Self-Reflection as a Tool to Uncover Tacit Knowledge in a Learning Organization

Victoria Hasenstab1[0000-0001-5098-7200] and Manuel Pietzonka2[0000-0002-1107-6655]

[1] Frankfurt, Germany – vjhasenstab@gmail.com
[2] FOM Hochschule Hannover, Germany – manuel.pietzonka@fom.de

Abstract. By working in different projects and different teams over years, employees acquire tacit knowledge unconsciously. It is represented through experiences and is intangible. This knowledge is embodied in our routines. Therefore, it is difficult to verbalize tacit knowledge. This paper introduces a practical approach for companies to use their tacit knowledge in order to become a learning organization. The results of a semi-standardized face-to-face-interview survey with participants (n=10) show to what extent a self-reflection can contribute to uncover and share tacit knowledge in an IT-organization. The answers of the participants were recorded, utilized, coded and analyzed qualitatively. The results show that the intervention can encourage the process of uncovering tacit knowledge. It is possible for the employees to see the past project problems from different perspectives via self-reflection. Thereby they are able to uncover the tacit dimension of their experience and gain new insights.

Keywords: Tacit knowledge, organizational learning, self-reflection, knowledge transfer.

1 Tacit knowledge in learning organizations

With a view to the volatile markets of today caused by globalization and digitalization there is a need for organizations to adapt to these changes of their environment. Often it is difficult to implement organizational learning in companies because of silo-structures and silo-thinking [1]. There are different ways to let the personnel adapt their work settings to changing organizational goals.

One way is forgetting intentionally about the acquired retrieval cues [2]. Another way could be to find the retrieval cues of the employees, give conscious access to the routines and let them reflect on which part of their routine still supports the new organizational goals and which one does not. This process uncovers their tacit knowledge and reveals the unconscious cues that lead them to their decisions at work [3]. This paper focuses on developing a method to manage this process in order to help organizations become learning organizations.

As tacit knowledge is acquired through learning from problems, failures and difficult situations, sharing tacit knowledge would be helpful to adapt to changing organizational goals [4]. Projects are a suitable way to realize organizational learning. Employees can learn from their failures and can avoid letting them happen again. So, mistakes don’t have to be made twice [5]. One of the most important success factors in sharing experiences between projects is the dependence of a working error culture [6]. So, the corporate culture plays an important role in this case. Organizations often have problems with handling their personnel's tacit knowledge because of silo structures. Companies working with projects often do not look back at their problems and reflect what they could have done better [7]. Or they only reflect the past failed projects on an explicit level, not on a tacit level. Sharing those experiences between projects would avoid making mistakes twice and therefore would save resources.

1.1 Self-reflection as a tool to uncover tacit knowledge

The most commonly used definition of knowledge types in the scientific literature is the one of Polanyi (1966) and distinguishes between tacit knowledge (person-bound) and explicit knowledge (not person-bound). Person-bound knowledge is intangible, not taught formally, not even verbalized and therefore not fully transferable [8, 9]. It determines behavior and the constitution of mental states as well as the way people face and solve problems [10]. By working over years in different projects and different teams employees acquire tacit knowledge unconsciously [11]. It is represented through experiences, intuition, personal settings, ideals, perspectives, ideology and emotions [12]. These are the reasons why Polanyi introduced the term of tacit knowledge with the statement that people know more, than they can tell [13]. Because tacit knowledge is intangible researchers kept focusing on explicit knowledge in the past [14]. For that reason, today there are many approaches of exploring and saving explicit knowledge in a digital way. Both types of knowledge arise in different ways, require different methods of dissemination, are measurable in different ways. Thus, the topic of developing and transferring tacit knowledge is a difficult one and is on a great scientific interest.

There are already a few different studys which explain the concept of tacit knowledge, but not how to handle it. Nonaka and Takeuchi (1995) have introduced four forms of knowledge conversion that arise when the two forms of knowledge meet and describe their transition into one another. Their SECI-Model pronounces that tacit knowledge can be transformed into explicit knowledge whereby tacit knowledge can be shared with others [15]. This process of making the unknown known is called *externalization* [16]. It happens for instance when Berry explains the corporate culture in his own words to new colleagues. Converting tacit knowledge works through articulating experiences in the form of concepts, models, hypothesis, metaphors and analogies [17]. Dialogue and collective reflections support this process [18]. Social interactions and sharing experiences among employees through social interaction is called *socialization*. Merging and Reclassifying existing explicit knowledge leads to a creation of new explicit knowledge and is called *combination*. This happens, for example, when a project manager tells his colleagues about his experiences in a successful project that develops a tangible work concept for the entire company. Colleagues can exchange this knowledge through documents, meetings and telephone calls. Explicit knowledge can create new tacit knowledge [19]. This mode is called *internalization*. This means for instance the process of gaining new experiences when employees try out the new working-concept a project officer has developed. As shown in figure 1 the four modes of the SECI Model are interdependent and rely on each other.

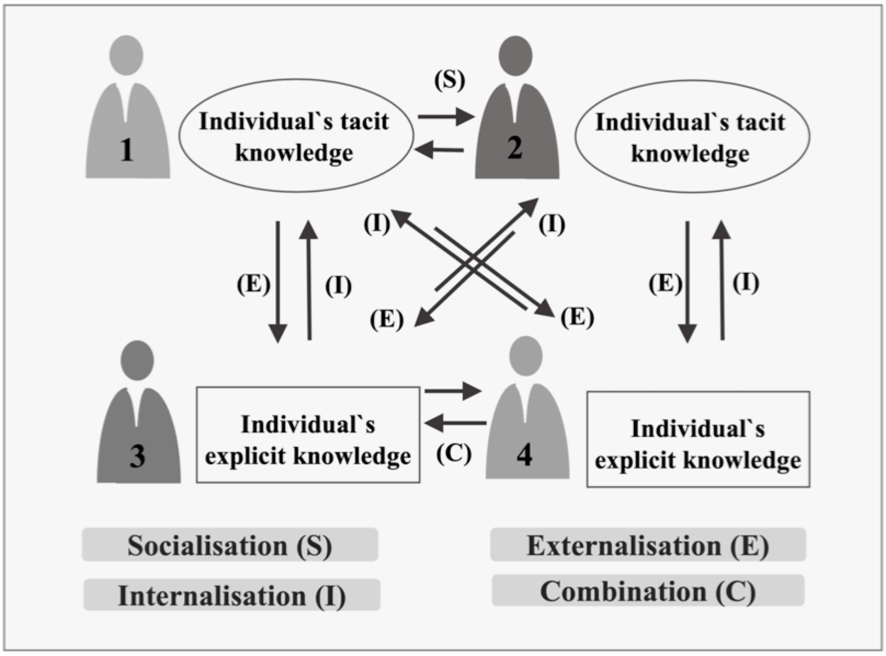

Figure 1: SECI-Model (Nonaka & Takeuchi, 1995)

There is a lack of empirical evidence on how to uncover and save tacit knowledge [20]. In that respect there is a need for more investigations on planning and structuring externalization. Interviews and self-reflection can support the process of uncovering and using it consciously [21, 22], which is why these methods are going to play a major role in the following research. Self-Reflection is in the following research used as a tool to uncover tacit knowledge. When something did not work out the way employees expect it, self-reflection helps modifying the thought patterns [23]. Therefore, people can change perspectives and compare different situations from different angles. Also, it is possible to change behavior accordingly in order to support individual and organizational learning [24]. The process of action regulation within a complex system is divided into different tasks (Dörner, 1989):

1.) Goal Elaboration
2.) Hypothesis Formation
3.) Prognosing
4.) Planning and Decision Making
5.) Monitoring
6.) Self-Reflection.

Not everyone deals with neither every of those steps while solving problems nor in the same sequence as shown above [25]. Especially the last step self-reflection is missing often due to time lacks [7]. As this is the point where organizations can find their hidden treasures companies should focus on motivating their employees to reflect on their solved problems. By using circular questioning, the unconscious parts of the tacit knowledge can become conscious. As tacit knowledge is kind of unconscious embodied knowledge it is not easy to verbalize [26, 27]. Through self-reflection people get the chance to analyze their routines and proof their actions to be right in the context of changing organizational goals [28].

1.2 Learning organizations

The concept of a learning organization derives from a humanist approach. Its aim is to implement an openminded culture of learning in an organizational context [29]. The philosophy of the learning organization is to motivate employees to share their work experiences. By telling others about achievements and failures the employees and thus the company are able to make progress. Through sharing knowledge companies can improve their product lifecycle and therefore their competitive position. Individual and organizational learning have to be organized within an integrated knowledge management [30]. The purpose is to motivate employees to talk about their experiences and make them tangible so others can understand them and learn from them [31]. Through methods of reflecting, uncovering and sharing tacit as well as explicit knowledge, organizations will be able to adapt to changing markets and therefore changing organizational goals.

Argyris & Schön (1978) introduced the term of triple loop-learnig in learning organzations [32]. In an organizational context single loop learning means that companies observe their environment and adjust the information with their own standards. On this first level companies only change within their fixed frame of values and principles [24]. On the next level, the double-loop, companies expand the range of the first loop and learn to change their values. On this level there is an open-minded corporate culture needed to succeed in the process of changing. Organizations face their problems in an open-minded way. On the third level, the deutero-learning, companies learn on a meta-level. So, companies reflect on the results of the first and the second loop and work on their ability to adapt to changing markets and customer needs [22]. For instance, an IT-Company could reflect its business on a tacit level and change its attitude to its customers in order to adapt to changing market conditions. These challenges one's existing learning frameworks as well as mental models and assumptions. Another basic element to have success is a working error culture and the motivation to change guiding principles in organizations. In the respect of knowledge management this concept of learning plays an important role regarding uncovering the tacit experiences. The following chapter explains how the SECI-Model of Nonaka, the problem-solving theory of Dörner and the Loop-Learning Theory of Argyris & Schön fit together in a practical way to uncover and share tacit knowledge in organizations.

2 Methods: The Intervention and the Interviews

The intervention takes place in a company in the IT-branch. The company provides its customers with software, administration and consulting – everything developed and organized in projects. Ten Participants were asked about an intervention on their experiences, perceptions and assessments with qualitative partially structured interviews. Of particular relevance is the perceived gain in competence through the intervention. The selection of participants was voluntary in the context of a non-probabilistic sample. It is therefore possible that the participants were more open to the subject than their colleagues. The case selection criteria were limited to age (as heterogeneous as possible) and gender. In addition, all participants had to have at least 3 years of project experience. The two research questions of the study are:

- To what extent is self-reflection a suitable way to uncover tacit knowledge?
- To what extent does sharing the reflected experiences support organizational learning?

After the presentation of the intervention (chapter 2.1-2.3) follows a description of the interview survey (chapter 2.4).

2.1 Theoretical background of the self-reflection Coaching-session

The intervention is divided into two parts to realize the two modes of externalization and socialization of the SECI-Model (figure 1). The first part starts with uncovering the tacit knowledge about critical success situations in past projects (figure 2). In this part project managers are interviewed with self-reflective questions face-to-face by the researcher. Especially in these times when companies tend to work more on organizing their projects in a virtual and global way it gets more and more important to bring people together and let them share their tacit knowledge face-to-face [33].

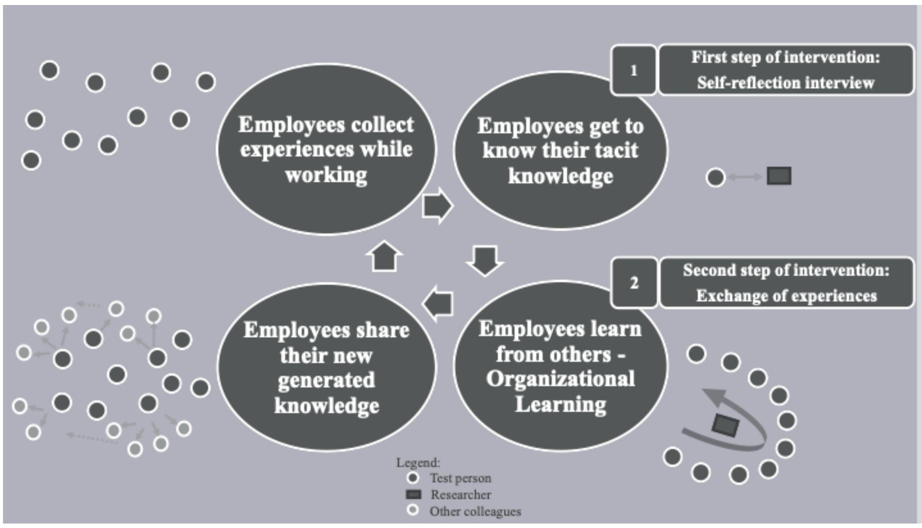

Figure 2: Circuit of the developed intervention in two parts

Through reflecting and verbalizing the own experience people are able to uncover their schemes [34]. This process represents the mentioned *externalization.* After the project manager reflected his experiences he is ready to share them with other colleagues. Thus, the second part of the intervention represents the *socialization* which is realized through a workshop to exchange the reflected experiences from part one. All participants of the first part are invited to take part at this workshop. In the group they reflect together on each critical situation and consider what to improve in future projects. After taking part at the workshop the project managers go back to work and pass on their new generated knowledge to their project employees. That is the way how the confronted and re-worked experiences are supposed to find their way into the organization and lead to changes in order to adapt to changing organizational goals.

2.2 The first part of the intervention: Self-reflection Coaching-session

In the first part of the intervention there are 10 project managers of the research company invited to the bilateral self-reflection interview. The only criterion to be interviewed was to be a project manager so that the topic of the shared experiences for the second part of the intervention would be similar. The participants take part voluntarily. They are aged between 26 and 53 years. The semi-standardized recorded face-to-face-interview takes 60-120 minutes. The process of this interview is similar to a coaching-session. The structure of the coaching session follows the course of Dörner:
The coaching starts with an warming-up to introduce the intervention and the participants. The aim is here to let them feel comfortable so they are ready to engage in the dialogue. Then starts the phase "Focusing on themselves" to undercover individual competencies in project management. So, the test person starts thinking indirectly about himself and by this positive formulated question gets an approach to his own self-concept. This is a preparation for next step the "Dream journey" (5 minutes): By giving instructions and asking circular questions [22, 35] employees get access to their hidden tacit knowledge. The test person is instructed through his past projects. He thinks about what was good and what was bad while working on that project. In the end the test person chooses one specific critical success factor which he wants to discuss further in the following interview part to pass this experience finally on to other project managers. Those instructions advise them to choose one critical success situation of their past project experiences.
After they have chosen one situation the next step "Reflection the problem by circular questions". The reflection starts with different questions, e.g.:

- Did you find a solution to that problem back then?
- How satisfied have you been with this solution?
- How did you recognize there was a problem in that situation? How did others recognize?
- How did this problem occur from your perspective?
- What do your colleagues think how this problem occurred?
- What could be their reasons to react like they did in that situation?

The next phase is “Visualize the Problem”: The test person is asked to draw the scene he just explained. While reflecting they are asked to draw the constellation of the problem and the optimized solution on papers. Through visualization he connects different levels of his unconsciousness. The test person tries to verbalize what he felt in that situation and what activated this feeling. New insights, solutions and perspectives can be developed. Thus, they reflect on their experience on different meta levels in the next phase “Reflect the solution” via reflection questions, e.g.:

- To what extent did the question of the beginning regarding your special skills in project management play a role here?
- Take a look back to what happened in the past. Would you change something about your solution if this problem comes up again in the future? What would you do differently?
- Which effect would such a solution have?

Additionally, they are asked to write down the reflected key facts of the situation on a prepared handout. This prepared form is besides the painting one of the materialistic results of this interview. By filling in the form with keywords about the insights of the interview the test person prepares automatically the story of his experience he would tell others. So, this form guides and supports the test person while he explains the story. This self-reflection session adapts to the first loop explained in 1.3.

2.3 The second part of the intervention – Workshop to exchange experiences

The goal of the second part of the intervention is to pass on the reflected lesson of the employee`s experience to others. All participants from the first step are invited to take place in the second step to finally benefit from sharing their knowledge. Four participants take part in the workshop to exchange experiences. Due to the smaller group there was the chance of having deeper discussions about the experiences. The face-to-face-workshop takes six hours. It starts with an exercise to get to know each other. The participants are going to share their experiences, so they need a basis of trust to be able to open themselves to others. Otherwise there is the risk of not sharing their reflected experiences in an open-minded way. Ensuing the participants are asked about their expectations on the day. Every participant gets 20 minutes to present the reflected experience to his colleagues. To visualize his presentation, he uses his paintings and the handout from the self-reflection interview of the first step. After every presentation took place the participants are able to discuss their questions and recommendations. After each presentation the group discusses the main points of the experiences by giving each other hints, which are documented. Everybody writes down what he learned from the other’s lessons. This second part of the intervention adapts to the second loop explained in 1.3. As shown in figure 1 the employees return to their work after participating in the workshop and tell others about their new insights. This is the point where the third loop takes place. The whole company reflects on their strategies and changes them according to economic and environmental changes.

2.4 The interviews

After going through the self-reflection part 1, the actual interview takes place. These questions help getting to know the effects of the intervention on the test persons. For example, the following questions were asked:

- Please describe the changes the intervention brought.
- Do you know more about the critical success situation than before the intervention?
- Did your ability to pass on your experience to others change during this intervention?
- How do you assess the importance of self-reflections like you did in this coaching in project management?
- In what extent is the materialistic outcome (painting & form) suitable to pass on your experience to others?
- How do you assess the acceptance for an intervention like this to other colleagues?
- Can you imagine explaining your experience in a further workshop to others? What benefit would you and others have?
- What is your insight about the critical success situation we reflected together?

The interview aims measuring a difference in the participant's attitude to tacit knowledge. The answers were recorded, utilized, coded and analyzed qualitatively. In the end of the second workshop, the group evaluates the whole workshop in a recorded semi-standardized interview. The evaluation answers are also recorded and coded as well as analyzed qualitatively. The codings (inductive) of the first as well as the second part of the intervention lead to the following results on this research.

3 Results

3.1 Results of the first part of the intervention

The main research question of the first part of the intervention ("To what extent is self-reflection a suitable way to uncover tacit knowledge?") is divided into five more detailed research questions which lead the interview.

Table 1: Research questions on part 1 of the intervention

1.1	How do employees (before and after the intervention) assess their ability to share their tacit knowledge from the last project?
1.2	How does the employee's opinion on his way of solving problems in his last project change through the intervention?
1.3	How do the employees perceive the intervention?
1.4	How do the visual tools support the impact of the intervention?
1.5	How should an exchange of experiences be organized?

Answer to 1.1: Most of the participants think they improved their ability to share their tacit knowledge with others by taking part in the interview. All of the participants concluded they think they are more aware of their tacit knowledge and they want to continue with self-reflecting. They had new insights as a result of the self-reflection interview. This means the structured process of the intervention is suitable to get access to tacit knowledge.
Answer to 1.2: In the beginning of the intervention some employees say they are satisfied with the solution they had on their past project problem. Some say they are not satisfied with the solution. After the intervention both types either changed their former opinion or not. Even the project managers, who had thought of a good solution to their problem, noticed a need for optimization. Those changes are recognized on two different levels and confirm the existing literature [2]. On the one hand they change their mind on a meta-level concerning the problem and on the other hand on a technical level.
Answer to 1.3: In the evaluation part of the interview the participants tell how they felt during the intervention in general. The results say that all participants are feeling well and safe during the intervention. Three of them found the intervention a little exhausting at some points. These three participants were the three oldest persons.
Answer to 1.4: Concerning the visual tools, the participants make clear they are highly suited to uncover tacit knowledge. Also, they limit that they are only useful with instructions from the coach. The participants also emphasize the necessity of the visual tool. Without reflecting their experience on a creative level through drawing and writing they may not have had the same insights they got through the intervention.
Answer to 1.5: In the first step of the intervention the researcher takes the chance to directly ask the participant what he wants the second part of the intervention to be like. For the participants it is important to have an informal during the workshop. Also, they want to have time in the beginning to get to know each other. They would like to have smaller groups so they can have dialogues and discussions instead of listening to lectures by only one person. In case of group dynamics, they suggest to only invite people

that already took part in the first step of the intervention so that everybody starts from the same level of self-reflection.

3.2 The second part of the intervention

The main research question of the second part of the intervention is divided into four more questions based on the results of the first part of the investigation.

Table 2: Research questions of part 2 of the intervention: To what extent does sharing the reflected experiences support organizational learning?

2.1	Which expectations do the employees have on the exchange of experiences?
2.2	Which impulses to change do the employees get through the intervention?
2.3	How do the employees assess the value of sharing their experience for themselves?
2.4	How do the employees assess the value of sharing their experience for others?

Answer to 2.1: Most of the participant's expectations are met during the workshop. For instance, the participants are satisfied with getting feedback from colleagues on their way of problem solving. Also, they are pleased with the time they got in the beginning to get to know each other. Partially met are expectations regarding getting to know each other's personal "aha-experiences" during the first step of the intervention.
Answer to 2.2: In the case of this intervention based on self-reflection it is interesting if the employees would like to change their behavior after the intervention. All the participants felt comfortable with the small group. That way they could build trust and thus rapport with each other. Based on that rapport they were able to open up to others and their opinion. Therefore, they got new insights from the experiences of others. Also, three of them recognized new impulses to change their behavior in future projects.
Answer to 2.3: All of the participants assessed the value of sharing their tacit knowledge with others for themselves from high till very high (range from very low to very high). This result is a little surprising as it could have been assumed that they already reaped the rewards of the first step of the intervention. Nevertheless, this result is a good advertisement for further research to motivate participants after taking part in the first step of the intervention to go ahead with the second part.
Answer to 2.4: The question regarding the value of sharing tacit knowledge for others is answered by the participants to be low. The participants see the reason for this answer in their inability to assess the value for others. An assumption in this case is that they could not classify the different advantages made on their own experience.

4 Discussion, Limitations and Conclusion

Which outcome of the present study is relevant for companies? There is a risk for the economy in not sharing experiences between projects. The same mistakes could be done in one company twice or more often and cause high costs. Because of the intangible character of tacit knowledge, only little empirical evidence-based literature is published. The intervention that is presented here is a hint for furthermore rigorous investigation on how organizations can handle their tacit knowledge.

The selection of participants was voluntary in the context of a non-probabilistic sample. It is therefore possible that the participants were biased and more open to the subject than their colleagues. Regarding the results of the evaluation the main question of the first step of the intervention can be answered as follows: In general, self-reflection generates added value through coaching. The intervention can encourage the process of uncovering tacit knowledge. Tacit knowledge becomes conscious and explicit through drawing and writing. Via self-reflection it is possible for the employees to see the past project problems from different perspectives. Thereby they are able to uncover the tacit dimension of their experience and get new insights. They changed their attitude to their problem-solving ability through the intervention. The answer to the main research question is that self-reflection is a suitable way to uncover tacit knowledge.

Regarding the main research question of the second part of the intervention everybody concludes the effort of taking part in the workshop is worth it. In this workshop the participants got feedback to their critical situations and their solutions. Also, they got to know what kind of problems their colleagues have. The aim of preventing making the same mistakes twice can be achieved by this proceed. The participants criticized that on the one hand on an individual level they have learned a lot but on the other hand on the organizational level they would like to know more about the "aha-experiences" of their colleagues. This means that there has to be more reflecting on the reflected "aha-experiences" in the first step of the intervention to fulfill the second loop of learning. So, the employees get the ability to tell others in their own words what they uncovered in the self-reflection interview. Afterwards it should be possible for groups to reflect together on the reflected experiences and realize Deutero-learning in the meaning of organizational learning.

In literature one can find two conflicting positions on tacit knowledge. There are researchers who say tacit knowledge is at least in parts accessible, like Nonaka and Takeuchi (1995). Others like Cook & Brown state that tacit knowledge cannot be into explicit knowledge because it is not accessible (1999) [36]. The presented study follows the approach of Nonaka & Takeuchi as this concept has a grounded standing in today`s literature. However, this investigation gives only a direction for further research. Future research should improve the comparability of the intervention. For instance, by giving concrete examples while assessing their ability of sharing tacit knowledge. Also, there should be more research about how to implement the third loop of the learning theory by Argyris & Schön as this was not included in this research. Only the first and the second loop are provided within the presented intervention. Tacit knowledge is uncovered on an individual level and shared between project managers. To have a benefit for the whole company there have to be internal structures in leadership who take care of this step and make reflection on a company-level possible. The presented intervention could be a first step to realize organizational learning.

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