

Sustainability of Learning at Work: A Typology of Learners in an ICT Organisation

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Abstract

Purpose

This study examines how the sustainability of learning at work varies within the same organisational context. The objective is to enhance understanding of sustainable learning at work by identifying learner typologies that demonstrate the diverse manifestations of workplace learning sustainability.

Design

The study draws on semi-structured interviews ($n = 27$) conducted with employees and managers in a Finnish ICT organisation. The concept of workplace learning is approached from a sociocultural perspective, with sustainable learning understood as continuous competence development supported by adequate resources, social interaction and opportunities to anticipate future learning needs. The data were analysed using a two-stage process combining thematic analysis and typification.

Findings

The analysis identified three distinct learner types: enthusiastic learners, exhausted learners and uncertain learners. The learner types exhibited variation across three dimensions of sustainable learning: knowledge sharing and interaction, management support, and anticipation of learning needs. Enthusiastic learners experienced learning as meaningful and manageable, indicating that sustainable learning was largely achieved. Among exhausted learners, sustainability was challenged by excessive workload and learning demands. For uncertain learners, sustainability was challenged by insecurity, limited participation in knowledge-sharing practices and difficulties in directing their competence development.

Originality/value

The study contributes to the research on sustainable learning at work by demonstrating how the sustainability of workplace learning varies between individuals even within the same organisational context. The findings highlight the importance of learning support, the affordances present within the workplace, and the role of employee agency in the process of shaping sustainable learning within the professional environment.

Introduction

The contemporary workplace is characterised by rapid change and an abundance of information, placing significant demands on employees to maintain the skills required for their roles. The necessity for upskilling and reskilling of the workforce is expected to remain high (World Economic Forum, 2025), and all categories of workers are required to engage in continuous education and training throughout their careers (Billett, 2026). Employers recognise the significant potential of initiatives related to reskilling and upskilling, as well as supporting employee health and well-being, in attracting talent (World Economic

Forum, 2025). These developments have sparked discourse concerning the sustainability of learning at work for employees (Pfeffer, 2010) and the impact of continuous learning requirements on employee well-being.

Every job has specific learning requirements for its employees. The challenge for organisations is to identify and provide the optimal level of these learning demands. Learning requirements imposed by work have been shown to have a detrimental effect on motivation at work (Mauno et al., 2019) and can lead to indirect or direct resistance, such as resignation (Järvensivu & Koski, 2012). Increased learning requirements have been found to hinder employees' recovery, which is not sustainable in the long term (Järvensivu & Koski, 2012; Lemmetty & Collin, 2019). This may result in employees being unable to cope and experiencing negative effects on their overall well-being in the workplace. Conversely, a lack of sufficient learning challenges in the workplace has been shown to negatively impact employees' motivation at work (Mauno et al., 2019).

In this study, we analyse employees' diverse perceptions of their learning at work within a Finnish ICT (information and communication technology) organisation regarding their learning at work and then synthesise these perceptions from the perspective of sustainable learning. Sustainable learning can be defined as learning that supports learners' well-being, enables the versatile and transferable use of existing knowledge and skills, facilitates the rapid application of new knowledge, and prepares individuals to respond proactively to continuously changing future circumstances. (Hays & Reinders, 2020; Lemmetty & Collin, 2020, 2022). Recent studies on sustainable learning at work have emphasised the necessity for further research on, amongst other things, the sustainability of learning situations and processes from the perspectives of individuals and communities (Brandi et al., 2022). While prior research has identified numerous factors that either promote or hinder the sustainability of learning at work, comparatively little attention has been paid to how the sustainability of learning at work varies between individuals, or to the sociocultural conditions that underpin it. Consequently, this study addresses this gap by offering insight into the different types of learners among employees and managers in a technology organisation from the perspective of sustainable learning. The study constructs learner typologies to illustrate the differences in the sustainability of workplace learning between managers and employees. It shows that experiences of sustainable learning can differ considerably, even within the same organisational context.

The present study was conducted within the context of an ICT organisation. From a research perspective, the ICT sector is a particularly interesting area of study, given the pronounced demand for continuous learning that are evident within it. In the contemporary era, technological knowledge and skills are subject to rapid obsolescence. Consequently, employment in this field requires constant problem solving, a fast pace, and creativity (Gáthy-Stéber, 2022).

This article's structure is as follows. Firstly, the concept of learning at work is examined from a sociocultural perspective, and the notion of sustainable learning at work is conceptualised. The next section describes the methodological and analytical choices made in this study, namely thematic

analysis and typology. The findings present the three learner types that were constructed, which are then explored in relation to the dimensions of sustainability that were identified through thematic analysis.

Sociocultural perspective on learning at work

Learning at work is deeply connected to the employee's role and organisational environment because it occurs within the flow of work (Wijga et al., 2025). This study examines learning at work as a sociocultural phenomenon. This perspective is based on the idea that participation and interaction are essential for learning (Sommer, 2014; Wenger, 2019), and that learning frequently takes place within social relationships and cooperation during everyday work activities (Segers et al., 2022).

Sociocultural learning theory recognises that learning environments are affected by numerous social, cultural, and environmental factors (Sommer, 2014), which can be termed *affordances* (Billett, 2001). Examples include resources available for learning, formal and informal power relations in the workplace, organisational culture, induction training provided, and the type of expertise available in the work community (Billett, 2002; Eteläpelto et al., 2014). Furthermore, opportunities to engage in a variety of tasks and to receive guidance and support from more experienced colleagues are essential, as these factors have been shown to influence the learning quality (Billett, 2004; Eraut, 2007). Affordances have been shown to influence the manner in which individuals engage with their environment (Billett, 2004). This influence can be observed in whether an employee proactively seeks assistance from more skilled colleagues or takes a more passive approach of observing and emulating their actions from a distance. However, employees' commitment to learning at work is also affected by their agency (Billett, 2002) as is their interpretation of the opportunities offered by the workplace (Billett, 2004). The sociocultural approach emphasises the importance of environmental factors, organisational culture, material resources, and individual identity, skills, and values (Eteläpelto et al., 2013). Consequently, it facilitates the examination of learning at work from two perspectives: interactive relationships and individual employees.

When learning is conceptualised as a sociocultural phenomenon, it emerges as an activity that can be supported in multiple ways within workplaces. Leadership plays a pivotal role in facilitating knowledge sharing, and daily knowledge exchange between employees can be promoted through managerial coaching (Li et al., 2022). Furthermore, the physical and social proximity to managers, regular and timely feedback, and supportive leadership have been recognised as encouraging learning at work (Coetzer et al., 2022). In recent years, however, the traditional concept of physical and social proximity between managers and colleagues has come under scrutiny. The advent of the COVID pandemic resulted in a considerable increase in remote, hybrid, and multi-location working, practices which have since become widespread. However, the impact of these changes can vary considerably between individuals (Lehtonen et al., 2025). As Puhakka et al. (2025a) observed, organisations should provide autonomy and foster relationships between employees to enhance well-being at work.

Those engaged in knowledge-intensive occupations in particular anticipate that their employers will facilitate their professional advancement and learning. However, they also demonstrate a propensity for self-directed learning. Gáthy-Stéber (2022) conducted a study of knowledge workers in three organisations. The study identified the following as effective forms of learning supports: allocation of time for learning that is available on an unrestricted basis, appropriately challenging work tasks, and support from a mentor or coach. In all the organisations examined, the internet, professional blogs, and discussions with colleagues were identified as the predominant sources of learning. Furthermore, two of the organisations established a dedicated online community forum for disseminating information.

Sustainable learning at work

Sustainable learning has been linked to foresight, proactivity and updating, i.e. directing learning resources towards the acquisition of knowledge and skills that can be expected to be useful in the future and constantly changing circumstances (Hays & Reinders, 2020; Lemmetty & Collin, 2022). According to Lemmetty and Collin (2020), sustainable learning means learning that promotes learner's *well-being*, enables the *transferability and broad utilization* of existing knowledge, and ensures the *rapid application of newly acquired* knowledge. Karhapää and colleagues (2025), who studied the impact of digital technology on the sustainability of learning at work, define sustainability as mitigation of the negative effects digital technology may bring, such as information overload, multitasking and rapid changes. In the context of learning, sustainability therefore strongly links also to human resources and employee well-being.

Research still provides only a limited understanding of the relationship between workplace learning and employee well-being. However, increasing learning requirements have been found to be associated with higher job satisfaction (Mauno et al., 2022). Conversely, it has been observed that increasing responsibility for one's own learning can become burdensome, particularly when learning resources are insufficient and learning demands are high (Lemmetty & Collin, 2019). Because the high demands require sufficient resources to support achieving of them (Bakker & Demerouti, 2007), an optimal situation would be one in which the competency and learning requirements are reasonable and achievable with moderate effort within working hours without compromising recovery from work (Mauno et al., 2022).

New skill requirements are constantly emerging. If employees have a clear goal and purpose for their learning, they may strive to develop the skills they consider important regardless of the learning environment (Lehtonen et al., 2021). However, employees who perceive learning as a "necessary evil" seem to resort more often to superficial learning strategies (Vanthournout et al., 2014). In this case, the knowledge they acquire may not result in a structured overall picture, making it difficult to apply later. Additionally, it has been observed that employees who do not know exactly how to develop themselves may not be able to make the best use of the available resources (Collin et al., 2021).

Increasing learning demands are particularly prominent in knowledge-intensive work, such as in the ICT sector (see, e.g., Ivaldi et al., 2022). As mentioned previously, ICT organisation employees largely work in teams, sharing and transferring various types of information and expertise within and between them. However, an overly intense pace, as well as remote and hybrid working practices, may reduce interaction between employees, thereby weakening this learning resource. This is demonstrated by the isolated and struggling learner type identified in the study by Lehtonen et al. (2025). This learner type strongly associated learning with working together, which they perceived to be more challenging or even non-existent in multi-location work. They also perceived the threshold for asking for help was also perceived to be higher, and there were fewer opportunities for spontaneous knowledge exchange and sharing of tacit knowledge.

To promote sustainable learning, organisations should simultaneously support staff learning and well-being and enhance the transferability and usability of knowledge (Karhapää et al., 2025). Based on the above literature, and as stated by Hays and Reinders (2020), sustainable learning is ongoing, purposeful, responsive, and proactive. In other words, it is a conscious and intentional process of acquiring the knowledge and skills required in constantly changing circumstances. Previous research shows that the sustainability of learning at work is shaped by both individual and workplace factors, which can either promote or undermine the sustainability of learning (see Table 1).

Table 1
Factors that promote and undermine the sustainability of learning at work

Factors that promote the sustainability of learning	Factors that undermine the sustainability of learning
Rapid application of what has been learned (Brandi & Christensen, 2018)	Work pace too fast for knowledge sharing (Brun et al., 2018)
Anticipation of learning needs (Grauer et al., 2022)	Reactive learning (Lemmetty & Collin, 2020)
Maintenance of learning (Brandi & Christensen, 2018)	Superficial skills and learning strategies (Vanhournout et al., 2014)
Reasonable learning requirements (Mauno et al., 2022)	Learning requirements that seem unreasonable (Järvensivu & Koski, 2012)
Clear learning goals and objectives (Lehtonen et al., 2021)	Vague learning objectives (Collin et al., 2021)
Sufficient resources to achieve learning objectives (Bakker & Demerouti, 2007)	Inadequate learning resources (Lemmetty & Collin, 2019)

Sociocultural perspective is thus suitable for examining the phenomenon because sustainable learning is not only a matter of individual motivation but also whether the individual has opportunities to engage in activities that enhance the sustainability of their learning.

Research aim and question

Previous research has identified factors that promote or hinder the sustainability of learning at work. However, there is limited understanding of how this varies between individuals even within the same organisational context.

In this study, we examine these differences and identify the different types of learners from the perspective of sustainable learning by analysing descriptions of learning at work provided by employees and managers of an ICT organisation. Our aim is to deepen understanding of sustainable learning at work by analysing the interviewees' descriptions of the subject, and to illustrate these differences through learner types. This study not only identifies learner types but also shows how the sustainability of learning at work is shaped by individual relationships between workplace resources, learning support, and employee agency. Our research question is:

How do employees and managers describe the sustainability of their learning at work, and what learner types can be identified based on these descriptions?

Methodology

Participants and context

In the hectic and challenging ICT sector in particular, peer learning between is essential. Indeed, it can be considered crucial to the effectiveness of the entire organisation (Buonomo et al., 2022). Thus, the data was gathered from an ICT organisation operating in Finland, through semi-structured individual interviews (Brinkmann & Kvale, 2015) with 9 employees and 18 managers. Four of the interviewed employees were women and five were men. They worked as software developers, automation designers, and in customer service roles. Of the interviewed managers, 15 were men and four were women, working in roles such as sales manager, project manager, lead engineer, and human resources officer. The interviews, which lasted approximately one hour, took place in 2021 and 2022, thus coinciding with the COVID-19 pandemic and conducted remotely. Guided by key themes based on existing theoretical knowledge about sustainable learning at work, the interviews covered the following topics: own work; competence and competence development; problem solving and development; responsibilities and self-direction; well-being at work and motivation; leadership and community (Collin et al., 2023). The impact of the coronavirus pandemic was also discussed.

Data analysis

The interview data were analysed using thematic analysis (Braun & Clarke 2006, 2022) with the aim of identifying descriptions related to the sustainability of learning at work. Thematic analysis involves identifying, analysing and reporting on recurring, meaningful structures in the data and grouping them into descriptive themes (Braun & Clarke 2006, 2022). In the first stage, the data were reviewed and initial perceptions were recorded. In the second stage, the material was coded by compiling expressions

relevant to the research question. This coding was also guided by theoretical knowledge of the subject, such as the factors that promote and undermine the sustainability of learning at work. In the third stage, similarities and shared meanings were sought from the formed codes, which were then combined into broader potential themes. The result was eight themes. In the fourth and fifth stages, the themes were examined and combined, as some of them proved to be thin and overlapping in content. The suitability of the remaining themes for the entire dataset was examined to ensure that there were no internal contradictions. The final result was three themes representing the dimensions through which the sustainability of learning at work was examined: 1) knowledge sharing and interaction, 2) management support, and 3) anticipating learning needs. Knowledge sharing and interaction involve participating in social learning practices and accessing colleagues' expertise. Management support refers to the organisational resources, guidance, and encouragement available for learning and competence development. Anticipating learning needs concerns employees' ability to recognize future skills requirements and direct their learning accordingly. Together, these themes capture the social, organisational, and future-oriented dimensions of sustainable learning at work.

The thematic analysis was continued, drawing on the principles of ideal-type analysis (Stapley et al., 2022), in which the three aforementioned themes served as analytical dimensions. In other words, the learner types were constructed by examining how the interviewees differed in relation to the previously identified themes of knowledge sharing and interaction, management support, and anticipation of learning needs. The resulting learner types are best understood as empirically derived types that reflect patterns identified in the interview data, rather than purely theoretical idealisations. The analysis began by rereading the interview transcripts. Expressions related to the identified themes or which otherwise referring to learning at work were extracted, with similar expressions being grouped together. These groups were named and given a few descriptive keywords (for example, the group named "Uncertainty" had keywords such as 'helplessness' and 'being lost'). As the work progressed, the connections and differences between employees who describe the sustainability of their learning at work in different ways became clearer. Based on these groups, three learner were constructed from the perspective of sustainable learning at work. These types are: 1) enthusiastic learners, 2) exhausted learners, and 3) uncertain learners. These types differ in their attitudes towards the learning requirements set by their work, and in how they achieve the sustainability of learning at work. The stages of the data analysis process are outlined in Fig. 1.

Findings: Types of learners in sustainable learning at work

Based on interviews with employees and managers, three types of learners at work from the perspective of sustainable learning were identified: enthusiastic learners, exhausted learners and uncertain learners. Employees and managers were both included in the analysis and construction of the learner types, as they all face the challenge of continuous learning at work, regardless of their role or position. The learner types differ in terms of how they share knowledge and interact with their colleagues, how they utilise the support offered by management, and how proactive they are in developing their skills. These differences are also summarised in Table 2.

Table 2
The types of learners at work from the perspective of sustainability

Themes: Knowledge sharing and interaction, management support, anticipation of learning needs		
Enthusiastic learners	Exhausted learners	Uncertain learners
● Active knowledge sharing and interaction ● Effective use of management support and learning resources ● Proactive learning and anticipation of learning needs → sustainability of learning is largely achieved	● Limited knowledge sharing and interaction ● Limited use of management support and learning resources ● Reactive learning, difficulty of long-term skills development → sustainability of learning is challenged by work overload	● Hesitation in participating in knowledge sharing and interaction ● Difficulty of utilising management support and learning resources ● Unclear direction for learning and skills development → sustainability of learning is challenged by uncertainty

The following are the constructed descriptions of learner types. The descriptions are enriched with direct interview quotes.

Enthusiastic learners at work

“When talking about the field of information technology, where you learn something new every day and have to keep up with developments, it's a matter of learning every day, so the work has to be such that you're ready to learn every day and, like... Or, as an individual, to pave the way so that you can learn and your work doesn't prevent you from doing so.” (Employee 13)

“I see [continuous learning] as positive and normal, and perhaps that's what keeps me interested in the job.” (Manager 3)

For enthusiastic learners, learning is a natural and inspiring part of their work. They recognise the need for continuous learning and skills development, and are prepared to make time for it. For them, learning is both individual and communal. They actively share their knowledge and professional skills with their colleagues, and interaction is a constant part of their work. They also receive tips from their colleagues to support their professional development, such as information on potentially useful literature. Enthusiastic learners also receive support from their managers in the form of opportunities to participate in formal courses and time allocated for studying. Some of these learners have also turned their initial hobby into a profession. They keep up to date with changes in their professional field, proactively maintaining the relevance of their skills. They have clear career goals and actively pursue them. They communicate these aspirations to their superiors and utilise the available learning resources to enhance their expertise.

Several factors contribute positively to the sustainability of enthusiastic learners' learning at work. They can proactively identify the ever-changing competence requirements and view them as reasonable and as opportunities to develop their skills. They set clear learning goals, receive adequate support, and have professional networks that enable the smooth sharing of knowledge in the workplace. The pace of learning seems realistic to them, and they can maintain a balance between work and free time. Consequently, constant learning doesn't place too much strain on them.

Unlike exhausted and uncertain learners at work, enthusiastic learners consider the competence requirements set by their work to be reasonable and manageable. Unlike uncertain learners, they do not hesitate to ask for help and actively utilise the learning resources offered. They are also willing to share their expertise with others. They appear to be more proactive and systematic in their learning, setting themselves clear goals to advance their expertise. Unlike exhausted learners, they find that the learning requirements are balanced with their workload.

Exhausted learners at work

When I had that responsibility and problems arose, and when the problem-solving methods and perhaps the support network around me weren't so clear, it often felt like those problems were piling up on my shoulders and then it kind of felt like, now things are going badly and there are too many problems and I can't solve them. (Employee 15)

Exhausted learners feel drained by the learning demands of their work. This exhaustion is often linked to starting a new job or experiencing a significant change in work, when the routines and support networks facilitating work are lacking. The situation usually improves over time as interaction with managers and colleagues becomes more straightforward. However, some exhausted learners may feel inferior when unable to find a solution, which reduces their confidence to ask for help or participate in collaborative learning. This results in limited knowledge sharing and interaction at work.

In some cases, the demands of learning at work remain so challenging that exhausted learners are forced to work constantly at their limits. The seemingly constant and ever-increasing number of problems and workload may reduce their willingness and ability to proactively use the offered learning resources, even if management support is available. To them, anticipating learning needs may mainly appear as pressure to react to changes rather than as an opportunity for further professional development. This can also restrict their long-term skills development.

The sustainability of learning among exhausted learners at work is primarily weakened by the fact that the job's learning requirements at least temporarily exceed their capabilities. The work pace may seem very fast, causing them to rely on reactive and superficial learning strategies, with the main goal being to complete only the necessary work. While the available learning resources may be sufficient in theory, vague or non-existent learning objectives can hinder their use. Knowledge sharing and interaction with colleagues also remains unnatural for them, making it more difficult to utilise their colleagues' expertise.

Unlike enthusiastic learners, exhausted learners find the demands of continuous learning burdensome. Their learning objectives are vague, and they make limited use of learning resources, resulting in fragmented long-term skills development. Like uncertain learners, they share their knowledge with colleagues only occasionally, but this is mainly due to stress rather than insecurity. They work at a fast pace with a high workload, but, unlike uncertain learners, their exhaustion is often temporary and eases over time.

Uncertain learners at work

It's perhaps a challenge for me that I feel that the models I see in my everyday life are people learning to make some kind of fancy robot with artificial intelligence or something like that, and then I'm so oriented in a different direction that there is no one I could easily look up to as a model. (Employee 3)

You feel that everyone is a bit busy and then you try to bombard someone with messages on a channel and at first you don't get any response, so the threshold keeps rising and you have to ask for help again and again. (Manager 5)

Uncertain learners are characterised by feelings of exclusion and alienation. They may be reluctant to share knowledge and interact if they are ashamed of their own incompetence and find it difficult to ask for help. They may feel that they should already know the things they are uncertain about, suggesting that their training and induction may have been inadequate. This insecurity can also manifest as a belief that pursuing one's own interests is inappropriate, causing them to withdraw from opportunities for shared learning. Working remotely and therefore having to ask for help via digital channels can also make them less likely to ask for help. Although uncertain learners recognise gaps in their knowledge and understand that their work requires continuous skill development, they often do not know how to proceed or which learning resources to use. Although they receive support and encouragement from management, uncertainty and the quick pace of work cause them to proceed with learning cautiously and alone. However, once they recognise these gaps in their knowledge and their work situation allows it, they may use the available learning resources to gain additional confidence and clarify unclear issues they encounter at work.

Their characteristic uncertainty can challenge the sustainability of learning among uncertain learners at work. Limited knowledge sharing and interaction, as well as reluctance to ask for help, prevents them from benefiting from their colleagues' expertise. This causes them to seek solutions alone, even when it might not be the fastest or easiest way to find answers. Their vague learning objectives can lead to insufficient use of provided learning resources, while a seemingly high work pace or large workload may cause them to rely on reactive and superficial learning strategies. This can hinder the transferability and later application of what has been learnt.

Similar to enthusiastic learners, uncertain learners recognise gaps in their knowledge. However, unlike enthusiastic learners, they don't always know how to fill these gaps, nor do they set clear goals for their professional development. Like exhausted learners, they may resort to superficial or reactive learning

strategies, seeking solutions alone rather than utilising their colleagues' support. Like enthusiastic learners, uncertain learners receive support from their managers, but uncertainty can still prevent them from making effective use of learning resources.

Conclusion

This study examined sustainable learning at work by analysing descriptions of learning provided by employees and managers of an ICT organisation. The results show that the sustainability of learning at work is a multifaceted phenomenon involving both organisational practices and factors related to employees. The study identified three types of learners at work in the context of sustainable learning: 1) enthusiastic learners, 2) exhausted learners, and 3) uncertain learners. All of the learner types recognise the importance of developing skills and the need for continuous learning. Support and learning resources are available to all learners, but their ability, courage, or willingness to utilize these resources varies between learner types. The difference between them lies particularly in the extent to which sustainable learning is realised in their everyday work. While enthusiastic learners are proactive and find learning energising, exhausted and uncertain learners are more reactive and find learning stressful and even burdensome.

Knowledge sharing and interaction. The work of experts, such as those employed in an ICT organisation, is characterised by the utilisation of colleagues' know-how (see, e.g., Manuti et al., 2015). This approach supports the sustainability of learning at work. However, the learner types differ in their participation in knowledge sharing and interaction with colleagues, and therefore in their ability to utilise this learning resource. Enthusiastic learners interact frequently with their colleagues and are willing and able to share their skills with others. The managers, many of whom are enthusiastic learners, recognise the importance of sharing skills, knowledge, and good practices, and of providing opportunities for this. In contrast, the knowledge sharing and interaction activities of exhausted and uncertain learners are much more limited, which reduces the sustainability of their learning at work. Exhausted learners struggle because the demands of learning at least momentarily strain their mental resources and their ability to cope at work. In this situation, they may be unable or unwilling to participate in knowledge sharing and interaction. Their exhaustion may also stem from starting a new job or experiencing a significant change in their work. They may not immediately be able to fully utilise their colleagues' expertise to ask for help and advice. Uncertain learners' knowledge sharing and interaction with colleagues is limited by feelings of exclusion and alienation. They may feel ashamed of their own incompetence and be reluctant to ask for help. This insecurity can manifest as a belief that pursuing one's own interests is inappropriate, causing them to withdraw from shared learning opportunities. Working remotely and therefore having to ask for help via digital channels can also raise their mental threshold for asking for help.

Management support. The sustainability of enthusiastic learners at work is promoted by active encouragement from management to develop their skills and utilise learning resources. For these learners, learning is a natural and even energising part of their everyday work. Many of the interviewed managers are enthusiastic learners themselves and do describe in detail the ways in which they

facilitate and encourage their subordinates to learn at work. They also strive to make competence development feel meaningful and take responsibility for fostering a positive attitude towards learning. Management support is also available for exhausted and uncertain learners. However, exhausted learners may feel that their workload is so significant, or the demands set by the job tasks so severe that they are reluctant to proactively use management support to develop their skills. To these learners, developing new skills or furthering existing ones may seem like an additional burden on top of their already overwhelming workload. Therefore, they are reluctant to ask management for extra help with it. Hesitation in asking for management support among uncertain learners may be due to feeling excluded from their work community or inferior when unable to solve problems at work. This may be due to, for example, inadequate induction and training, which can negatively impact their professional self-esteem. This can cause them to believe that solutions such as setting aside work hours for learning are not possible for them. The learning requirements of work deplete the resources of exhausted learners. Starting a new job or taking on new responsibilities can challenge their skills and hinder their ability to learn at work. Those starting a new job cannot immediately fully utilise their colleagues' expertise by asking for help and advice, even though expert work is characterised by utilising colleagues' know-how (see, e.g., Manuti et al., 2015). For exhausted learners at work, learning sustainability practices emphasise anticipating competence needs, as sustainable learning focuses on the mastering knowledge and skills that are expected to be useful in the future and changing circumstances (Hays & Reinders, 2020; Lemmetty & Collin, 2022). Support from management in utilising learning resources and creating a good knowledge base is also important.

Anticipation of learning needs. As enthusiastic learners find the learning requirements of their job inspiring and motivating, they proactively develop their skills and effectively utilise the available support and resources. In their everyday lives, the level of competence required and the available learning resources seem to be balanced, promoting the sustainability of their learning at work. This situation, in which the competence and learning requirements are reasonable and can be achieved with moderate effort during working hours without compromising recovery, has also been identified as optimal in previous studies (Mauno et al., 2022). For exhausted learners, learning tends to be more reactive. Anticipating learning needs mainly appears as pressure to react to changes rather than as an opportunity for further professional development, making it difficult to develop skills in the long term. However, one aspect of sustainable learning is mastering knowledge and skills that are expected to be useful in the future and in changing circumstances (Hays & Reinders, 2020; Lemmetty & Collin, 2022). As this does not always happen for exhausted learners, the sustainability of their learning at work is compromised, at least temporarily. Uncertain learners' uncertainty is not necessarily due to a lack of learning resources or support, but rather from not knowing which skills would benefit them. Without clear direction, they may not be able to make the best possible use of the available learning resources. This phenomenon has also been observed in previous studies (see, e.g., Collin et al., 2021). In addition to having unclear goals, uncertain learners may lack the confidence and sense of agency required to utilise the support and resources available to them effectively. This makes the sustainability of their learning at work fragile.

In conclusion, this study's results show that sustainable learning at work is enabled when employees have meaningful social support from colleagues and management, access to learning resources, and clear direction for developing their skills. The results also demonstrate the importance of setting appropriate levels of skills development and competence requirements. Exhausted learners become exhausted when the competence requirements exceed their capabilities. At the same time, too little challenge could undermine the work morale of enthusiastic learners. The results suggest that, even when similar forms of support and learning opportunities are available, employees utilise those resources differently. Previous studies have also found that the same skills development practices do not necessarily suit everyone (see, e.g., Lehtonen et al., 2021, Collin et al., 2021), and that the diversity of workers' learning processes and goal orientations should be acknowledged (Puhakka et al., 2025b). The results also support previous findings that employee agency (Billett 2002, 2004; Eteläpelto et al., 2013), initiative and self-confidence (Bryson et al., 2006; Eraut, 2007) are important for earning at work. Employees who are proactive and enterprising, and who can carve out time and space for learning, are likely to find opportunities to develop their skills (Bryson et al., 2006). According to Eraut (2007), making the most of learning opportunities requires self-confidence and courage, both of which are closely related to how much support employees feel they receive from their colleagues. This is consistent with the results of this study, which suggest that effective information sharing and interaction practices are crucial for sustainability of learning at work. Furthermore, this study corroborates the conclusions of Hein *et al.* (2025) that, in addition to granting employees the freedom to learn, managers should provide feedback and encourage collegial engagement to foster self-directed learning in the workplace.

As a practical contribution, this study demonstrates the importance of ensuring that all employees can access and benefit from learning and competence development resources, regardless of their position or job description. The learner types identified in this study further illustrate how factors such as employee motivation, temperament, and previous experience influence the sustainability of learning at work. Promoting sustainable learning requires providing employees with opportunities to share their knowledge and expertise with others, while also benefiting from the knowledge and experience of their colleagues. Managers' support and encouragement in utilising learning resources and developing skills in various ways also appears to strengthen the sustainability of learning at work. Such support may include comprehensive induction and training, as well as practices that provide regular opportunities for employees to share, reflect on, and assess their knowledge, skills, and potential competence gaps. Sustainability also involves temporality and long-term thinking, meaning that the structures and practices supporting competence development should be maintained during periods of change and high workload, while being continuously adapted to remain relevant and effective.

This study has its limitations. At the time of the interviews, the employees and managers interviewed had switched to working entirely remotely due to the Coronavirus pandemic. While the employees kept in touch with each other via instant messaging and video calls, spontaneous social interaction and learning situations in everyday work were not possible. This may have impacted their learning, given that interaction plays a pivotal role in the professional development of ICT workers (see, e.g., Hirschmann & Mulder 2018). Additionally, most of the interviewees were managers, which may have resulted in a

greater focus on supporting and facilitating the learning and skills development of others. However, the learner types were constructed from both employee and manager interviews and are not limited to organisational roles. Furthermore, the results are limited in their generalisability due to the specific context of a single organisation. Nevertheless, the identified learner types may be transferable to other knowledge-intensive work settings characterised by continuous learning, rapid technological change, and a reliance on collaborative work and learning.

As the sustainability of learning at work is still a relatively new area of interest in working life research, there are few longitudinal and follow-up studies on the subject. Therefore, it could be fruitful to investigate the participants' current views on their learning at work. This could also help to establish whether the pandemic has had any long-lasting effects on their learning at work and its sustainability. Another interesting topic for further research would be whether a more guided approach, such as mentoring, can promote the sustainability of learning at work.

Declarations

Competing Interests

Kaija Collin is an Editorial Board member of *Vocations & Learning*

Author Contribution

The manuscript is based on M.T.'s master's thesis. M.T. wrote the main manuscript text and prepared the tables and figures. K.C. and S.L. contributed to the writing of introduction and theoretical framework sections. All authors commented on previous versions of the manuscript and read and approved the final manuscript.

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Data Availability

Raw data of this study is not publicly available to preserve individuals participants' privacy.

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Figures

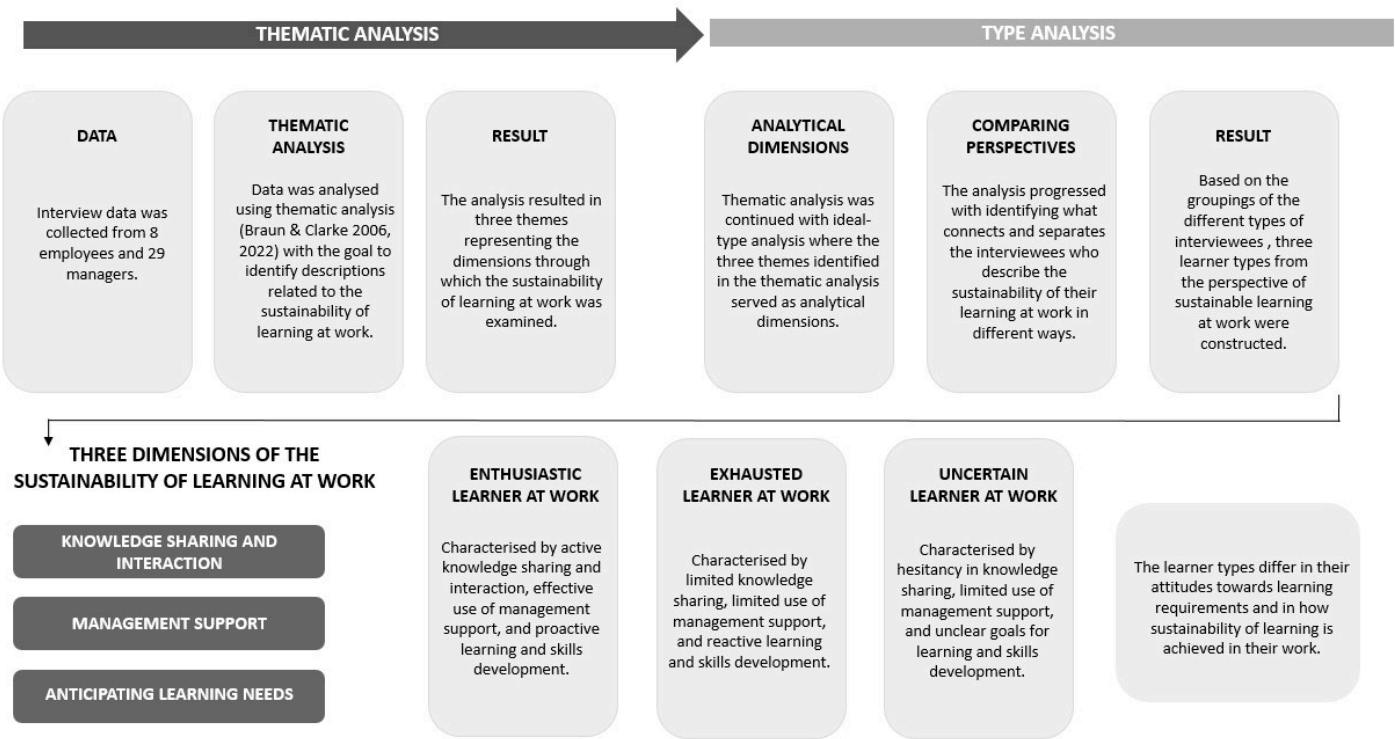


Figure 1

The stages of data analysis and the findings