The Role of Reflection in Maturing Organizational Know-how

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Abstract. The Knowledge Maturing Phase Model has been presented as a model aligning knowledge management and organizational learning. The core argument underlying the present paper is that maturing organizational know-how requires individual and collaborative reflection at work. We present an explorative interview study that analyzes reflection at the workplace in four organizations in different European countries. Our qualitative findings suggest that reflection is not equally self-evident in different settings. A deeper analysis of the findings leads to the hypothesis that different levels of maturity of processes come along with different expectations towards the workers with regard to compliance and flexibility, and to different ways of how learning at work takes place. Furthermore, reflection in situations where the processes are in early maturing phases seems to lead to consolidation of best practice, while reflection in situations where processes are highly standardized may lead to a modification of these standard processes. Therefore, in order to support the maturing of organizational know-how by providing reflection support, one should take into account the degree of standardisation of the processes in the target group.

1 Introduction

Organizational learning has been investigated in various disciplines (e.g., [1]), and from various angles (for overviews see [2], [3]). Researchers from the field of cognitive psychology have provided conceptualizations of the complex interplay between individual and collaborative knowledge creation and learning, putting different concepts in the centre of attention such as the conversion between tacit and explicit knowledge [4], the mutual dependencies between individual and shared mental models [5], and the co-evolution of individual and organizational knowledge mediated through shared artefacts [6]. A more recent theory of organizational learning and knowledge evolution that strongly focuses on socio-technical interactions is the Knowledge Maturing Model suggested by Schmidt [7] and further developed in the course of the MATURE Project (e.g. [8]). Knowledge Maturing is defined as goal-oriented learning on a collective level, emphasizing that it is always purposeful.

When we consider that an organization's knowledge stock is 'mirrored' in its work practice, and organizational practice is one of the main knowledge repositories of an organization, organizational learning might then be understood as any *change in organizational work practice* (including change of existing work practices or the development of new work practices respectively). While the Knowledge Maturing Model also relates to the evolution of conceptual or factual knowledge, we will focus on knowledge maturing related to change of 'know-how' (i.e. procedural knowledge) [9]. This process shall be called *task-centred organizational knowledge maturing*.

Creation of new knowledge is often triggered by changes in an organization's environment that puts new demands. However, it is stressed in the literature that organizational learning is more than just the adaptation to environmental changes but includes *deliberate reflection* on daily work practice and transformation of organizational routines (e.g., [3]). In line with Hoyrup [10] and Järvinen & Poikela [11], we argue that reflection is one of the major mechanisms that lead to maturing of organizational know-how. While the Knowledge Maturing Model implicitly covers aspects of reflection, it does not provide a comprehensive theoretical rationale on how reflection and knowledge maturing are interrelated. The aim of this paper is to examine the relationship of reflection at work and its role for task-centred organizational knowledge maturing. Moreover, we will examine reflection in settings with different levels of maturity of organizational know-how based on data from an interview study in four European organizations. This will be the first step to integrate work from two large-scale EU projects in the TEL community, namely MATURE and MIRROR.

In the following, we outline the Knowledge Maturing Model developed within the context of MATURE, before explaining the specific role of reflection for organizational learning. We then present the major findings from our interview study that examined the interrelationship of reflection and knowledge maturing. Finally, we present our integrative model linking knowledge maturing and reflection.

2   The Knowledge Maturing Model of Organisational Learning

The development of the Knowledge Maturing Model of organizational learning started several years ago by the joint interpretation of empirical evidence gained in several applied research projects; the first version of the model [7] was refined in [8] by incorporating results from a large empirical study (described in [12]) as well as further experience gained in projects on implementing tools for knowledge management and organizational learning. The model was then subjected to a series of three empirical studies, an ethnographically-informed study, a representative empirical study, and an in-depth study conducted within the MATURE project. A comprehensive description of the Knowledge Maturing Model can be found in [13].
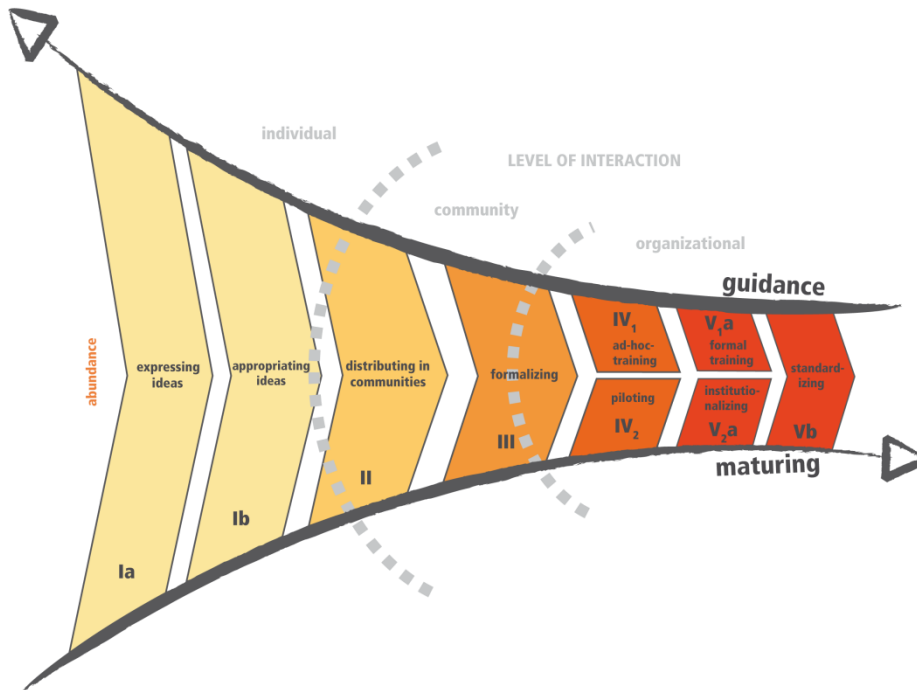

Fig. 1: Knowledge Maturing Model v.3, [14]

The Knowledge Maturing Model outlines the following phases (see Fig.1):

Ia. Expressing ideas (investigation): New ideas are developed by individuals either in informal discussions or by 'browsing' the knowledge available within the organization and beyond. Extensive search and retrieval activities result in loads of materials facilitating idea generation. Knowledge at this stage is subjective, deeply embedded in the originator's context, and the vocabulary used for communication might be vague and restricted to the originator.

Ib. Appropriating ideas (individuation): New ideas that have been enriched, refined, or otherwise contextualized with respect to their use are now duly

appropriated by the individual. Contributions are 'bookmarked' so that an individual can benefit from its future (re-)use.

II. Distributing in communities (community interaction): This phase is driven by social motives such as belonging to a preferred social group or the expectation of reciprocal knowledge exchange within the community. A common terminology for individual contributions is developed and shared among community members.

III. Formalising (information): Artefacts created in the preceding phases are often unstructured and still embedded in the community context. They are only comprehensible for people in this community as shared knowledge is still needed for interpretation. In Phase III, structured documents are created in which knowledge is de-subjectified, and context is explicated with the purpose to ease the transfer to collectives other than the originating community.

From Phase IV on, there are two alternative paths of knowledge maturing:

IV$_1$. Ad-hoc training (instruction): Activities related to creating training materials out of documents that are typically not suited as learning material as they lack didactical considerations. Topics are refined to ease teaching, consumption, or re-use. Learning objects are arranged to cover a broader subject area. Tests help assess the knowledge level and select learning objects or paths. Knowledge can be used for formal training in Phase *V (V$_1$a. Formal training (instruction))*. The subject area becomes teachable to novices. A curriculum integrates learning content into a sequence using sophisticated didactical concepts to guide learners in their learning process. Learning modules and courses can be combined into programs used to prepare for taking over a new role, for example.

IV$_2$. Piloting (implementation): Experiences are deliberately collected with a test case stressing pragmatic action trying a solution before a larger roll-out of a product or service to an external target community, or new rules, procedures, or processes to an internal target community such as project teams or other organizational units. Know-how can be institutionalized at the beginning of Phase *V*.

V$_2$a. Institutionalising (introduction): In the organization-internal case, formalized documents that have been learned by knowledge workers are solidified and implemented into the organizational infrastructure in the form of business rules, processes or standard operating procedures. In the organization-external case, products or services are launched on the market.

Vb. Standardising (incorporation): This latest phase covers standardization or certification. Certificates confirm that participants of formal trainings achieved a certain degree of proficiency or justify compliance with a set of rules that organizations have agreed to fulfil. Standards also help connecting products or services or showing that they fulfil laws or recommendations before being offered on a certain market.

To summarize, so far we have explained (1) the Knowledge Maturing Model that describes how knowledge is becoming more 'mature', i.e. more justified, understandable, committed, legitimated, teachable, or even standardized. Furthermore, in our view, (2) knowledge maturing was introduced as a type of organizational learning, and (3) task-centred knowledge maturing is considered to be a process leading to more justified, understood, committed, legitimated, or even standardized organizational processes. In the following, we argue that reflection on work practice is an effective mechanism for maturing organizational know-how.

3   Reflection Processes in Task-centred Knowledge Maturing

Reflection on one's own work practice is crucial for learning at work as it leads to a better understanding of own work practice and can guide future behaviour [11], [15]. Thus, reflecting on past experiences is an effective mechanism for individual and collaborative learning [16], [17] and knowledge maturing in the early phases of the Knowledge Maturing Model.

Theoretical work in the field of reflection can be traced back to Dewey's 'reflective thinking' [16], defined as "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends [that] includes a conscious and voluntary effort to establish belief upon a firm basis of evidence and rationality." (p. 118). We further base our work on Boud et al. ([18], p.19) who extend Dewey's conceptualization adding the notion of *learning* through reflection: "Reflection in the context of learning is a generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to new understandings and appreciations."

We argue that reflection does not occur automatically during the course of daily work but is triggered by either an external event or critical incidents or by an internal cue such as a negative affective state, feelings of uncertainty etc. We surveyed empirical studies examining the initiation of reflection and found that in general, all known triggers for reflection (such as disturbances, errors, negative feedback, unexpected success etc.) have in common that they elicit a state of *discrepancy*. The awareness of discrepancy leads to instability or dissonance in the cognitive system [19]. It is experienced as psychological discomfort that leads to a general arousal of the individual cognitive and affective system. This can be considered to be a fundamentally motivational state as people aim at minimizing the dissonance to alleviate psychological discomfort [20] [21]. Reflection is one means to do so by critical analysis of the experience.

The outcome of reflection can be individual learning, team learning, and/or organizational learning. In this paper, we focus on the significance of reflection for organizational learning, i.e. for changing the explicit (i.e. standard procedures, working routines) or implicit (i.e. best practices, organizational culture) knowledge base of an organization. Thus, in the following, we present findings from an interview study that we conducted with the goal to understand individual and collaborative reflection and how reflection leads to organizational learning. The findings will be discussed before the background of the Knowledge Maturing Model in Section 5.

4   Knowledge Maturing through Reflection: An Interview Study

4.1   Method

The interview study took place in the context of the MIRROR Project (see Acknowledgement). During our first visits at four application partner sites, we had the opportunity to talk to several staff members of each organization. In order to best possibly seize this opportunity during the site visits, we decided to carry out group

interviews to learn when and how staff reflects about their daily work and what impact this reflection has on their work practice. Therefore, the interview was focused on specific examples and personal experiences. In addition, the purpose of the group interviews was to acquire a deeper understanding of current work practices and current practices of learning within the organization.

The group discussions were guided by questions tackling the following topics:
- Daily work practice, job demands, role of standards and routines ("Could you please describe a typical work day?", "When is your boss satisfied with your work?")
- Learning at work (including formal and informal learning) ("Do you have opportunities for further education at your workplace?", "How do you acquire new knowledge at work?")
- Triggers, content, and outcome of reflection on daily work practice ("Could you give an example for a situation you reflected on?"; "What was the outcome of your reflection - what was your lesson learned?")
- Organizational learning through reflection ("After a project has been finished, do you discuss what went well and what should be improved?")

During the group interviews, one interviewer asked open questions, another person observed and took notes. The interviewer encouraged the participants to discuss their points of view in order to find similarities and differences between individuals. The group interview took 90 minutes approximately. The participants agreed to audio recording of the group discussion.

4.2   Sample

Four interviews were carried out in four organizations which are partners in the MIRROR Project. Prior to the site visits, we asked the management to provide contact to 2-5 staff members, interdisciplinary participants whenever possible, and with varying degree of professional expertise. Three of the interviews were actual group interviews with two, three, and four participants respectively; one of them was an individual interview due to unexpected time constraints of other participants.

Neurological Clinic.
The neurological clinic is a large, modern hospital in Germany with approximately 400 full-bodied employees dealing with approximately 1000 strokes a year (app. 2000 emergencies all together, including other severe neurological emergencies than stroke). The staff work in interdisciplinary teams of doctors, care staff, and therapists (physio therapists, ergo therapists, logo therapists etc.). Work is organized in shifts, and there are regular well-structured handovers.

The clinic is DIN EN ISO certified, i.e. quality assurance is taken as of paramount importance: Practically every task is documented in detail in the Quality Management (QM) Handbook, and practically every task of daily work is standardized. Regular QM Circles are implemented to continuously evaluate and improve work processes.

We interviewed four employees, all belonging to the stroke unit. The sample included one assistant doctor (currently in her specialist training, three years of professional experience), two therapists with five and ten years of experience, and one head nurse with about twenty years of experience, thereof six years in management.

Nursing Home.

The nursing home where the interview was taking place is a privately run and managed care home in Great Britain with approximately 43 staff and 70 residents.

Most of the care staff, except for recently qualified nurses, are not educated to degree level and only have National Vocational Qualifications. This means, staff without formal training/qualifications is asked to tackle complex situations. Care staff have a number of tasks that they need to do each day (e.g. waking, bathing, feeding, etc.) and are often more concerned with getting the task done than accommodating individual residents' moods and behaviour. Work is organized in day and night-shifts with handovers; protocols document every treatment and activity.

We had the opportunity to talk to three female carers having more than ten years of professional experience. They all hold a professional exam in caring. Two of them are also concerned with administrative issues.

Telecommunication Company.

Work at the global telecommunication company (head quarter in Great Britain) is entirely different: Most employees work from home as teleworkers. They communicate via Emails, phone conferences, or Instant Messenger. The choice of media is depending on the content ('simple' or 'complex' topics) and the number of participants (two or many). Teams are dispersed all over the country, and they are managed virtually. Work is highly standardized on the project level, i.e. there is a standard business process for contract management. There is a huge range of formal training opportunities, many of them available in the company's e-learning system. Performance management is implemented to ensure the quality of work.

Due to time constraints, we could talk to one of the contract managers only. She had 5 years of experience in her current position and a higher education background. She works full-time, mostly from home. Her job duties include managing an interdisciplinary 'contract management team' of three and more people.

Software Consultancy.

At the German software consultancy, a medium-sized Full Service Customer Relationship Management Provider, people work in small teams of two to three people. Altogether, the company holds about 60 employees, most of them based in the head quarter. However, they have a lot of customer meetings at the customers' site which require internal preparation and post-processing. Daily work is heavily focused on customers' needs and requirements which requires some flexibility. However, there are several standard business consulting processes. Regular job appraisal interviews allow for continuous evaluation of job performance based on predefined criteria (business-related criteria mainly).

We interviewed two employees, a sales consultant and a software consultant, both with about two years of professional experience as consultant.

4.3   Results

Individual and Collaborative Reflection.
   The original purpose of the study was to find out whether and how reflection takes place in the different organizations, what typically is the content of reflection, and how reflection contributes to organizational learning.
   We found three different types of situations which typically trigger reflection:

1. Critical Incidents: Spontaneous reflection may be triggered by a critical incident, such as a contract being lost, or a patient showing unintended reactions to a certain treatment. At the nursing home, for example, reflection typically happens "if care is not delivered how it should be, e.g. [...] in a hurry". This kind of reflection is also often shared within a team of nurses whenever a single staff member could not find a solution to a challenging situation: "We had a female checking the windows every day around four, five o'clock in the evening [...]; it turned out that she was a head mistress in a big school and one of her jobs, once everyone had left school was to lock all the windows; So once we found this out, went with her; she was quite happy then". While of course also positive incidents (e.g., unexpected success) are conceivable as triggers, the need for reflection typically was bigger in case of negative incidents.

2. Performance and Team Evaluation: Reflection was also triggered by performance or team evaluation sessions where finished (project post mortem) or running projects (project monitoring) are being discussed. For instance, during the interview at the telecommunication company the participant said that "if we lose a contract, it may be the case that we have internally a big workshop trying to analyze why we lost the business". Similarly, supervision sessions with a coach or mentor are settings that most likely provoke reflection on own performance. Typical triggers for reflection include regular performance appraisal interviews with a line manager, where "personal development goals are defined together with the supervisor", and "after one year, it is tested whether the goals were achieved". In general, the participants reported that they perceive it as "helpful and interesting to have the opinion of the supervisor" on their work performance. These situations have in common that they are regular occasions that typically include evaluation of recent task performance.

3. Regular Team Meetings: Regular team meetings provide a further opportunity for reflection but rather 'on demand'. Such meetings happen frequently at the neurological clinic, for instance: Three times a week they have x-ray meetings; the chief physician shows MRT/CT images, the neurologist presents patients' history, the radiologist shows x-rays; unclear medical evidence is discussed, the process of diagnosis is reflected upon, and alternative ways of diagnosis are being elaborated together. Similarly, at the software consultancy, "in the weekly team meeting, the supervisors are informed about things which work well, or not so well with customers", and the team discusses how to proceed in the future. There are also "best practice meetings" to discuss different approaches to handle projects in order to develop a shared best practice - "but it depends on the team how this is handled". These team meetings are the occasion to "share success stories within the organization".

Furthermore, we found that reflective thinking often occurs 'spontaneously', e.g., after interaction with a client. One person from the software consultancy reported: "If two of us have been at a customer, we are discussing on our way back what went well, how we did things, how the other saw things; The other one serves as a mirror". At the neurological clinic, recreation time with colleagues is also a typical occasion to share experiences and to reflect on work practice: "We talk with our colleagues about our work during lunchtime". There, the participants reported that "even at private meetings, we do 'doctors blathering'".

Strong triggers for reflection are evoked in situations where comparisons take place on an individual or collaborative level ("The monthly company meeting is a very formal meeting to exchange news and to compare with others", software consultancy), or on an organizational level ("There are comparisons with other hospitals; e.g., if they have a low holding time, we also should reduce our holding time; these comparisons trigger further improvement of our own processes", neurological clinic).

Comparing our interviews, we realized that in these organizations, there are strong differences in how readily the answers were given by the participants during the interview: While with participants from the software consultancy and the telecommunication company, we had no difficulties to explain what we mean by 'reflection', and the participants readily gave answers that fit our concept of reflection, participants at the neurological clinic seemed to be irritated by the term 'reflection', and stated that they would not reflect a lot due to lack of time and as they were "happy not to think about their work too much because there are not many success stories". When participants from the nursing home spoke of reflection, they mostly meant thinking about 'challenging behaviour' of residents; reflection about their own work practice was not reported to happen regularly.

Factors Related to Reflection and Reflective Learning within Organizations.

The observation that reflection on own work practice was not a concept that was readily tangible for all participants, and that reflection was nothing to take place in each organization to the same extent led us to a further analysis of factors that may influence whether reflection takes place within a company. We could identify a couple of characteristics that are candidates for explaining the variance with regard to organizational knowledge maturing through reflection.

Flexibility vs. Standardization of Work Processes.

Analyzing the differences between the four organizations we realized that one aspect in which the organizations in our study differed strongly was the degree of standardization of the work tasks: On one end of the continuum, we have highly standardized work tasks where every step needs to adhere to quality assurance regulations or other standards, and must be documented comprehensively. This is the case at the neurological clinic where "everything is very structured", and "there are many standard forms that have to be filled". This is similar at the nursing home, however, the care staff seems to have more flexibility in their procedures: "From 8 o' clock in the morning, it's basically helping people sit up for breakfast; if they do not want to get up, they do not have to. […] Then, we bring them down to the hall where we have activities going on; everyone is encouraged to join in". Obviously, there are

standard procedures but the care staff can adapt to a resident's needs in order to deliver good care.

On the other end of the continuum, workers have quite a lot of flexibility in doing their work. This is the case, for example, at the software consultancy, where "a typical work day is an untypical work day". Clearly, there is some structure (procedures, meetings, content management systems), but the employees have a lot of freedom in deciding how to do their jobs. Projects are very much driven by the needs of their customers and thus, each project is somewhat unique. At the telecommunication company, there are standard business processes pre-defined ("everything is very much standardized"), however, the daily work requires a lot of flexibility ("If I ever had a typical work day"), and days differ much depending on meetings and customer interaction. The staff can basically decide how and when to carry out their work. The interviewee at the telecommunication company stated further that she should "not even need to think about what the team is doing, because it should just happen in the background; it's a standard process".

According to the degree to which daily work is standardized the requirements for high work performance differ, too. During the interviews, we examined what kind of behaviour is expected and rewarded within the company and what would constitute a 'good day' or a 'bad day'. The answers illustrate the different job demands very nicely: According to the interviewees at the neurological clinic, a good day is "when the day plan is working, when I have the feeling that I had time for the patients". Asked for performance criteria, the interviewees stated "if we stick to structure and process; [...] if we adhere to instructions". Similarly, at the nursing home, employees are expected to follow the quality standards of care. One of the interviewees with management responsibility explained: "If we have new policies, I print them out, and I will ask every staff member to sign a form to say that they have read it, and I put that policy into their file with that form." These answers indicate that at the neurological clinic and the nursing home, the expectation is to show full compliance to regulations in order to ensure efficiency and high quality.

However, at the nursing home, residents may show 'challenging behaviour', due to dementia. Then, the care staff is expected to find out the reason for this behaviour and to identify a way to deal with the situation, reacting appropriately to the patients' needs thereby still adhering to quality regulations.

At the telecommunication company, the staff is expected to carry out pre-defined business processes. Any disturbances have to be avoided (as they cost time, and "any additional time needed reduces the margin of a contract"). The interviewee stated that her team had a really good day "if the processes worked without any intervention from them". Nonetheless, the regulations are at a much lower granularity than e.g. in the neurological clinic (i.e. business process steps are defined, daily task execution is not regulated), and the staff is expected to solve issues once they occur.

Of the organizations participating in the interview, the software consultancy is the company where most creativity and creative problem solving is expected from the employees: "Our customers are changing; thus, we have to move into new topics; our consulting techniques improve and develop further; we refine what we have, and we include new topics".

These observations led us to the hypothesis that jobs with a high degree of standardization mainly require compliance (adhering to standards) whereas jobs with low degree of standardization require creative problem solving.

Formal Training vs. Informal Learning

Further analysing the situation in the different organisations, we realized that they also differed with regard to how learning takes place. In the interviews, we found four ways of how learning and knowledge transfer take place in these organizations:

- Courses/eLearning (e.g., MS Excel eLearning course)
- On-the-job training (e.g., 'shadowing' more experienced peers, mentoring)
- Learning through Communication (e.g., project monitoring meetings)
- Learning by doing (e.g., creative problem solving, dealing with mistakes and disturbances)

Courses are useful if standard procedures exist that need to be known by many persons. Such courses have been mentioned by the neurological clinic ("We have a lot of courses; we can also suggest courses; for example we wanted to have a seminar on 'clusters of symptoms' – this was then arranged for us"), by interviewees at the nursing home ("We have many courses, e.g., on dementia, palliative care, end of life, medication course etc."), and also by the telecommunication company ("You go to the training pages on the intranet, see what training is available, see if it is of interest to you and then you have to apply to go on it").

On the job training needs to take place where physical activities are dominant: At the nursing home, typically novices accompany more experienced colleagues for one day and observe what they are doing ('shadowing'). Then, on the next day, the novices try to do it on their own.

Another way of learning is through communication, e.g. in meetings: In the neurological clinic, they "have a lot of informative meetings. If there are exceptional events, [they] discuss them. Sometimes also studies are presented". At the nursing home, information is shared during the ward meeting or handover. At the software consultancy, "everyone could talk about everything in the company meeting".

Learning by doing was named as a way of learning at the software consultancy. According to the interviewees, acquiring new knowledge and learning sometimes happens through customer relations. Reflection plays a crucial role here.

Obviously, the more standardized the work processes, and the more compliance is expected from the workforce, the more formalized is the professional further education that is offered to the staff. On one side of the informal-formal learning continuum are courses that teach standard procedures. Here, reflection is not crucial as a means to learn. Instead, the staff should be able to carry out the standardized procedure without deviation. On the other side of the continuum, when learning by doing, reflection about one's own experience is essential to transfer learning from one concrete experience to other similar situations.

5   Discussion: Linking Reflection and Knowledge Maturing

The observation that reflection seems not to occur self-evidently in different organizations raised an important question: Are there factors that determine whether or not reflective learning is likely to be experienced by persons within an organizational context? We took a closer look at the interview data and identified a number of factors according to which the organizations differed and that are strongly related: The degree of standardization of work tasks (flexibility vs. standardization), and related job demands for the staff (compliance vs. creativity), and established learning practice within an organization. These findings shall now be mapped to the ideas of the Knowledge Maturing Model. It shall be emphasized at this point that while our interview study has triggered some interesting thoughts about the role of reflection in different maturing stages, due to methodological constraints (small sample size, the way how samples were created and composed, heterogeneity of participants, etc.), the study is only a first step into the direction of combining theories of reflection and knowledge maturing.

By definition, maturing organizational know-how – if taken to the last phase of knowledge maturing – by definition results in shared 'best practice' or even standardized processes. Standardization typically has the goal to ensure high efficiency and high quality. We argue that performing 'mature' processes requires highly specific knowledge. Vice versa, performing (non-trivial) unstandardized tasks requires creativity and problem solving capacities, and thus more general skills and knowledge. As in standardized processes, the associated knowledge is more 'mature', i.e., typically more justified, understood, committed, legitimated, and teachable, formal trainings can be provided to train their workforce which then can rely on this knowledge in performing their tasks in a compliant way.

As we stated in Section 3, in general, reflection is triggered by the perception of *discrepancy*. We argue that in case of performing work tasks, the discrepancy is a deviation of the employee's actual performance from the expected performance. As we have found, the expectation may range from creatively solving a task to carrying out a task exactly as foreseen by the process standard. In the case of high standardization, discrepancy may occur if the standard process could not be carried out as expected, or if the outcome did not occur even though the process had been carried out as prescribed. One of the outcomes of reflection may be in this case that the employee has to learn an exception of how to carry out a task in a specific situation; organizational learning may take place as an outcome of the reflection, too, if the process standardization is modified or extended based on an individual's reflection process. In non-standardized tasks where creative problem solving is expected, discrepancy may occur if they do not meet performance criteria. In this case, reflection either may lead to individual learning, or – in case of organizational knowledge maturing through reflection – towards sharing experiences and joint development of best practice.

To put these considerations in a nutshell, in case of low maturity (i.e. high variability of practices), reflection can be one means to consolidate shared best practice and to develop standard processes, whereas in case of high maturity (i.e. high standardization), reflection leads to modification of institutionalized practices and innovation with regard to processes and routines. Fig. 2 integrates these assumptions.
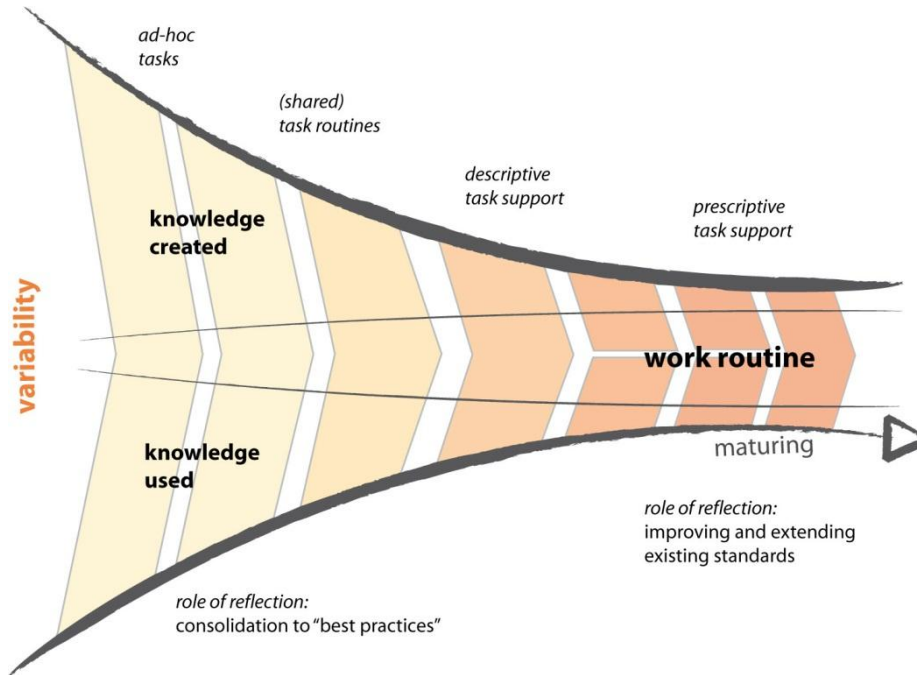
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Fig. 2: Reflection in maturing organizational know-how

The figure shows a simplified version of the Knowledge Maturing Model focusing on maturing know-how, combined with the characteristics of task support typically available from [22]. These range from no support (ad-hoc tasks) via informally shared practices and more formal descriptive task support to prescriptive standards. Carrying out *fully* standardized processes (right side of the spectrum in Fig. 2) with pre-defined outcome may lead to creating new knowledge only if the process cannot be carried out as described for some reason, if the expected outcome does not occur, or the standardized process does not cover the situation encountered. Then, reflection may lead to a modification of the standard process on a fine-grained level: In other words, there is a strong stable core ('sedimented knowledge', [23]), and new knowledge is created around this core, which may result in a further detailed standard procedure. On the other end of the spectrum, broad and divergent knowledge is needed for carrying out *un-standardized* tasks. Here, learning typically 'just happens' in a self-directed manner through actively searching for information, experimentation, or learning-by-doing. Thus, carrying out un-standardized tasks might lead to the creation of new know-how, and even to new standard processes. Reflection in this case leads to maturing on a more coarse grained level as not so much 'sedimented knowledge' exists.

6   Discussion

We have started the analysis of our data with the question of what may be the reasons for differences between organizations with regard to the prevalence of reflection. Our findings revealed that these companies differ strongly with regard to the degree of 'maturity' of their know-how. This difference, as explained above, may have an impact on the kind of discrepancy that is experienced – 'complying with a standard does not lead to the expected result' vs. 'own expectations are not met by carrying out a task'. This alone, however, does not mean that more or less reflection occurs in these different contexts, but it implies that reflection has different characteristics.

One explanation why the participants in the neurological clinic and the nursing home stated that reflection does not play a major role in their work may be that in the more standardized settings, (reflective) feedback loops are built into the standards to ensure continuous improvement. For example, there is a clear process to whom a deviation from the standard should be reported, or how feedback on standard procedures can be given. That way, reflection becomes part of standardized work practice and may not be perceived as 'separate' activity.

Also, the health care staff's answers may have been biased by 'social desirability': Persons in jobs that require creative problem solving may find it natural to reflect about their work; persons that are expected to follow standard procedures, when asked about reflection, may be irritated because good performance in their case would mean 'do as the process prescribes'. Clearly, our study has the limitation that we only have subjective answers but no measure of how often reflection actually took place.

The question if the differences that we found are purely due to varying degrees of 'process maturity' or if the different institutions or branches (health vs. technology) also have an impact on whether reflection is perceived to take place remains open to future work. An alternative explanation may even be that health care staff in general tends to experience less reflection than technical staff. In our view, however, how reflection is perceived is not determined by the organization (or branch) but rather by the level of maturity of their processes. This implies for example that in the same company different professions may have different perceptions of reflection.

7   Conclusion and Outlook

Reflection is a means to improve 'maturity' of organizational processes as it contributes to the development of shared know-how, organizational best practice, and standardization of work processes. Thus, supporting reflection implies supporting organizational knowledge maturing.

However, findings from our exploratory interview study led to the hypothesis that the role of reflection changes throughout the different maturing phases: In early phases, reflection seems to lead to the implementation and consolidation of shared work practice; in later phases, reflection may trigger revision and refinement of described, prescribed, or even standardized processes. Moreover, different causes of discrepancy seem to trigger reflection in the different phases, ranging from not meeting own (or a supervisor's) expectations to deviating from a standard process. As

a consequence, reflection support in early maturing phases should raise awareness of own work practice and stimulate re-evaluation of own experiences. Sharing of individual reflection outcomes should be supported to enable the development of shared work practice. Reflection support in later maturing phases should make deviations from standardized processes and outcomes more visible. Feedback loops to refine established standards should be implemented to enable continuous improvement of standard processes. Clearly, future work needs to be directed towards testing these propositions and analyzing which maturing phase requires which kind of reflection support.

Furthermore, other factors as the ones explained above may have an impact on the prevalence of reflection. Kelloway & Barling [24] suggest that three different factors determine whether workers engage in 'knowledge work': *motivation*, *ability,* and *opportunity*. We argue that these factors can also explain whether reflection (as a specific type of knowledge work) takes place. 'Opportunity' could mean the opportunity to experience discrepancy. Fully standardized processes may only offer the opportunity to reflect on these processes if they do not lead to the desired outcome, while situations where persons are invited to experiment may provide plenty of opportunities for reflection. Time pressure may reduce the opportunity to reflect and thus constitutes a barrier to reflection at work. 'Ability' means that persons need to have the mental capabilities to abstract from their actual experience and draw conclusions for future behaviour–this ability cannot be taken for granted for every person. 'Motivation' means the motivation of a worker to reflect. Clearly, the motivation to reflect may be low if the worker does not see the benefit of reflection or if staff does not have the possibility to improve their work practice on their own. Moreover, there may be interindividual differences with regard to the need to reflect. These factors will also be considered in future studies.

8   References

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