. The individual's responsibility to follow these channels of information was highlighted. It was expected that at least certain main channels in Yammer and Teams are followed by everyone regularly to keep up with important information. In addition to these main channels, there were numerous other channels related to different work tasks or topics. Employees could choose which ones to follow according to their interests and the relevance for their work. In the diaries, participants identified several occasions when they learned something new from an online forum or chat, as the following extract illustrates:

In the morning, I also noticed in the Yammer instructions how you can create a list of important messages for yourself in Teams. This was very useful instruction and makes work easier, since you don't have to search for the things you need from the history of the discussion. Next, instructions were sent to Yammer about opening Teams tabs onto a new window [...] I watched the YouTube video linked to the discussion, and it was really clear. It was easy to learn how the opening of tabs works. (D4)

Newcomers as well could learn by following digital channels. A new employee explained how she followed the discussions on Teams: 'There are questions that I could not even ask yet, but then, when I follow them, I start to think that, okay, this kind of thing and that, and then I start to gradually understand' (I5). However, at times, employees found it challenging to keep up with the multiple forums and chat conversations with flooding information, resulting in valuable information being lost. Some admitted that they did not follow the digital channels as much as they felt they should, or that they browsed through them very quickly to get rid of the notifications of unread messages.

In addition to internal channels, social media, such as Twitter and LinkedIn, provided information sources outside the organisation. The use of social media varied; while some used it actively, others did not use it at all, or restricted its use only for personal purposes unrelated to work. An interviewee explained his use of LinkedIn, stating, 'I do follow those resources and interesting shares, articles, and blogs, and that's how I also learn things' (I12).

Online meetings provided flexible ways to listen to and learn from others. Some participants explained that they listen to meetings to learn about issues that they might not yet understand well: 'I participate in many different meetings and listen, and that has provided much learning and orienting' (I6). While listening, people often simultaneously did something else, like multitasking on work or doing something with their hands, such as jigsaw puzzles or hanging laundry, which helped them to listen.

The practices of following and actively engaging with digital environments encouraged learning from others and diverse content sources. These activities proved to be more dynamic than might be generally presumed, as participants actively selected channels and methods to stay informed with the available information. Digital technology offered flexible opportunities to monitor the information flowing online and learn from it according to personal needs. Online forums and meetings not only provided information but also enabled observing others and learning accordingly.

Jointly controlling the use of digital technology

The work community discussed and agreed on the shared practices of using digital technology, such as where to store information and how various online channels were to be used for interaction. The structures in digital environments, which included named channels for topics and the guidelines for using them, were ways of controlling the numerous digital channels. With the introduction of Teams, new practices were developed deliberately, like how to tag certain people or a group so that they receive notification of new messages in the channels. Challenges encountered created the need to further develop practices for controlling. For instance, some felt that chat discussion was too abundant, uncontrolled, and thus difficult to follow. At times, the diversity of the channels caused difficulties in choosing the correct place to post a question or comment.

The practices of controlling became visible in certain online activities, as in the case of an employee reminding others about suitable ways of using the various channels, indicating that ‘it would be very desirable that other matters would not be asked/written, for example, on [a topic-specific chat thread] or similar channels’ (excerpt from a discussion in the Teams channel). The managers also had a role in ensuring that discussion and agreement on practices took place and that training and support were available. Despite these efforts, some felt that the digital work practices were not clear enough, the process of developing practices was incomplete, or it was difficult to remember what was agreed upon. However, there was confidence that this would be worked out, and as one participant indicated, ‘The exact agreement about what kinds of things each platform is used for, that is not finished yet. And it has been discussed, which is good, and I have understood that this will be clarified’ (I3). As digital technology changes constantly, its practices must also be constantly renewed.

The practices that controlled the use of digital technology were important for the emergence and management of the other practice categories introduced previously, and thus for informal learning. Active communication online provided various opportunities to learn from others and various content sources but could become a burden without controlling practices that assisted to address the challenges digital technology might pose for working and learning. Through controlling practices, the workplace ensured they have shared tools and practices.

Discussion

As indicated in the introduction, earlier research has recognised that digital technology can support informal workplace learning. This study contributes by providing knowledge

of digital work practices that promote informal workplace learning. Instead of studying tools made particularly for informal learning at work (see, e.g. Treasure-Jones et al. 2019), this study investigated how informal learning takes place while using the general digital technology of work. By investigating mundane activities and the meanings behind them, we found several digital work practices that can facilitate informal learning. We presented our main findings through five descriptive categories of shared practices of a workplace: work-related communication, relational communication, sharing knowledge and experiences, following and listening, and controlling the use of digital technology. These practices illustrate how learning is embedded in everyday work. Digital technology served not only as a tool for these practices but also shaped them.

Communication via digital technology included work-related and relational communication practices that fostered informal learning by enabling discussion, support, and knowledge construction. Asking questions and getting information are proactive actions that are essential for learning, but ascertaining whom to ask requires confidence and social understanding (Eraut 2011). Digital technology not only allowed for flexible ways to communicate on work-related matters, but also provided knowledge about the workplace as a social environment and facilitated the expression of emotions. Because emotions can support or hinder learning at work (Hökkä, Vähäsantanen, and Paloniemi 2020), the digital forms of expression have special significance. While workplace relational communication via digital technology is a challenge, it is simultaneously a possibility (Jämsen, Sivunen, and Blomqvist 2022). Our findings provide more detailed knowledge about the practices of relational communication via digital technology.

Sharing knowledge and experiences allows others to learn from them and brings attention to things that might otherwise remain unnoticed. Thus, the reflection promotes informal learning also for the person sharing (Eraut 2004). The practices of following and listening enabled learning from constantly flowing information in these digital environments. Digital work practices produce an accumulating body of knowledge that digital technology enriches, documents, and makes visible, thus offering rich possibilities for learning. In addition, the work community studied had developed practices to jointly control the use of digital technology, which was important for creating shared digital work practices and addressing the challenges related to the use of digital technology. Due to the emergent nature of practices (Hager, Lee, and Reich 2012), discussion and reaching a consensus on digital work practices need to be a continuous process. Furthermore, the fast-changing nature of digital technology requires the constant development of these practices.

Along the same line as the knowledge appropriation model (Ley 2020; Ley et al. 2020), the digital work practices identified in this study involved sharing knowledge and experiences, co-creating new knowledge, and augmenting knowledge with additional knowledge or expertise from others. Through digital work practices, knowledge is documented in various ways, thus making it accessible to others and facilitating collective knowledge development. The digital work practices also had scaffolding functions (see Ley et al. 2020). For instance, a chat discussion thread provided peer support for work problems but faded away when the need for support decreased.

In workplaces where digital work practices are still new or little used for collaboration, digital environments have been perceived to be partially inadequate to meet the diverse needs of human interaction and thus to support informal learning (see Amenduni et al.

2022; Byström 2023; Karatuna, Jönsson, and Muhonen 2022). The findings of this research demonstrate that informal workplace learning also takes place in digital environments, provided that the work community has well-developed digital work practices. The digital technology used in the target workplace was advanced, as it supported collaboration and knowledge management. However, it was still primarily designed for working rather than learning. We argue that workplace practices and organisational culture, emphasising learning, played a crucial role in shaping these shared digital work practices that promote informal learning.

Limitations and further research

We acknowledge that informal workplace learning is a challenging phenomenon to study, as it often takes place unconsciously and is closely intertwined with work. In this research, we could only capture some potential instances of and opportunities for informal learning. We do not suggest that this is an exhaustive representation of the complex process of informal learning. Our research methodology and the methods we used, guided the focus of the study and the findings mainly to the shared practices of the workplace. Therefore, some of the individual practices and learning processes remained hidden from our study. However, with the ethnographic methodology, we were able to provide rich accounts of digital work practices of a workplace and exemplify how informal learning takes place in knowledge work today.

Regarding the applicability of the findings, it is worth considering the context-specific aspects of the research. The workplace investigated had a developed culture of using digital tools in its everyday work and learning, and thus settled digital work practices. It would be interesting to compare these practices to those of a workplace that has less experience with digital work. The affordances of digital technologies will inevitably affect digital work practices which could be studied in future works. In addition, it is worth emphasising that our study primarily focused on the opportunities digital technology offers for learning. While we briefly addressed the challenges we identified, it is imperative to conduct further research on problems that relate to the use of digital technology.

Conclusion

As digitalisation changes the workplace, it is particularly important that educational research examines the emergence of digital work practices (Harteis 2017). These practices require new competencies from employees, as well as leaders, to overcome the challenges that digital transformation poses for learning (Vallo Hult and Byström 2022). Accordingly, this study contributes to improving our understanding of informal workplace learning in knowledge work. By examining the practices of digital work, we can see how these practices emerge from the complex network of actions of people, shared understandings of the work community, the established organisational culture, and the material and virtual environment the digital technology provides.

Today, knowledge work is increasingly multi-location and mobile. When a significant portion of work is done remotely, it is important that learning from others is not solely

reliant on chance face-to-face encounters in the workplace. Our study illustrates that digital work practices can actually facilitate informal learning. In the future, it will be crucial to find novel ways to support informal learning, such as by creating practices of digital work that encourage work-related communication along with relational communication. While this is particularly essential in multi-located workplaces or remote work contexts in which people have limited opportunities to meet face-to-face, all workplaces should pay attention to these developments. With increased knowledge of digital work practices, all workplaces can create a more favourable environment for informal learning.

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