

Informal Social Learning Activities at the Workplace:

**Interrelations of Learning Activities, Contexts, Triggers,
Outcome, and Domain Specifics**

vorgelegt von

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1. Introduction to informal learning at work

Past and present research seems to agree that learning at the workplace is necessary for employees and almost unavoidable for those who want to sustain their employability (Russ-Eft, Watkins, Marsick, Jacobs, & McLean, 2014; Van der Klink, Van der Heijden, Boon, & van Rooij, 2014).

Learning at the workplace has gained importance while its meaning and goals have changed. Economic, social and cultural changes such as globalisation and digitalization have altered the needs and demands of our society. Current world reality has brought forth new challenges and turbulences such as financial crises and climate change (Russ-Eft et al., 2014).

Informal learning happens through work and, at the same time, seems to be desired for work. Informal learning is not perceived as learning, in terms of effort or expense. Informal learning activities at the workplace occur when people have the need or the opportunity to learn; for instance, in the case of solving problems or finding solutions at critical moments (Marsick & Watkins, 2001; Manuti, Pastore, Scardigno, Giancaspro, & Morciano, 2015).

Much research has been conducted in the field of informal learning, workplace learning and social learning, such as team learning at the workplace. All studies have different foci, even when conducted in different domains. Conditions for informal learning as well as characteristics of employees, organisations and teams that could enhance informal learning at the workplace (e.g. Kyndt, Dochy, & Nijs, 2009; Noe, Tews, & Marand, 2013; Hetzner, Heid, & Gruber, 2015) are dominant topics in this research domain. Another important research focus lies in the conceptualisation and operationalisation of informal learning in various contexts (e.g. Van den Bossche, Gijssels, Segers, & Kirschner, 2006; Hu & Randel, 2014; Timmermans, Van Linge, Van Petegem, & Elseviers, 2010). Furthermore, more studies focus on the outcome of learning with different ways of operationalisation of the outcomes, such as innovation (e.g. Schippers, West, & Dawson, 2015), effectiveness of teams (e.g. Proehl, 2013; Van Woerkom & Croon, 2009), or shared understanding (e.g. Van der Haar; Segers, Jehn, & Van den Bossche, 2014).

Although these studies enhance our understanding of informal learning at the workplace, there is a current call that future research must focus on the interrelated nature of workplace learning (Russ-Eft et al., 2014). To conceptualise the interrelated nature of informal learning at the workplace, learning activities, the context in which they are embedded, outcomes of learning activities, the triggers for learning activities and different domains in which learning activities take place must be included.

Therefore, the aim of this thesis is to combine these different aspects in a framework of informal social learning activities and enhance understanding of learning activities, contexts, trigger, outcome and domain specifics. The research question of this thesis is:

Which informal social learning activities in different contexts at the workplace can be described and how are they interrelated to trigger, outcome and domain specifics?

In Chapter 2, the conceptualisation of informal social learning activities at the workplace will be described. A framework was built to visualise the interrelations of learning activities, contexts, trigger outcome and domain specifics. Studies that are included in this PhD thesis could be in this framework because they focus on specific learning activities due to their interrelation to the other aspects. The framework of informal social learning activities at the workplace can be seen as a frame and gives structure to the following paragraphs. Studies incorporate specific aspects of learning activities, contexts, trigger, outcome and domain specifics in different ways. Based on the framework of informal social learning activities, the theoretical foundation of the key concepts will be described.

In Chapter 3, the aim of this thesis will be explained and an overview of the studies included in the PhD thesis will be given.

In Chapters 4, 5, 6, 7 and 8, studies published in peer-reviewed journals are presented. We conducted studies on individual engagement in social learning activities after errors, social learning in teams and the development of work-task vignettes to answer the research question.

In Chapter 9, the results and implications of the presented studies are discussed. By incorporating the results of our studies in the introduced framework of informal social learning activities, an answer to the research question is given. The chapter closes with the implications for practice and for future research.

2. Conceptualisation of informal social learning at the workplace

The aim of this chapter is to conceptualise informal social learning activities at the workplace. First, the key concept of learning is defined and discussed from different perspectives. Second, a framework of informal social learning activities at the workplace is presented. Third, experiential learning theories and theoretical assumptions on social learning, as the theoretical foundation of informal social learning activities, are described.

2.1 Learning – process and activity

To conceptualise informal social learning at the workplace, the key concept of learning must be defined. Simons and Ruijters (2004, p. 210) describe learning as “implicit or explicit mental / or overt activities and processes leading to changes in knowledge, skills or attitudes or the ability to learn from individuals, groups or organisations. These can under certain conditions lead to changes in work processes, work outcomes of individuals, groups or organisations.” The definition indicates that both, activities and processes, are important in defining the concept of learning. The relationship between learning activities and processes is described by Kolb (1984) in the way that learning can be seen as a process in which knowledge is created by transforming experiences. The described process can be made visible in concrete activities (Kolb, 1984; Kolb & Kolb, 2008). With regard to informal learning at the workplace, learning activities are embedded in everyday practices (Fenwick, 2008). This involves mental or cognitive activities that are not observable but can be made observable as well as physical learning activities that are observable (Mulder & Ellinger, 2013).

Perspectives that regard learning as a product mainly focus on knowledge and skill acquisition. To grasp the complexity of learning, perspectives that focus on learning as a process understand learning as developing through the active engagement in processes (Hager, 2005). Based on these assumptions, informal social learning at the workplace can be regarded as a complex process of cognitive and physical learning activities that are embedded in everyday work practices.

To conceptualise informal social learning in the workplace, a framework of these learning activities was developed. In the following paragraph, the developed framework and its theoretical foundation will be described.

2.2. Framework of informal learning activities at the workplace

To describe the interrelated nature of informal learning activities at the workplace a framework was built to visualise the interrelations of learning activities, the context in which they are embedded, the outcomes of learning activities, the triggers for learning activities and the specifics of different domains in which learning activities are accomplished. Figure 1 shows a schematic representation of a framework of informal learning activities at the workplace. This framework provides the basis for the conceptualisation of informal social learning activities and their relation to the other dimensions. The studies included in this PhD thesis are in this framework because they focus on a specific learning activity and its relation to other specific dimensions of the framework. The dimensions of the framework will be explained in the following chapter.

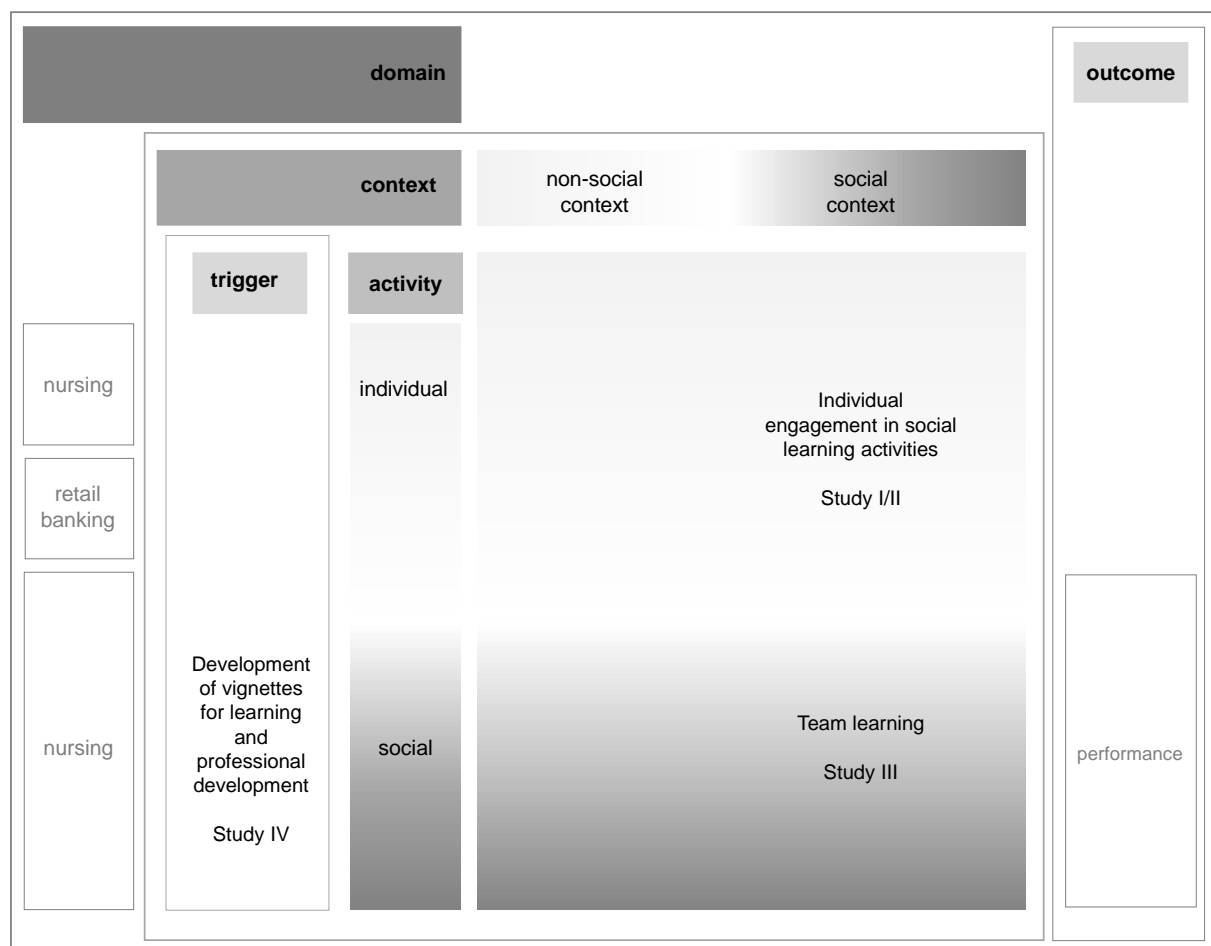


Figure 1 Framework of informal learning activities at the workplace

2.2.1. Learning activities and contexts

Watkins and Marsick (1992) define informal learning as learning from experience that can be planned or unplanned, and is not formally structured or intuitionally organised. Eraut (2004) describes a continuum of informal and formal learning, and defines informal learning as implicit, unintended and unstructured learning. Because these learning processes are unstructured and experiential, they are often influenced by the learners' intention and preferences (Marsick & Volpe, 1999). Informal learning activities can occur when people analyse problems from different perspectives, try to find alternatives and implement and evaluate future acting (Marsick & Watkins, 2001; Russ-Eft et al., 2014).

Based on the definition of informal learning, it can be assumed that informal learning activities in the workplace can be distinguished with regard to the *learning activity*. Informal learning activities can be individually performed or socially shared learning activities. The characteristics of individually or socially shared cannot be understood as a category so that the presence of one learning activity excludes the existence of other kinds of learning activities. It must be considered that learning activities are interrelated with each other, can happen in short intervals, and can be repeated and vary in their level of sharing or individual performance. This should be understood as a continuum on which learning activities could be located. The ideas, information and knowledge of an individual can be the starting point for learning activities. But individuals engage in social learning activities when they share their ideas and build mutually shared knowledge. Informal learning can occur in individual cognitive processes that are also influenced by social interaction with others (Russ-Eft et al., 2014; Kyndt, Dochy, & Nijs, 2009). Learning at the workplace can be understood as a dynamic process between individuals and social entities (Fenwick, 2008).

The workplace offers opportunities for learning, not in a structured way, in people's daily work situations. That means informal learning at the workplace occurs in daily work when people are challenged by the accomplishment of work tasks or face problems that need to be solved (Marsick & Volpe, 1999). Billett (2004) conceptualises workplaces as learning environments that are constructed by individuals and regulated by the cultural norms and practices in the workplace. Research indicates that the characteristics of the workplace, such as organisational climate, teamwork and social interaction, and possibilities for experimentation, can enhance or foster informal learning (Manuti et al., 2015). Therefore, informal learning activities can also be differentiated with regard to the *context* in which they are embedded. The context can be defined as the situational surroundings in the work environment that can include constraints such as stimuli for learning (Johns, 2006). The context in which learning activities are embedded offers individuals' different opportunities for learning and participation, such as possibilities for individuals to engage in interaction and social learning with others (Billett, 2004). The context in which learning activities can occur can be social or not. The contexts in which individuals learn by their own or solve problems without cooperation with others can be described as non-social learning contexts. Social contexts offer the possibility to learn through activities that require interaction and communication to reflect on experiences (Tynjälä, 2008).

The challenge in this PhD thesis with regard to the dimension of learning activities and contexts of our framework was to find out which informal social learning activities can be found at the workplace. Based on the described differentiation between learning activities as individual or socially shared activities and their integration in social or non-social contexts, we conducted studies on the individual engagement in social learning activities and social learning activities in teams.

2.2.2 Triggers, outcomes and domain specifics

All learning activities can be *triggered by internal or external stimuli*. Informal learning at the workplace is a conscious inductive process of reflection and action, integrated into work and daily routines and triggered by an internal or external cause (Marsick & Volpe, 1999). Informal learning at the workplace occurs at critical moments in practice. It happens when people have the need or the opportunity for learning; for instance, in the case of problem situations that require solutions (Marsick & Watkins, 2001; Manuti et al., 2015). Stimuli in the external environment can be found in the context, the domain or social interaction with other people. Internal trigger refers to changes in the individual's attitudes and approaches. Both kinds of trigger can lead to individual or social learning activities in social or non-social contexts.

With regard to triggers for learning activities, two aspects are important: first, we wanted to find out how triggers can influence informal learning activities. Therefore, we focused on errors as a trigger for learning. Errors can be external triggers for informal learning activities at work (Bauer & Mulder, 2007; Kolb, 1984). Errors mostly result in a deviation from intended outcomes. This can lead to intentional reflection about the error experience, which in turn can lead to further learning activities, such as questioning or reviewing past events (Watkins & Marsick, 1992). We conducted two studies on elder care nurses' and retail bankers' engagement in social learning activities after errors. Second, because of the numerous possibilities that can act as a trigger, such as characteristics of the job, errors, and interaction with other people, it is difficult to measure the impact of triggers on learning and for learning. Therefore, we wanted to find out how learning and professional development can be directly triggered. Learning and professional development is context-bound and can be triggered by authentic descriptions of real work situations. To get more insight into how learning can be triggered, we developed vignettes as short and descriptive stories of an incident of practice.

All learning activities can lead to a kind of *outcome*. Different performance indicators can be applied to measure the outcome of learning activities. With regard to work performance, indicators like effectiveness or efficiency seem to be important. Performance indicators can only be applied to context and domain. In learning settings, outcomes can also be seen as the added insights or a growth in knowledge. To find out if learning activities are interrelated to different kinds of outcomes, we conducted studies on social learning activities in teams and on the relationship to performance.

Characteristics of the work **domain** are also important to the conceptualisation of informal learning activities at the workplace. Work domains can be described by their general activities in their defined work setting. In a specific work domain, the work activities are accomplished with the goal of meeting defined needs or purposes (Rasmussen, Pejtersen, & Schmidt, 1990). That means that work tasks, work structures and work goals as well as the possibility for informal learning are influenced by the domain so that social or individual learning activities in social or non-social contexts can occur. To find out if results of our studies can be generalised to different domains, we conducted replication studies.

To sum up, the framework of informal social learning activities shows that the type of activity, the context, and the interrelation with triggers, outcomes and characteristics of the domain are important. The theoretical foundation of these dimensions will be described in the next section.

2.3. Theoretical foundation of the key concepts

In this chapter, the theoretical foundation of the dimensions described in the framework will be explained. Experiential learning theories and theoretical assumptions on social learning provide the foundation for learning activities in different contexts and domains. Furthermore, Piaget's (1977) concept of disturbances will be described to explain the role of triggers for informal learning activities following from a description of different kinds of outcomes of learning activities at the workplace.

2.3.1 Experiential learning and social learning

The theoretical foundation regarding informal social learning activities is based on theories of experimental learning and social learning (Billett, 2004; Boshuizen, Bromme, & Gruber, 2004; Kolb, 1984; Kolodner, 1983). Theoretical assumptions on experiential learning offer insights into how experience can be a source of learning and can influence cognition and behaviour. In particular, with regard to the experience of an error that can be a trigger for learning, experiential learning theories can give important insights into individual and social learning activities. Although experiential learning theories can provide an important explanation of individual and social learning activities, theoretical assumptions on social learning are necessary to get more insight into the specific dynamics of social learning activities. Cognitive theories and assumptions on collaborative learning are described to explain how learning at the interindividual level takes place.

Experiential learning

Experiential learning models learning as a self-organised process that aims to improve performance (Boshuizen et al., 2004; Glendon, Clarke & Mc Kenna, 2006; Gruber, 2001; Kolb, 1984). It can be regarded as a continuing process that is grounded in experience and offers an integrative perspective on learning, including experience, perception, cognition and behaviour (Kolb, 1984).

A cognitive perspective on experiential learning regards learning as a modification of scripts and routines (Bauer & Gruber, 2007). Based on the model of dynamic memory, it can be assumed that individual experiences can be generalised and integrated into existing knowledge structures (Kolodner, 1983). Generalisation and modification processes are important in handling new situations and in the flexible application of knowledge (Bauer & Gruber, 2007).

Derived from experiential learning theory, Kolb's learning cycle describes a model of different learning activities. Kolb (1984) defines learning as a process of knowledge creation based on the transformation of experience. The model includes dialectical processes by combining experience and abstract conceptualisation as well as reflective observation and active experimentation (Kolb, Boyatzis, & Mainemelis, 2011). The model consists of four steps: perception of a concrete conflicting experience, reflection and analysis, development of a new action strategy, and experimenting and evaluating the strategy (Kolb, 1984; Gruber, 1999).

Based on Kolb's learning cycle, Bauer and Mulder (2007) developed a framework of learning activities on the experience of an error. It involves reflection activities, the development of a new action strategy, and the implementation of a new strategy. Reflection is considered an important learning activity because it includes cause analysis, which can lead to the identification of the source of an error. This can be a necessary antecedent for further learning activities (Van Woerkom, 2004). Based on the identified probable causes, new action strategies can be developed. This involves considering strategies to change the causes, developing alternative action strategies for the future, allocation of information and resources, and the process of planning the implementation of the new strategy. The implementation and accomplishment of new action strategies also involve activities of experimenting with the new strategy and evaluating it (Bauer & Mulder, 2007, 2011). With the theoretical perspective of experiential learning, individual and social or group learning activities can be described as changes in individual scripts and routines (Bauer & Gruber, 2007).

Social learning

Individual cognition and behaviour are influenced by social interaction because attitudes, perspectives and behaviour of others can shape it (Edmondson, 2002). Social interaction with others can give employees the opportunity to include perspectives of others, and lead to the co-construction of knowledge and shared mental models (Bauer & Gruber, 2007). The theoretical framework for social learning can be built on cognitive theories as well as models of collaborative learning.

Cognitive perspective and social perspective are important to explain individual learning in groups and integration of knowledge at the interindividual level (Van den Bossche, Gijsselaers, Segers, & Kirschner, 2006). Cognitive theories focus on collective cognition and underline the importance of thought patterns and cognitive structures that influence behaviour (Gibson, 2001). With team learning, cognitive theories assume that cognition and team processes are interconnected. Team processes, such as information acquisition or storage, can be seen as cognitive intergroup processes because they also refer to the development of cognitive

processes (Gibson, 2001). From this perspective, teams and organisations are often seen as information processing systems. The interrelation of actions in social systems such as in organisations allows people to develop a collective mind. It can be described as patterns of attentive interrelations among actions in social systems (Weick & Roberts, 1993). Gibson (2001) emphasises that such collective cognition cannot exist in individuals as entities even if individuals of a team or group contribute to it. It can be developed and exist in the interrelated action between members of a group or team (Gibson, 2001).

Social perspective and models of collaborative learning were introduced in education and training with the goal of providing students with the possibility of learning from other students. This includes giving and receiving help, recognising differences in perspectives and knowledge, and the construction of new understandings (Ryu & Sandoval, 2015; Webb, Troper, & Fall, 1995). Most studies focus on enabling factors for successful collaborative learning, such as group composition. In social learning, collaboration is important because it also includes cooperation and aims to develop mutually shared knowledge (Blumenfeld, Marx, Soloway & Krajcik, 1996). Cooperation is a process that emerges in deliberation and decision making in task performing. A reflexive relationship, communication, the development of procedures for task accomplishment and the development of collaboration culture are seen as products and antecedents of collaboration and cooperation (Keyton & Stallworth, 2003).

Social learning activities that are performed within a group and within a social context can be described as team learning activities. Team learning can be defined as a process of permanent change in the collective level of knowledge and skills within teams produced by the shared experiences of the team members (Ellis et al., 2003). Based on the described theoretical background, team learning can be conceptualised as activities through which team members collectively share and reflect on knowledge. Sharing new information with other team members can be seen as a necessary antecedent of more elaborate team learning processes, which is related to team reflection (Van den Bossche, Gijsselaers, Segers, Woltjer, & Kirschner, 2011). Team reflection includes activities of questioning, planning as well as reviewing past events and, therefore, refers to the exploration of all work-related issues. Reflection can vary in depth involving issues closely related to the task, a more critical reflection and a deep reflection about norms and values of the team (Schippers, den Hartog, & Koopman, 2007).

2.3.2. Trigger for informal learning at the workplace

One characteristic of informal learning is that it can be triggered by an internal or external trigger (Marsick & Volpe, 1999). Following Piaget's (1977) concept of disturbances, discrepancies between actual and intended outcomes or results of a situation can be a trigger for learning. That means that learning processes can start with a trigger, which can be internal or external (Marsick & Volpe, 1999). Triggers can lead to activities such as searching for new information, revising one's initial beliefs, and experimenting with new ideas and behaviours (Watkins & Marsick, 1992). Triggers in the external environment can be, for instance, changes in the job task or the demands of a new technology. Internal triggers can be when people change

their focus or direction or want to prepare for future challenges, for instance, by rehearsing (Marsick & Watkins, 2001; Marsick & Volpe, 1999; Ellinger & Cseh, 2007).

Regarding work context, other people and the social interaction with other people can be a trigger for learning. Learning through work includes social practices and collaborative acts. In many work domains, employees have the need to participate and share knowledge to solve problems effectively (Billett & Choy, 2013). Social interaction with others also means integrating different perspectives, discussing various ideas and attitudes, and negotiation (Van den Bossche et al., 2006). These activities can be a trigger for learning, socially and individually. The integration of different perspectives and ideas can lead to reflection and trigger one's own attitudes and knowledge. Triggers can have the potential to foster learning, for instance, in the way of reflection. This can happen individually or it can be socially shared.

Errors as a trigger for informal learning at the workplace

Errors can be external triggers for informal learning activities at work (Bauer & Mulder, 2007; Kolb, 1984). On the one hand, errors can be regarded as a kind of disturbance. Errors mostly result in a deviation from intended outcomes. This can lead to intentional reflection about the error experience, which in turn can lead to further learning activities such as questioning or reviewing past events (Watkins & Marsick, 1992). On the other hand, based on Kolodner's (1983) model of dynamic memory, knowledge is presented as episodic events that include subjective perceptions of episodes as well as knowledge about the application of errors. Therefore, errors can be a trigger for learning because analysis of errors regarding a specific episode are stored and can be used in other situations to avoid errors (Gruber & Mohe, 2012).

Vignettes describing authentic work situations as a trigger for learning

Triggers can be found in the characteristics of the workplace, the work tasks, or the social interaction. But how can learning and professional development be directly triggered? What can act as a trigger in formal and informal learning situations independently of the person's individual characteristics, such as work-related expertise or work experience?

The perspective of informal learning in the workplace indicates that learning and professional development is context-bound. It happens when people have the need or opportunity for learning, such as in problem situations that require solutions (Manuti et al., 2015). In line with these arguments, it can be assumed that professional development can be triggered by authentic descriptions of real work life situations that lead to intentional reflection on experiences.

Vignettes are short, descriptive stories of incidents of practice presented to elicit rich but focused opinions and reactions to its content. Furthermore, they are used to encourage people to produce thoughtful explanations and find potential solutions for the described situations, including the application of knowledge and skills with regard to interpersonal and organisational circumstances (Finch, 1987; Jeffries & Maeder, 2004; Schoenberg & Ravdal, 2000).

To use vignettes as a trigger for learning processes, it is necessary that vignettes focus on authentic situations that must be reflected in realistic, complex and coherent structured descriptions. The authenticity of a learning environment means that it includes ordinary activities of practical work of a specific domain. Enabling learners to acquire knowledge and skills by situated use deepens their understanding continuously (Van Merriënboer & Kirschner, 2001; Brown, Collins, & Duguid, 1988). An important part of authentic learning environments is the realistic content. In addition, it can contain authentic tasks, coaching (teacher behaviour) and assessment (Mulder, 2004). Therefore, vignettes must be constructed in consideration of important aspects regarding their construction, style and content. Using the vignette technique is a way to get responses from individuals that also refers to interpersonal relations and structures of a specific organisation. Vignettes could be used in different learning settings, in combination with different learning methods and with different topics. They can be introduced to encourage individual learning as well as in group settings to encourage discussion and to develop solutions in social cooperation (Hughes & Huby, 2002).

Learning is an active process that is context bounded and depends on experiences in specific situations. In learning environments in which people learn by solving realistic problems in their work field, domain-specific cognition and skills as well as qualifications that enable people to adapt to different situations, and use knowledge and skills in different contexts can be acquired (Mulder, 2004). Focusing on concrete tasks can be a possibility for learners to integrate knowledge, skills and the attitudes that are needed for professional task performance in their work life (Van Merriënboer, Kirschner, & Kester, 2003).

2.3.3. Outcomes of informal learning at the workplace

Fast-changing work environments and new challenges for organisations lead to more complex and multidimensional requirements for work performance (Billett, 2006). Learning and knowledge acquisition can be seen as a necessary antecedent for achieving performance goals. But outcomes of learning can be diverse. Learning can lead to changes in knowledge, skills and attitudes that can influence work processes and outcomes (Simons & Ruijters, 2004). Because of this, the distinction between learning outcomes and performance, especially regarding informal learning, is difficult. Learning is also seen as a key concept for performance. The measurement of performance as a learning outcome often only includes short-time changes and knowledge acquisition while learning is aimed at continuing and sustainable efforts (Noe, Clarke & Klein, 2014). Furthermore, in different domains and business sectors, different performance indicators are relevant.

Van Woerkom and Croon (2009) distinguish between effectiveness, efficiency, quality and innovativeness as indicators for team performance. Effectiveness describes the attainment of goals and expectations. This refers also to the satisfaction of customers with the value of the product or the process the team provided. It means that the output of a team meets the directives and intended purpose (Wageman, Hackman, & Lehman, 2005; Hoegl & Gemuenden, 2001).

Team efficiency can be seen as a comparison of input and output. This also includes cost balancing and financing. Innovativeness refers to the introduction and implementation of new ideas and processes with the goal of improving team performance (Van Woerkom & Croon, 2009). Workplace innovation can include the generation of ideas, as well as their implementation, and both activities are aimed at improvement or enhancement (Anderson, De Dreu, & Nijstad, 2004). Quality refers to the goal of meeting the customer's requirements by the conformance to mutually agreed requirements (Lai et al., 2004).

3. Aim of this thesis and overview of the studies

Based on the general research question on informal social learning activities in different contexts and their interrelation to triggers, outcomes and domain specifics, the aim of this thesis will be described. An overview of the studies included in this paper will be given.

3.1. Aim

Based on the assumption that informal social learning in the workplace is characterised by its interrelated nature, a framework (Russ-Eft et al., 2014) is built that includes types of learning activities, contexts, triggers for learning, outcomes of learning and the domain specifics in which learning activities are conducted. The following aims are pursued:

Description of informal social learning activities in different contexts

The first aim of this thesis is to find out which informal social learning activities can be found at the workplace. Based on the described theoretical framework, learning activities in the workplace can be distinguished from their type of activity and the context in which they are embedded. Informal learning activities can be individual or socially shared, and can be embedded in social or non-social contexts. Therefore, the aim of this study was to find out if individual engagement in social learning activities, as well as social learning activities in a team, are relevant learning activities in different domains.

Interrelation of informal social learning activities with triggers, outcomes and domain specifics

The second aim of this thesis was to take a broader perspective and find out which aspects can trigger informal social learning activities, how they are related to outcomes and if they can be generalised to different domains. To get more insight into informal social learning activities, its interrelations to internal and external triggers must be considered. Characteristics of the domain, such as possibilities for social interaction, can be triggers for informal social learning activities in the workplace. Furthermore, it is necessary to think about domain specifics, such as work goals or work structures that can influence informal social learning activities in the workplace. Also, regarding the domain, different kinds of outcomes such as performance as effectiveness or efficiency are required. Different kinds of outcomes can also be triggers for further informal social learning activities that can be embedded in different contexts. Based on these assumptions, the second aim was to grasp the whole interrelated nature of informal social learning in the workplace.

3.2. Overview

The aim of this thesis is to increase insight into informal social learning activities in different contexts in the workplace and their interrelations with triggers, outcomes and domain specifics. With regard to different types of learning activities, different contexts, triggers, outcomes and different domains, four studies have been conducted.

Individual engagement in social learning activities after errors

In this replica study, we analysed conditions that can foster elder care nurses' engagement in social learning activities (ESLA). The goal of this study was to investigate whether exploratory findings from an earlier study on hospital nurses' ESLA (Bauer and Mulder 2011) can be replicated and generalised to the domain of elder care nursing. Therefore, we conducted a survey with vignette-based questionnaires ($N = 180$) in the domain of elder care nursing.

The research question: Can exploratory findings by Bauer and Mulder (2011) be replicated and generalised to the domain of elder care nursing?

Individual engagement in social learning activities after errors in the domain of retail banking

The goal of this study was to determine if the predictors for learning activities are the same for the domains of nursing and retail banking. We conducted a cross-sectional replication study in retail banking departments of a German Bank. In prestudy research, we conducted interviews with experts ($N=4$) of retail banking. The prestudy was necessary to develop vignettes describing authentic examples of error situations that were part of the questionnaire. A questionnaire was filled out by 178 employees.

The research questions: (1) Which individual and contextual conditions influence learning from errors in the domain of retail banking? (2) Are these influencing factors the same as in previous studies on learning from errors in the domains of nursing?

Team learning

In this study, we wanted to find out if elder care nurses engage in team learning activities of knowledge sharing and reflection within their teams, and if these team learning activities influence the performance of the elder care nursing team. The team performance was measured by the estimation of the team members, and by using performance assessments from an independent institution. Furthermore, we investigated the relationship between elder care nurses' estimation of the team climate as being safe and team learning activities. We conducted a questionnaire survey of 30 elder care nursing teams ($N = 30$, $n = 149$) working in 17 different retirement homes.

The research questions: (1) Do elder care nurses engage in knowledge sharing and reflection within their teams? (2) Do knowledge sharing and reflection influence an elder care nursing

team's performance? (3) Do elder care nurses' perceptions of their team climate influence their knowledge sharing and reflection?

Developing vignettes to foster learning and professional development

The goal of this interview study was to develop work task vignettes as a trigger for learning processes and the professional development of elder care nurses. Therefore, we analysed how vignettes must be designed to use them as a trigger for learning processes and professional development. Based on these requirements, we developed four vignettes describing the work tasks of geriatric nursing staff and validated them in an interview study with twelve experts ($N=12$) in the domain of geriatric nursing.

The research questions: (1) How do vignettes have to be designed to use them as a trigger for learning and professional development? (2) Can vignettes be developed in an interview study with experts in elder care nursing?

In the following chapter, the described studies are presented. They are all published in peer – reviewed journals or books. In chapters 4 and 5, studies on learning from errors are introduced. Chapter 6 is published as a book chapter and shows a comprehension of the studies on learning from errors in the domain of hospital nursing and elder care nursing. In chapter 7, a study on social learning in teams is presented. Chapter 8 shows a study on the development of vignettes for learning and professional development.

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4. Study I

Learning from errors at work: A replication study in elder care nursing

5. Study II

Individual and contextual factors influencing engagement in learning activities after errors at work:

A replication study in a German Retail Bank

This chapter is based on:

Leicher, V., & Mulder, R. H. (2016). Individual and contextual factors influencing engagement in learning activities after errors at work: A replication study in a German Retail Bank. *Journal of Workplace Learning*, 28(2), 66-80. doi: 10.1108/JWL-03-2015-0022

6. Book Chapter

On nurses' learning from errors at work

This chapter is based on:

Bauer, J., Leicher, V. & Mulder, R. H. (2016). On nurses' learning from errors at work. In S. Billett, D. Dymock & S. Choy (Eds.), *Supporting learning across working life: Models, processes and practices* (pp.129-147). Dordrecht: Springer

7. Study III

Team Learning, Team Performance, and Safe Team Climate in Elder Care Nursing

This chapter is based on:

Leicher, V., & Mulder, R. H. (2016). Team learning, team performance and safe team climate in elder care nursing. *Team Performance Management: An International Journal (TPM)*, 22(7/8), 399-414.

8. Study IV

Development of vignettes for learning and professional development

This chapter is based on:

Leicher, V., & Mulder, R. H. (2016). Team learning, team performance and safe team climate in elder care nursing. *Team Performance Management: An International Journal (TPM)*, 22(7/8), 399-414.

9. Discussion

The aim of this chapter is to integrate the results of our studies and the described theoretical framework. Four discrete studies were conducted to answer the research question. Based on the findings of these studies an answer to our general research question is given. Further, we will describe limitations as well as implications for practice and further research.

9.1. Key findings

The aim of this thesis was to increase insight into informal social learning activities at the workplace. Based on the specific research questions, the key findings of the different studies will be discussed.

Can findings on learning from errors be replicated and generalized to other domains?

Shavelson and Towne (2002) pointed out that replication is an important principle of empiric inquiries because it enables the researcher to verify the accuracy of studies. Replication, as the use of a set of variables across studies, enables a better understanding of the extent to which findings from one study could be generalized to another field or another situation.

Therefore, results of our studies on learning from errors in the domains of elder care nursing and retail banking matter with regard to two different aspects: first, results of the original study on learning from errors in the domain of hospital nursing from Bauer and Mulder (2011) could be replicated; and second, because results could be generalized in the domain of retail banking, normative questions arise. In comparing the nursing and retail banking domains with regard to learning from errors, results indicate that the same mechanism is at work. Results show that the estimation of an error as relevant for learning predicts employees' engagement in social learning activities. Moreover, the tendency to cover up errors has a negative effect on employees' engagement in social learning activities. Error strain fosters the estimation of an error situation as relevant for learning, and, by this, influences the engagement in social learning activities indirectly. Also, the perception of a safe team climate influences engagement in social learning activities indirectly by reducing the tendency to cover up errors. These results could be replicated in the domains of elder care nursing and retail banking. Although it could be assumed that it makes a difference if errors are harmful to the health of elderly people or result in financial loss, the results of our studies indicate that in both domains the same factors do influence employees' learning activities. Systems and, therefore, organizations have norms and standards that determine what characterizes an error or an incorrect action. These determinations depend on the specific domain (Bauer, 2008). However, the content and the consequences of an error are not the most important factors with regard to learning from errors. In fact, an error that is life-threatening in one domain is also as meaningful as an error that results in financial loss in another domain. The replication of these results in two different domains broadens our understanding of errors and learning from errors.

Do elder care nurses engage in team learning activities?

Results of our study on team learning indicate that team learning activities are important learning activities in the domain of elder care nursing. Elder care nurses engage in team learning activities, and, especially, knowledge sharing frequently occurs. With regard to reflection, the results of our study show that it is important to differentiate between different types of reflection. Reflection on more general topics can influence reflection on narrower topics, such as specific strategies to accomplish work goals. But only when knowledge is shared can it influence the team's performance. Furthermore, reflection can be performed individually and socially shared, and it can vary with regard to the depth of reflection and with regard to different topics. Our results indicate that it is important to analyse sequences of learning activities and, by doing this, emphasize the dynamic structure of the learning activities. Informal learning at the workplace often does not have a temporal or chronological order. Additionally, learning activities are not accomplished in a logical order, and the situation and opportunities the workplace offers directly affect employees' engagement in different learning activities. Research on workplace learning often neglects the dynamic structure of informal learning activities at the workplace. Salas, Cook and Rosen (2008) emphasized that it is necessary to study teams "in the wild" (p.544) because this enables the researcher to examine teams, their learning activities and the facilitating factors for team learning that are embedded in organizations and broader systems. In this way, all components of a team and team processes can be included.

How are team learning activities of elder care nursing teams related to their team's performance?

Team performance is a multidimensional construct and can be regarded as a multilevel process that arises when team members engage in individual and team learning activities while accomplishing their team-related task work (Kozlowski & Klein, 2000; Salas, Cooke, & Rosen, 2008). Results of our studies show that team performance can only be conceptualized by incorporating different perspectives and different performance indicators. Research shows that nursing teams can influence patient outcomes with regard to quality of care and patient safety (Van Boegert, Van Heusden, Timmermans, & Franck, 2013). But, nursing teams are also supposed to be effective and efficient as well as innovative (e.g., Timmermans, Van Linge, Van Petegem, Van Rompaey, & Denekens, 2012). While the effectiveness, efficiency and innovativeness of teams can be measured based on reliable indicators (e.g., Van Woerkom & Croon, 2009), the complexity of the construct of quality of care makes it difficult to find an appropriate measurement tool. There is no common theory-driven pattern that provides a basis to define, organize and operationalize nursing care performance by encompassing diverse dimensions and different perspectives (Dobius, D'Amour, Pomey, Girard, & Brault, 2013; Mukamel et al., 2006; Temkin-Greener, Gross, Kunitz, & Mukamel, 2004).

Results of our study show that there could be an appropriate way to combine different performance indicators and different perspectives on performance. For this, we measured team performance with regard to effectiveness, efficiency and innovativeness, and we included a performance assessment of team members and a performance assessment of health insurance medical services. Our results show that the team learning activity of knowledge sharing significantly predicts positive team efficiency, effectiveness and innovativeness. However, knowledge sharing is negatively related to the performance estimation by health insurance medical services. Our results also show that performance estimation by team members and performance estimation by health insurance medical services differ. Based on our results, it could be assumed that performance measurement in nursing depends on the objectives of the assessment. This influences the selection of the variables for the measurement of performance, such as measuring the effectiveness of the nursing team versus measuring the quality of care. Moreover, the particular perspective on team performance matters. The measurement of performance in elder care nursing depends on the perspective. This could be subjective, or more objective. Our results are in line with the current call to overcome the lack of objective healthcare outcomes and to find a measurement that reflects nurses' contribution to healthcare outcomes and quality of care (Przylog, Storka, Engel, & Linder, 2015).

How do vignettes have to be designed to use them as a trigger for learning and professional development?

Professional development plays a significant role in helping elder care nurses to cope with changes in their work field and to ensure high standards of quality (Collin, Paloniemi, & Mecklin, 2010; Lammintakanen & Kivinen, 2012). Informal learning at the workplace and authentic learning environments have great potential to enable elder care nurses to achieve competent task performance and handle the new demands in their work field (Herrington & Oliver, 2000; Mulder, 2004; Van Merriënboer, Kirschner, & Kester, 2003). By developing vignettes as an authentic description of realistic work tasks and situations, we attempted to find a way to foster learning and professional development for elder care nurses in vocational education and training.

We developed a criteria framework for vignettes that included the construction process, the content and the style. The criteria for the construction process are collaboration with professionals and evaluation of the vignettes by professionals. Criteria for the content of vignettes, for example, consist of the description of a realistic situation, relevance to participants or inclusion of characteristics regarding the professional activity. Inclusion of frequently used terms and adaption of the writing style to the type of respondent are criteria for the style of vignettes. We developed vignettes and validated them in an interview study with experts. Results of our study indicate that collaboration with experts in the work area is necessary because this enabled us to ensure that the vignettes approximated the reality of the work and to specify practical solutions for the described work tasks. The developed work task vignettes could be used in various learning settings and combined with different learning methods and

content. They are developed to be a trigger for independent learning processes for a specific learning goal.

9.2. Conclusion

Four different studies were conducted to answer the general research question of this thesis. The research question is:

Which informal social learning activities in different contexts at the workplace can be described, and how are they interrelated to triggers, outcomes and domain specifics?

Informal learning is defined as learning from experience that can be planned or unplanned and that is not formally structured or intuitionally organized (Marsick & Watkins, 1999). In order to conceptualize informal social learning activities at the workplace, a framework of learning activities, context, trigger for learning activities, outcome and domain specifics was developed.

Based on the assumption that learning activities can be individually or socially shared and can be embedded in a social or non-social context, we conducted studies on individual engagement in social learning activities after errors and social learning activities in teams. Results of our studies indicate that informal social learning at the workplace could be conceptualized as the individual engagement in social learning activities and as social learning activities in teams. With regard to the context, results show that informal learning after errors can be conceptualized as an individual learning activity embedded in a social context. Learning activities were operationalized as general and specific cause analysis and the development of new action strategies. The study on social learning activities in teams shows that social learning activities of reflection and knowledge sharing are important for elder care nursing teams in order to improve their performance. In this study, team learning activities are embedded in a social context. Based on these results, it could be assumed that both individual and social learning activities in social contexts could be informal social learning activities at the workplace.

Informal learning at the workplace is often triggered by an internal or external cause. A trigger can lead to individual or social learning activities in a social or non-social context. We conducted two different studies to gain more insight into how triggers influence informal learning activities at the workplace. Our results indicate that errors are triggers for informal learning at the workplace in the way of individual engagement in social learning activities. We also tried to develop vignettes as a trigger for learning activities. The developed vignettes describe authentic work tasks and are assumed to foster learning activities and professional development. The relation of informal social learning activities to outcome indicators was also part of our studies. We conceptualized work performance with different performance indicators and included subjective measures, as well as more objective assessment of performance. Our results show that team learning activities can have a significant positive relation to team

performance and, therefore, are effective in enhancing outcomes at the workplace. Yet, it can depend on the specific work domain as to which informal social learning activities are important. Therefore, replication studies were conducted to compare different domains. Our results indicate that with regard to learning from errors, the work domain does not matter.

To sum up and give an answer to our research question, results of our studies indicate that individual engagement in social learning activities and social learning activities in teams can be found in the workplace. Both learning activities are important in such different domains as retail banking and elder care nursing. Informal learning activities can be triggered like for instance from errors. Furthermore, informal learning activities can enhance performance.

We conducted studies on learning from errors, team learning and the development of work task vignettes. In the following section we summarize limitations, practical implications and directions for future research.

9.3. Limitations

To increase our insight into learning activities, individually performed or socially shared longitudinal studies are necessary. All studies that are part of this thesis have a cross-sectional design. Especially with regard to team learning and team performance, it would be important to account for team development in empirical studies. To gain a more in-depth understanding of these processes, different points of measurement are necessary.

Regarding our study on the development of work task vignettes, it would be necessary to implement the developed vignettes in vocational education and training settings and evaluate results. The study focuses on the development of vignettes. The implementation of the vignettes in formal learning settings and their evaluation is the next important step.

All studies reported in this thesis have relatively small sample sizes. Research on learning at the workplace is difficult with regard to comparable organizations and settings. This also means finding ways to analyse small sample sizes. In particular, with regard to team learning, there are different methods to account for the nested structure of the data. Multilevel models would enable a comprehensive insight by analysing the between and within group differences, but this would require large sample sizes. Therefore, it is important to ensure that analysing methods are appropriate to answer research questions. Analysing methods should only be chosen considering the specific research focus and goal.

9.4. Implications for Practice

Based on the introduced framework, practical implications concern the learning activities, context, ways learning can be triggered and the outcome of learning activities with regard to performance. The results of our studies indicate that, in order to trigger learning activities and foster learning, it could be helpful to foster organizational developments to establish possibilities for employees to learn. This is also necessary with regard to the context in which a learning culture has to be created and is also important in handling error situations. With regard to performance, we assume it is necessary to use different performance measures in order to include different perspectives on performance.

Possibilities for employees to engage in learning activities

Results of our studies show that social learning activities are important for employees to learn at their workplace. Informal learning at the workplace happens, for instance, when employees have to solve problems to accomplish their work tasks. Which type of learning activities employees chose depends on the individual's attitude and motivation, but also on organizational structures that offer employees the possibility to learn together. Learning through work is also determined by the support individuals receive in their engagement in work activities and by their access to direct or indirect guidance (Billett, 2001). For organizational development, it is necessary to implement institutionalized arrangements that provide opportunities for employees to learn. Variation in work tasks, participation in communities of practice or the possibility to contact experts in the organization or outside of it and receive and give feedback could be examples for arrangements that can be seen as learning opportunities (Eraut, 2004; Marsick & Watkins, 1999; Skule, 2004).

Learning climate in organizations

With regard to learning from errors, it could be assumed that it is necessary for organizations to implement a learning culture that offers employees the possibility to openly address errors and engage in learning activities. Results of our studies show that a safe team climate has a positive effect on the engagement of employees in learning activities, individually performed as well as socially shared. A safe team climate could be fostered by employees and by leaders of a team or organization. Leaders that show a management style that allows employees to report errors, analyse errors and find alternative strategies for future actions could enable employees to learn from errors (Edmondson, 2011). Additionally, leaders should encourage employees to report their own perception of insufficient performance or inadequate strategies so that errors do not happen at all. This also requires employees who have the courage to speak up and ask for feedback (Anseel, Beatty, Shen, Lievens, & Sackett, 2015). Therefore, the behaviour of leaders and employees could result in a safe and trustful organizational climate that enables leaders and employees to engage in social learning activities after errors are made.

Performance in nursing: different perspectives, different measures

Practical implications derived from our research on team learning and team performance refer to the adaption of the concept of performance in nursing. Measurement must include different dimensions and different perspectives. Especially in geriatric nursing, performance measurement must include elderly peoples' perspectives and their satisfaction with the provided care. Elderly patients who depend on the help and care of geriatric nurses have multiple needs and require a complex set of services (Mukamel et al., 2006). Geriatric nurses' work is characterized by a prevalent tension that lies in the implementation of caregiving activities that help elderly people, but do not restrict them in their autonomy and decisions. Elderly people live in retirement homes in order to receive the help necessary to live their lives as independently as possible. However, the success of this can only be determined by the individuals being cared for.

Because of the reorganization of healthcare and the nursing crisis, performance measurement with regard to effectiveness and efficiency becomes more and more important in the nursing domain. External evaluation of retirement homes and nursing care organizations was introduced with the goal to monitor quality of care and ensure patient safety. But, this also created a new tension for nurses and nursing care organizations. External evaluation of performance introduced different performance indicators, and results of external evaluation became a competitive advantage for nursing care organizations, especially in the public perception.

To give nurses the opportunity to fulfil these demanding requirements for the individual satisfaction of elderly people, on the one hand, and effectiveness and quality, on the other, external and internal assessments should be combined. Performance measurement must include the elderly people's perceptions of the received care, the retirement homes' effectiveness criteria and commercial thinking, and the quality of care and patient safety measured by external institutions.

9.5. Implications for Future Research

Implications for future research concern the measurement of learning activities, research on facilitating factors for learning and the need to consider cultural aspects. This chapter closes with implications for research on individual or socially shared learning activities.

Dynamic processes of team learning

Implications for future research concern the measurement of learning activities as dynamic processes that vary with regard to their chronological, temporal and hierarchical order. Research should focus on different learning activities and account for learning sequences. That means that informal learning at the workplace does not happen in a specific order. It includes repeating

activities, combining different actions or turning back to already completed activities. To account for this, sequence research on learning must find appropriate ways to measure the whole of learning processes instead of identifying only their individual steps.

Facilitating factors for team learning and development

Further research on team learning should also focus on the variety of influencing factors on the individual, team and organizational levels. Working and learning in teams can be influenced by different factors that depend on the domain. A domain-specific selection of facilitating factors would increase our understanding of team learning. Additionally, further research on reflection in teams should include a more differentiated perspective on this learning activity. Less is known about the content of reflection and if reflection about one's own competencies is more successful with regard to performance than reflection about strategies or work tasks. Also, the combination of different types of reflection and the combination of reflection with other learning activities should be focused on in further studies. Furthermore, research should also examine team mental models as the shared understanding of team members with regard to their work tasks and work strategies. Based on cognitive theories on team learning, it could be assumed that such shared cognitive structures are interrelated with team learning processes.

Learning from errors: cultural differences, different error types and team learning from errors

Results of our studies on learning from errors indicate that there is no difference between influencing factors on the engagement in social learning activities after errors in different domains. Further research should focus on cultural differences in coping with error situations. Furthermore, our studies focus on knowledge and rule-based errors. Including different types of errors and concrete error examples reported by the employees could enhance our understanding of learning from errors. Additionally, it could be useful to get more insight into how teams handle error situations when the error is caused by an individual team member. This also relates to the team's mental model on errors and error situations and can clarify what norms and values determine an error in a specific domain.

Individually and/or socially shared?

Based on the assumption that informal learning activities can be individually performed or socially shared, it can be assumed that these categories of learning activities are extremes in a continuum of informal learning activities at the workplace. This depends, for instance, on the context, the domain and the possibilities provided for employees as to which kind of learning activities they engage in. Furthermore, to grasp the whole reality of learning at the workplace, it must be taken into account that learning activities are interrelated with each other, can happen

in short intervals and can be repeated. Therefore, future research should develop a more holistic approach to informal learning at the workplace and a broader concept of learning activities that does not separate learning with regard to the type of accomplishment. Including different conceptions of learning, individual learning, social learning and their combination would deepen our understanding of informal learning activities at work. Furthermore, it is necessary to take a broader perspective on informal learning at the workplace and make sure that types of activities, contexts, triggers, outcomes and domain specifics are taken into account.

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