

Please refer to this article as: Verdonschot, S.G.M. (2006). Methods to enhance reflective behaviour in innovation processes. *Journal of European Industrial Training*, 30(9), 670-686.

METHODS TO ENHANCE REFLECTIVE BEHAVIOUR IN INNOVATION PROCESSES

Keywords: Knowledge productivity; Innovation; Reflection

ABSTRACT

Literature review

Purpose

This study aims to trace methods that help to develop the reflective behaviour that is necessary for identifying and describing learning processes in organisations that focus on improvement and innovation.

Methodology, approach

An extensive literature review results in the characteristics of reflection when reflection is used to trace learning processes in innovation. This results in five characteristics. Literature on research methodology is reviewed in order to find methods that promote this reflective behaviour. These methods are analysed to find out to what extent they contain the characteristics for reflection in innovation processes.

Findings

The literature review leads to five elements that characterise reflective behaviour in innovation processes. It offers a description of several methods that can be used to identify learning processes. The main conclusion is that hardly any method contains all five characteristics for adequate reflective behaviour.

Research limitations/implications

The current study mainly reviewed research methodologies and no other methods that actively promote reflection.

Practical implications

The findings offer concrete guidance for practitioners how to encourage reflective behaviour and innovation processes.

Originality and value of the paper

The paper refers to the interest of both research and practice. From the research point of view it presents a variety of methods for analysing learning processes in order to deepen our knowledge with respect to these processes. From the practice point of view, it offers concrete methods that enable participants to develop reflective skills that help them to become more knowledge productive.

1. INTRODUCTION

In an economy where knowledge is dominant, daily operations in organisations should be designed to support the process of *knowledge productivity* (Kessels, 1996; Kessels, 2001). This process entails: identifying, gathering and interpreting relevant information, using this information to develop new skills and to apply these skills to improve and radically innovate operating procedures, products and services. Continuous improvement and radical innovation is needed for an organisation to be successful in a knowledge economy.

Learning and innovating are closely related. Brown and Duguid (1991) link innovation with learning in day-to-day activity. Keursten, Verdonschot, Kessels and Kwakman (2004) argue that learning lies at the heart of the processes needed for innovation: tracing relevant information, and developing and applying new competences are based on powerful learning processes.

If innovation is crucial for lasting success of organization, and learning is a key process in innovation, it becomes important to learn more about the kinds of learning processes that support innovation, about how to recognize these processes in practice in order to influence these processes in a positive way. By tracing the supporting learning processes, the innovation process can be positively influenced.

However, participants find it often difficult to directly answer questions on when they learned, how they learned and what they learned. When their own learning is addressed, they experience difficulties as they tend to focus on explicit learning activities such as formal training and education, whereas key learning processes often take place implicitly, in informal settings while working and interacting with others (Kwakman, 1999; Marsick & Watkins, 1990; Van Lakerveld, Van den Berg, De Brabander, & Kessels, 2000).

Keursten et.al. (2004) who analysed a series of innovation processes and their underlying learning processes, found that it was hard for interviewees to make explicit what exactly happened in terms of knowledge development. People are mainly concerned with the specific content and context of the innovation at hand. Learning processes that contribute to improvement and innovation occur at the workplace and it apparently requires specific reflective behaviour from the people involved to trace these. Direct questions on when, how and what people learnt, do not adequately stimulate this reflective behaviour. In addition Van Lakerveld (2005) concludes that reflection is an activity that most suffers from lack of time. Another complicating factor is that most theories on reflection pertain to the context of education and adult education, rather than the world of work (Van Woerkom, 2003).

Reflection at work upon learning processes is in many organisations not a matter of course practice. However, insight in these learning processes is valuable as it can stimulate the innovation- and improvement processes at hand. Therefore, it is necessary to find methods that enhance reflective behaviour of people at work in order to trace learning processes that they go through while innovating. This paper traces these methods by means of a literature review.

Finding methods that promote reflective behaviour has also a sustainable yield. Besides being able to trace learning processes and so to influence the particular innovation process, it supports the participants in developing their ability to be knowledge productive. The better developed meta-cognitive skills and reflective skills, the more innovative people's can be. Because then innovation is not solely the consequence of well-developed problem-solving skills or coincidence, but of being able to deliberately create the circumstances for oneself and the team that enable to be innovative.

In this respect we refer to Bolhuis and Simons (2001) who argue that the better meta-cognitive and self regulating skills are developed, the bigger one's learning capacity is. Other authors explicitly link the development of meta-cognitive and reflective skills with the ability

to improve and innovate in the work environment. McGivern and Thompson (2004) connect better meta-cognitive skills of workers with improvement of their work-environment. In the same line Kessels (1996) stressed the importance of developing reflective skills and meta-cognitions because it would be supportive in finding new ways to trace relevant information, to develop new knowledge and to make it applicable in innovations and improvements. Research done by Van Lakerveld et.al. (2000) shows that the development of reflective skills is crucial for developing the capability to improve and innovate the work-environment.

2. PROBLEM STATEMENT

In a knowledge economy continuous improvement and radical innovation are of crucial importance for organisations to survive. Learning is a key process in innovation. It is important to recognise these learning processes, in order to positively influence them. Tracing these learning processes requires systematic reflection on these processes. However in practice people are often prevented from continuous reflection. Therefore it is necessary to find methods that enhance reflective behaviour to trace and enhance learning processes in innovation processes.

The research question that follows from this reasoning is:

In what way can we grasp the learning processes that occur in innovation processes and is it possible to offer practitioners tools to enhance these processes?

1. What are the characteristics of such reflective behaviour in order to identify learning in innovation processes?
2. What methods support the search for these learning processes?
3. To what extent are these methods useful for practitioners to influence the innovation process positively?

3. RESEARCH DESIGN

The research questions are addressed by means of a literature study. In the first phase of the study literature is used to find characteristics that are important in the process of reflection in innovation processes. Since literature on how to promote reflection with teams that participate in actions of improvement and innovation, is scarce we also used literature with clear views on reflection in learning processes.

In the second phase, literature is used to find specific methods suitable for identifying learning processes in innovation projects. For each of the methods it is defined to what extent these methods contain the defined characteristics. The methods are found through a review of literature on research methodology. In this we followed earlier researchers on this topic. Several authors investigated methods that are suitable for studying learning processes. Marsick (2001), and Simons and Ruijters (2001) investigated these methods in view of promoting informal and implicit learning.

4. RESULTS

This paragraph contains three sections that present the results of the extensive literature review that was conducted. The first section elaborates on reflection when it is used to trace

learning processes in innovation processes. This results in a set of criteria the methods need to meet. The second section presents the methods that were found that promote this reflective behaviour. The third section offers an overview of the methods and the extent to which they contain the defined characteristics.

4.1 Reflection on innovation processes

In order to trace learning processes reflective behaviour is required. In this section we elaborate on the characteristics of reflective behaviour that enables people to trace learning specifically in the context of innovation processes.

4.1.1. Reflection with a focus on daily practice

Van Woerkom (2003) finds that most of the theories on reflection are not aimed at the context of work but rather at that of education or adult education. Since the workplace is a different environment from an educational setting, the process of reflection needs to adapt to that. That means that reflection on learning processes in a work context, should relate closely to the daily practice people are in.

Moreover, Van Lakerveld (2005) concludes that reflection is the learning function that suffers most from lack of time. It is likely that people would be more motivated to reflect when this process not only relates but also contributes to their innovation practice.

4.1.2. Reflection that pays attention to personal stories and emotions

Narratives and personal stories play an important role in innovation processes. Weick (1995) argues that people think narratively rather than argumentatively. Von Krogh, Ichijo, and Nonaka (2000) state that narratives are a natural part of how human beings come to terms with the world. They advocate that stories about what and how people do things are a necessary component of learning. Especially in the learning that occurs in innovation processes these stories and narratives play an important role. Lissack and Roos (1999) point out that stories that leave space for personal interpretation are of more help in the process of sense making, which is important in innovation processes, than conclusions formulated by a single person.

Reflection upon these innovation processes should also use these personal stories and emotions and not only work with mere facts and rationality. Otherwise there will be the risk of looking at the learning processes very unidimensional. Swan and Bailey (2004) state that instrumental and critical reflection are cognitive processes that pay little attention to emotions. After their interviews with managers from two organisations, the authors conclude that emotions can be seen as the content of reflection. In this sense emotions offer a source of special knowledge about the world that should be taken into account. Earlier, Boud, Keogh and Walker (Boud, Keogh, & Walker, 1985) wrote on the subject of reflection and emotions. They stress the importance of recalling positive feelings that occurred in the situation that is reflected upon, and to eliminate the hindering emotions. Emotions and personal stories offer an extra dimension to reflection that was merely a pure cognitive activity.

4.1.3. Appreciative reflection

For a long time learning processes were designed from a gap-point of view. The actual and the desired situations were analysed, and the difference between the two has to be overcome by a learning process. The learning process was designed accordingly. However, in a situation

where improvement and innovation is important for organisations to survive, this approach isn't self-evident. When working on innovation the end-point is not known in advance, otherwise it wouldn't be an innovative solution. Using gaps as a starting point for learning is not possible anymore.

Moreover, learning with gaps or deficits as a starting point is not as motivating for learning. Positive psychology offers a new perspective on this issue. Positive psychology sets in in the 90s with Martin Seligman as one of its founders. Before then, psychology was pointed towards pathology, and curing mental illnesses. The focus of positive psychology, in contrast, lies on identifying and nurturing talent (Seligman, 2005). The school of positive psychology becomes popular in various areas like organisation development (Cameron, Dutton, & Quinn, 2003), evaluation research (Preskill & Coghlan, 2003) and in thinking about organisational change (Whitney & Trosten-Bloom, 2003). Although this way of thinking became popular only recently, it is built on concepts such as self-efficacy that earlier have proven to play an important role in learning processes.

Since the learning process takes advantage from this perspective, the reflection process is expected to gain strengths when it follows this approach. Reflecting upon learning should be focused on what is there and what went good instead of the often-used question such as "what went wrong?" and "what can you do different the next time?". It is motivating for the people involved to focus on successes, things that went well, and their own contribution that made that possible. Swan and Bailey (2004) find in their research that some managers use a form of reflection that the authors called *gratification reflection*. The managers reflected upon events that they associated with positive feelings. By reflecting on these, the positive emotions were experienced again, which made them stronger. Neilsen and Winter (2005) argue that aligning these kind of positive emotions with cognition, has a favourable effect on learning.

4.1.4. Reflection that takes into account the social aspect of learning

"There is no such thing as abstract learning disconnected from the social context but (...) the very social context determines the way ideas and concepts as well as learning content and horizons are incorporated" (Sauquet, 2004: 380). With the work of Lave and Wenger (1991), who state that learning is not about acquiring an abstract body of knowledge but about participating in a community of practice, the idea of learning as a social process rather than an individual one, got more attention. This is especially true for innovation processes because people within these processes try to find new solutions for unusual questions. This new knowledge is not to be found but needs to be constructed in a social context.

Reynolds and Vince (2004) stress the importance of reflection and developing reflective skills in interaction with others. According to them social and political processes have not been given as much as attention as they deserve in studies on reflection. The authors argue that "reflection is best understood as a socially situated, relational, political and collective process, and that there are both theoretical and practical advantages to this perspective – especially in relation to management and organisational learning" (Reynolds & Vince, 2004: 6).

4.1.5 Past, present and future as points of reference for reflection

Another dimension that can be distinguished is the starting point of the reflection. That starting point can either lie in the past, in the present or in the future.

Methods of reflection that rely on past experiences relate to the way Dewey (1933) and Kolb (1984) referred to reflection. Dewey stressed the importance of active experimentation for learning and reflecting on that afterwards, and Kolb defined a learning cycle in which experience and reflection are two necessary and coupled elements, that are (through active experimentation and conceptualisation) necessary for learning to take place.

The second point of view offers methods that use reflection as a means to reflect upon the present. In these methods the reflection does not take place after the learning process happened but at the very moment. This is related to Schön's ideas on reflection-in-action. This is about how professionals 'think on their feet'. It helps practitioners to become aware of the theories, skills and metaphors they use (Schön, 1983).

The third category contains methods that use the future as a point of reference for reflection. When using the future as a starting point for reflection, there are no concrete experiences to reflect upon. There is only a future that can be constructed and reflected upon. Reflecting upon the future can lead to learning from the future. Keursten and Frijters (2002) define learning from the future as learning to see developments and patterns by looking at things that happen from a new perspective. This new perspective offers people the possibility to develop new knowledge that enables them to act in a new and unusual way. This supports the process of innovation. At the same time a new learning cycle emerges that differs from the one Kolb (1984) described. Scharmer (2000) and Senge, Scharmer, Jaworski and Flowers (2005) describe this cycle as seeing (open up), sensing (explore multiple meanings and perspectives to look from), presencing (linking these new ideas with the situation today), and enacting (acting in the situation at hand). Learning from future can lead to innovation because it breaks with the dominant way of thinking in the past.

Although every method has its own pros and contras, we believe that reflection with the future as a starting point is a promising way of reflection since the learning that is related to it, contributes directly to the innovation process.

4.1.6 Summary

The previous sections point out that reflection in the context of innovation processes has to focus on daily practice, it has to pay attention to personal stories and emotions, it has to be appreciative, it needs to work with the social context in which the learning takes place. And it can have three starting points, namely past, present and future.

4.2 Overview of methods

Literature on research methodologies was examined in order to find methods that help to trace learning processes in innovation processes. This paragraph offers an overview of the methods that were found:

- Storytelling
- Changes and developments at work
- Critical incidents
- Discontinuities and breakthroughs
- Peak experiences
- Formative evaluation
- Time-interval sampling
- Imagery and dreaming up

Some of the methods are clarified by giving a practical aid for working with them.

Storytelling

Storytelling is recognised as a useful strategy to advance understanding of professional practice because it enables practitioners to capture, code, and validate the knowledge born of experience, observation and intuition (McDrury & Alterio, 2000). Narratives allow the researcher to approach the interviewee's experiential world in a more comprehensive way,

this world being structured in itself (Flick, 2002). Simons and Ruijters (2001) refer to storytelling as a method to trace implicit learning processes. The idea behind the use of this method is that by asking the respondent for stories about his or her experiences in general, important events related to learning will pop-up themselves. In this view, the researcher does not ask for specific events related to themes or topics. This way of working has parallels with ethnographic and bibliographic research (Flick, 2002). It is about making a 'thick description' of reality, in order to describe and understand specific phenomena (Geertz, 1973). This is a way of inductive research in which not prescriptive theory is used to test, but experiences of learners themselves are used as input for research and even theory-building (Glaser & Strauss, 1976).

With this method, participants are invited to tell stories and anecdotes from their practice. This is about getting the story-telling mindset. Then, the participants come into a state in which they can tell stories as if it were movies, with the same amount of details. This state enables them to visualise concrete situations, and to select the situations in which there was really an urgency to perform well. Then it can be analysed how they acted, what they needed for that, and what skills they used. By sharing stories, it is possible to create shared meaning, to understand what has happened and to prepare for what may happen in the future.

A way to structure the process of storytelling is by making use of learning histories. A learning history is a document, or a series of documents, that is disseminated in a deliberately structured manner. Both the document and the dissemination are designed to help organisations and individuals in teams become better aware of their own learning and change efforts. The learning history presents the experiences and understandings of participants. It tells the story in the participants' own words, in a way that helps to move forward, without having to "re-invent" what a small group of learners have already discovered (Kleiner, 2006). In interviews to collect learning histories it is not about analysis, evaluation or assessment and judgement. It is about the story of what happened from the learner's perspective. Important in using this method is the *collaborative reflection*. After the histories are collected, a process of collaborative reflection forms the phase of analysis. This is a process of collaborative sense making out of what happened. The phase of analysis is one to go through collaboratively. Learning histories help to generate reflective conversations (Roth & Kleiner, 1998). They help to create a common context that allows the persons involved to develop a new and shared understanding. This indicates that stories not only offer the researcher a powerful tool to understand the world of the participants but it also helps these participants by functioning as a mirror, or as a reflection-tool. Learning occurs when collaborative reflection on the stories takes place.

Changes and developments at work

Another method is to investigate whether there are changes and developments in and outside the organisation that may have changed the character of work. By relating these developments and changes to one's current competences, one can get insight in his own learning process (Simons & Ruijters, 2001). Figure 1 offers some more practical aids for this method.

Investigating changes and developments:

→ To work with this method in practice first find out together with the participant what changes and developments took place. Use questions like:

- Do you experience that the nature of the work has changed since the last years?
- How has it changed?
- What is now different in your work than before?
- What caused this change?

→ Find developments that caused these changes by asking questions like:

- Did something in your organisation change dramatically?
- Did something in your specialty change?
- Were there developments society-broad that influenced your work?

→ Once you have traced these developments and how these changed the nature of the work, zoom in on the daily work of the participant. How did that change?

→ Investigate together with the participant if these new requirements made him act differently. Define what exactly changed in the way the participants acts in his/her work.

Figure 1. Working with the method ‘changes and developments at work’

The next set of methods is suitable for reflecting on specific events that are believed to be elements of a learning process the learner has gone through. The researcher tries to trace events that are critical, that mark a turn in a process or that the person involved is proud of. The idea behind such is that a description of important events in their specific context is a powerful means to make learning explicit. The idea is also that the most important learning is related to such crucial or meaningful situations in a process. These methods identify learning processes without explicitly asking for learning. Participants often have obvious feelings about the importance of what happened in a specific situation, and in these methods these feelings are used. The methods offer a new starting point for thinking, by starting to ask for concrete situations. This arises from the view that knowledge is a personal capability (Kessels, 2001) that is linked to practice. To trace learning processes, the context in which this learning manifests itself needs to be taken into account. The methods all assume that particular situations are more suitable for identifying learning than others. These specific situations can vary in their nature. It comprises critical incidents, discontinuities and situations in which the participants are proud of themselves.

Critical incidents

Flanagan founded the concept of critical incidents in 1954 (Flanagan, 1954). The critical incidents technique is a method to trace critical requirements for a specific task. It is about the behaviours that make the difference between effective and ineffective performance of a task. The critical incidents technique relies on the notion that every job has specific moments in which the person doing that job makes a difference. Collecting critical incidents is done by observing employees during their work or by interviewing them outside their work setting. Zemke and Kramlinger (1991) stress the importance of looking at actual behaviour and not only to conduct interviews. When interviewing workers outside their daily work-environment, it is helpful to ask them for dilemma's they encountered in order to trace these situations that are of particular importance for the job. Critical situations will show up in the form of dilemma's, in situations where one needs to choose between two plausible alternatives. In the phase of analysis various critical incidents can be compared. The capabilities or competences the individual used to solve the dilemma-situation can then be derived. Figure 2 explains the steps to take in more detail.

Working with the critical incidents-technique

- Try to get an idea of the context the person is working in. Ask questions such as:
 - o Can you explain what your organisation does? What do you do within this organisation? What is your background?
 - o Could you divide certain core tasks?
 - o Can you think of developments and changes that happened lately and that changed the nature of your work?
- Trace important moments where the person involved needed to choose between two plausible alternatives. These questions can help, but make sure that the interviewee has a *concrete* situation in mind. One that actually happened.
 - o I can imagine that [part of their task] sometimes brings you in a difficult position.... Is that right?
 - o Could you give an example of such a dilemma or moment of choice that you went through last month?
 - o Could you describe – very concrete – a moment in which you had to choose?
- When you have traced a dilemma, try to find out what happened *exactly*. In this situation the respondent used his implicit knowledge. For the respondent it is difficult to make explicit what happened exactly. Help the respondent to make the 'film' of the situation:
 - o When was it?
 - o What happened? (Ask a lot of questions like Where were you? With whom? What did you do? What tools did you use? What choices did you make? What strategy did you choose?)
 - o What was the result, what did this way of acting yield?

Figure 2. Working with the method 'critical incidents'

Marsick (2001) mentions the critical incidents technique as a method to trace the implicit knowledge and learning of the learner in specific tasks or work. The method assumes that other employees who do the same work or tasks will encounter similar critical incidents and therefore it is important to study how participants act in these situations. The critical incidents technique serves three purposes. 1) It helps to describe the competences required for successful innovation; 2) It leads to the identification of competences of participants that can be applied in new practices of innovations; 3) The description of the critical incidents can serve as inspiring stories for others engaged in innovation processes. The overview of critical incidents and competences offers an aid that supports the learning process others in the innovation process go through.

Discontinuities and breakthroughs

Another method is to trace specific discontinuities and breakthroughs. This idea is supported by work of Patriotta (2003) and Op de Weegh (2004). A breakthrough occurs when someone was able to let go his or her existing frame of reference and see and create something new. Chains of these breakthroughs together make up the innovation process (Op de Weegh, 2004). Breakthroughs are expected to be preceded by discontinuities. Below an overview is given of five categories of discontinuities that can be recognised. The categories are not completely distinctive but give an indication of how discontinuities can be recognised in innovation processes. The discontinuities serve as a starting point for further investigation in what happened and the consequences in terms of innovation. In figure 3 the various types of discontinuities are described.

Kind of discontinuity	Definition	Example
Persons	A change in the composition of the group, of roles people have.	Someone decides to leave or an expert is introduced during the process.
Context	A change in the place where the process takes place, or the way spaces are designed.	Instead of the usual meeting in their meeting room, they visit a location.
Thinking	A turn in the thinking process that allows new frames and perspectives to come into existence.	New words are used, and sense giving happens in a new way. The question is reformulated.
Action	A change of strategy, a new way of working or method.	A new way of working is adopted. Someone starts to make small reports after the meeting.
Time	An acceleration or slow-down in the process.	It is decided to organise a seminar. Everybody feels the time pressure and the process is accelerated.

Figure 3. Categories of discontinuities (based on Patriotta, 2003)

Patriotta (2003: 65) argues that “breakdowns, in the form of discontinuities, interruptions, and so on, create a cleavage between organization and disorganization, and therefore can be fruitfully deployed for an empirical investigation into knowing and organizing”. Other authors like Weick, Perrow and Shrivastave (in: Patriotta, 2003) also emphasize the cognitive implications of major events such as crises, accidents and failures. In the work of Weick we find support to look for interruptions to understand innovation processes. Weick (1995: 5) says that “whenever an expectation is disconfirmed, some kind of ongoing activity is interrupted. Thus to understand sense making is also to understand how people cope with interruptions”.

Tracing peak experiences

Another method to trace specific events in the learning process is to trace situations that the individual marks as ‘peak experiences’, or as times they felt most alive, engaged and proud of their work. This method has its origins in appreciative inquiry (Cooperrider, Whitney, & Stavros, 2003). Appreciative inquiry is the study and exploration of what gives life to human systems when they function at their best (Whitney & Trosten-Bloom, 2003). This way of inquiry is grounded in affirming and appreciating. It is used in organisational development but also in other areas such as action-based evaluation research (Preskill & Coghlan, 2003). An appreciative inquiry consists generally of four phases (Whitney & Trosten-Bloom, 2003). See figure 4 for an elaborate description. By going through these phases, the learning processes are inquired and at the same time a change process is activated.

The four phases of Appreciative Inquiry:
<ul style="list-style-type: none"> - Discovery by appreciating: “What is the best of what already is there?” Ask questions like: Describe a high-point experience in your [organisation] – a time when you were most alive and engaged? In this phase participants share their individual stories in pairs and with the larger group. Together they identify key topics or themes common to the stories. These themes form the basis of the next phase. - Dream by envisioning results: “What might be?” Based on the information of the previous phase, they envision themselves, others and the organisation functioning at their best. - Design by coconstructing the future: “What should be the ideal?” - Destiny by sustaining change: “How to empower, learn and adjust/improvise?”
A careful introduction is said to be important just as the formulation of various questions per phase in advance.
A book that gives practical advice in using this method is: Whitney, D., & Trosten-Bloom, A. (2003). <i>The power of appreciative inquiry, a practical guide to positive change</i> . San Fransisco: Berrett-Koehler Publishers.

Figure 4. Phases of Appreciative Inquiry

When employees are asked to think of moments of total commitment, moments they are proud of, we ask them to think back of situations in which learning took place. This is confirmed by the work of Csikszentmihalyi (1997). Csikszentmihalyi writes about the concept of *flow*. According to him, a state of flow, in which one is totally committed to a task one is busy with, is a situation in which learning goes very easily. After the flow experience one has feelings of fulfilment and pride. This is related to the extent to which individuals work according to their intrinsic motivations. When workers follow their passion and elaborate on a personal theme, learning is most likely to occur (Kessels, 2001). At the same time positive affirmation favours self-efficacy and that enables learning to take place.

Formative evaluation

Another way to reflect on actions is to compare the actual learning process with the predefined goals and objectives. Comparing what actually happens to a prior set of goals or goals that were set without having insight in what would happen during the process, is a widely used manner to evaluate learning processes. Rossi, Freeman, and Lipsey (1999) refer to this as formative evaluation. This comprises evaluative activities undertaken to furnish information that will guide program improvement. Formative evaluation can be done either in the context of learning or in the context of performance. In the context of learning the reflection takes place upon the learning goals that were set. It is evaluated whether the learning goals have been achieved and to what extent activities were helpful in reaching these goals.

In the context of performance this method is especially helpful when the goals that are set, refer to learning and innovation. Then it is possible to evaluate whether the working processes develop in the direction of the pursued goals. In this way the evaluation gives insight on how the learning and innovation process develops.

By comparing the actual learning results to what was planned, creative turmoil, a concept introduced by Kessels (2001), can stimulate the learning process.

Time-interval sampling

The method of *time-interval sampling* (Cooper & Schindler, 2003) is often used to measure people's feeling of happiness or freedom while busy with their regular activities like eating, watching television etc. In these kinds of researches, participants are asked to write down how they feel at fixed moments. When feelings of happiness or freedom are measured frequently and over a certain period of time, it is possible to create a portrait of this person's feelings and the development of these feelings over time. This method can also be used in a broader sense. The variables that are chosen need to be of value in the learning process and they should be measured over time. This method invites the respondent to react impulsively and spontaneously. This is helpful in addressing aspects of their learning process. To use time-interval sampling, define the variables that are relevant to measure over time. These variables can be competences needed for innovation processes, or development principles needed for innovation. Every day/week/month the respondent is asked to mention the competences or development principles that are most present at that time. In a short interview details and indicators can be asked for.

The new or unusual concepts that are introduced to the respondent, can improve the learning process.

Imagery and dreaming up

Several authors mention the importance of imagery and dreaming up when referring to methods that help to identify learning opportunities and realised learning (Marsick, 2001; Simons & Ruijters, 2001; Whitney & Trosten-Bloom, 2003). It can be used as follows. Use an imagination exercise and help participants to imagine a desired future, an ideal professional, a superb innovator etc. Ask what the respondent sees this person doing. Then, two steps are possible. Either start asking what in actual practice happens that is in conformity with the imagined situation. This leads to an explication of the learning in actual practice. Or start to think of what is needed to change the situation now into a situation similar to the one dreamed. This leads to an explication of conditions needed to create situations in which innovation can take place.

4.3 Methods to identify learning compared to the characteristics reflection should have

In the previous section a set of eight methods that meant as research methodology to identify learning, was presented. In this section we compare these methods to the characteristics that were found in section 4.1, that reflection should have. In this way it is checked whether the methods are expected to be suitable to enhance reflective behaviour in innovation processes. Figure 5 shows the results of this comparison. A “+” indicates that the particular characteristic is obviously present in the method, a “0” indicates that the characteristic is not necessarily present but that it might be put in by its users, depending of the exact purpose for which it is used and the participants involved. A “-“ indicates that the characteristic is not at all present in the method and that it would be hard to design it as such.

Characteristics \ Methods	Focus on daily practice	Attention for personal stories and emotions	Appreciation	Works with the social context	Starting point
Storytelling	+	+	0	+	Past
Changes and developments in daily work	+	0	0	0	Past
Critical incidents	+	+	0	0	Past
Discontinuities	+	+	0	0	Past
Peak experiences	+	+	+	+	Past
Formative evaluation	-	-	-	0	Past
Time-interval sampling	+	-	0	-	Present
Imagination	+	+	+	0	Future

Figure 5. Methods compared to the required characteristics of reflection

As becomes clear from figure 5, there are only a few methods that are indicated with a “-“. Most methods either incorporate the desired characteristic or offer space to put it in. The next sections take a closer look at the various characteristics.

4.3.1 Focus on daily practice

Almost all methods *use* the daily work as a starting point. However they do not necessarily *contribute* to the daily practice. The only methods that pay attention to design, rather than analysis, are the methods of collecting peak experiences and the method of imagination.

These methods explicitly focus on the design of a desired future based on the reflections that are made.

4.3.2 Personal stories and emotions

Five out of eight methods score positive on this dimension. Especially the method of storytelling and the method that works with peak experiences explicitly take into account the feelings of the people involved. In storytelling it can be positive or negative ones. In working with peak experiences the starting point are positive feelings related to a successful event.

4.3.3 Appreciation

Five methods score neutral on this indicator. They do not explicitly work from appreciation and successes of the people involved but do work with *what's there*. Only the formative evaluation does not. Formative evaluation works with gaps; it is pointed towards tracing what is missing in the actual situation.

4.3.4 Works with the social context

Most of the methods score neutral on this criterion since their primary focus is the individual. The method of storytelling and specifically working with learning histories, describes a collaborative analysis phase as part of its method. In this phase the group is occupied in a process of collaborative sense making. The stories themselves are a perfect means to describe reality in terms of the social context.

4.3.5 Starting point lies in past, present or future

Almost all methods use the past as a starting point for reflection. Only one uses the present and only one uses the future. However the method of working with peak experiences also includes a 'dream-phase' in which people are asked to look forward in order to design the present according to the desired future. Its starting point however consists of past experiences.

4.3.6 Implications for practice

Considering the previous section, several guidelines can be derived for enhancing reflective behaviour in practice. We could advise HRD professionals to select activities that invite participants in innovation processes to:

- Work with cases from participants' innovation practice. That makes the reflection activity worthwhile and not something that comes on top of the daily work. Methods that contain a design phase and that have explicit attention for designing the next step in the innovation process are adequate for that. (The method of working with Peak experiences and Imagination contain such elements).
- Start from strengths. Activities that start with what participants already realised in the innovation process, is very motivating and helps to uncover their personal and collaborative talents. Being aware of one's own strengths helps to extend these and to make more explicit use of them in the collaboration that leads to the innovation. (The method of working with Peak experiences uses this as a starting point).
- Break with existing patterns. Breaking patterns is needed in innovation processes to come to breakthroughs. (The method of Imagination supports this).
- Bring in new concepts. New concepts enlarge the participants' scope. This can lead to breakthroughs in the innovation process. In order to realise breakthroughs in the innovation process it is important to be sensitive for new signals and to be able to give them a new meaning (Verdonschot & Keursten, 2006). New words and concepts

stimulate this process. (The method of Time interval sampling brings in new concepts).

- Facilitate a collaborative process of sense making. Innovating is a collaborative activity. (The method of Storytelling works with a collaborative process of analysis).

5. CONCLUSION AND DISCUSSION

In this paragraph conclusions are drawn by looking back at the research questions at hand.

1. What are the characteristics of such reflective behaviour in order to identify learning in innovation processes?

The literature research showed five characteristics that reflection needs to have in order to be helpful in tracing learning processes in innovation processes. These are:

- The reflection needs to focus on daily practice and contribute to that in order to make it attractive for the people to work with.
- The reflection needs to pay attention to personal stories and emotions in order to grasp the implicit learning that are at the basis of innovation processes.
- The reflection needs to be appreciative, and should not only pay attention to things that went wrong. This encourages people to learn and to design next steps.
- The reflection should take into account the social context in which the learning takes place.
- The reflection can have various starting points. It might use the past, the present and the future as a starting point. From reflection that takes the future as a starting point is expected much in relation to the innovation process. It stimulates breaking existing patterns, which appears to play an important role in innovation.

2. What methods support the search for learning processes in innovation processes?

The review of research methodologies that might be helpful in identifying learning processes resulted in eight methods: Storytelling, Changes and developments in daily work, Critical incidents, Discontinuities, Peak experiences, Formative evaluation, Time-interval sampling, and Imagination.

Comparison of these methods with the identified characteristics for reflection in innovation processes revealed that the method of working with Peak experiences is the only method that matches all the characteristics. The method of Formative evaluation is the least suitable for enhancing reflection since it does not focus on the daily practice but rather on preset goals, it has no attention for personal stories and emotions, nor does it use an appreciative approach. Except for the method of Time interval sampling and the method of Formative evaluation, all the methods can potentially be adapted to fit with the described characteristics.

As for the last characteristic, the starting point for the reflection, it is found that most methods use the past as a source for inquiry. There is only one method that uses the present, and only one that uses the future as a starting point.

3. To what extent are these methods useful for practitioners to influence the innovation process positively?

It is likely that the innovation process is positively influenced when the reflective activities invite the participants in innovation processes to:

- Work with cases from participants' innovation practice.
- Start from strengths.
- Break with existing patterns.

- Bring in new concepts.
- Facilitate a collaborative process of sense making.

From an academic point of view an additional set of questions could be raised with reference to the explanation of the findings in this literature review. What might be the reason that most methods focus on learning in the past, instead of investigating current and ongoing learning processes, supporting innovation. A more daring and liberating proposition could be to take the imaginary stand of learning in and from the future.

Another observation is that almost none of the methods have negative points or specific weaknesses when it comes to matching with the defined and desired characteristics. The main reason could be that we selected methods that somehow are related to learning and to innovation processes. This might explain why most of them support reflective behaviour in one or another way. Implicitly, learning and innovation are regarded as closely intertwined with reflective behaviour.

This literature study on methods revealing reflective behaviour in innovation processes leads to a set of new questions that need further investigation in new research, of which the following are some examples:

- To what extent does the stage in which the innovation process is in, influence the importance of the various characteristics of reflection?
- Would a review of other literature than that on research methodology offer new methods to enhance reflection in innovation processes?

It would be most exciting to design a research framework in which professionals are invited to deliberately apply the most promising methods in existing innovation projects. Does this lead to increased reflective behaviour in comparison to projects where these methods are not in use? What capabilities are necessary to apply the selected methods in a proficient way? Is it possible to link specific methods to specific categories of innovation projects?

6. REFERENCES

- Bolhuis, S. M., & Simons, P. R. J. (2001). *Leren en werken [learning and working]*. Alphen aan de rijn: Samsom.
- Boud, D., Keogh, R., & Walker, D. (1985). *Reflection: Turning experience into learning*. London: Kogan Page.
- Brown, J. S., & Duguid, P. (1991). Organizational learning and communities-of-practice: Toward a unified view of working, learning and innovation. *Organization Science*, 2(1), 40-57.
- Cameron, K. S., Dutton, J. E., & Quinn, R. E. (2003). *Positive organizational scholarship, foundations of a new discipline*. San Fransisco: Berrett-Koehler Publishers.
- Cooper, D. R., & Schindler, P. S. (2003). *Business research methods*. New York: McGraw-Hill.
- Cooperrider, D. L., Whitney, D. L., & Stavros, J. M. (2003). *Appreciative inquiry handbook*. Bedford Heights: Lakeshore Communications, Inc.
- Csikszentmihalyi, M. (1997). *Finding flow. The psychology of engagement with everyday life*. New York: Basic Books.
- Dewey, J. (1933). *How we think*. New York: DC.
- Flanagan, J. C. (1954). The critical incident technique. *Psychological bulletin*, 51, 327.

- Flick, U. (2002). *An introduction to qualitative research (2nd ed.)*. London: Sage.
- Geertz, C. (1973). *The interpretation of cultures* (Vol. New York): Basic Books.
- Glaser, B. G., & Strauss, A. L. (1976). *De ontwikkeling van gefundeerde theorie [the discovery of grounded theory; strategies for qualitative research, 1st printed 1967]*. Alphen aan de Rijn: Samsom.
- Kessels, J. W. M. (1996). *Het corporate curriculum [the corporate curriculum]*. University of Leiden: Inaugural lecture.
- Kessels, J. W. M. (1996). Knowledge productivity and the corporate curriculum. In J. F. Schreinemakers (Ed.), *Knowledge management, organisation, competence and methodology* (pp. 168-174). Würzburg: Ergon Verlag.
- Kessels, J. W. M. (2001). *Verleiden tot kennisproductiviteit [tempting towards knowledge productivity]*. Inaugural Lecture University of Twente, Enschede.
- Keursten, P., Verdonshot, S. G. M., Kessels, J. W. M., & Kwakman, C. H. E. (2004, April). *Relating learning, knowledge creation and innovation, case studies into knowledge productivity*. Paper presented at the the fifth European conference on Organisational Knowledge, Learning and Capabilities (OKLC), Innsbruck.
- Kleiner, A. (2006). Field manual for the learning historian. Retrieved Januari 16, 2006, from <http://ccs.mit.edu/lh/intro.html>
- Kolb, D. A. (1984). *Experiential learning*. Englewood Cliffs: Prentice Hall.
- Kwakman, C. H. E. (1999). *Leren van docenten tijdens de beroepsloopbaan, studies naar professionaliteit op de werkplek in het voortgezet onderwijs [professional learning throughout the career]*. Katholic University Nijmegen, Nijmegen.
- Lave, J., & Wenger, E. (1991). Situated learning: Legitimate peripheral participation.
- Lissack, M., & Roos, J. (1999). *The next common sense: Mastering complexity through coherence*. London: Brealey.
- Marsick, V. (2001). *Informal strategic learning in the workplace*. Paper presented at the Second Conference on HRD Research and Practive Across Europe, Enschede, The Netherlands.
- Marsick, V. J., & Watkins, K. E. (1990). *Informal and incidental learning at the workplace*. London: Routledge.
- McDrury, J., & Alterio, M. (2000). Achieving reflective learning using storytelling pathways. *Innovations in education and teaching international*, 38(1), 63-73.
- McGivern, J., & Thompson, J. (2004). Dialoguing for development: Lessons for reflection. In M. Reynolds & R. Vince (Eds.), *Organizing reflection* (pp. 142-155). Hampshire: Ashgate Publishing Company.
- Neilsen, E. H., & Winter, M. (2005). Building a learning community by aligning cognition and affect within and across members. *Journal of Management Education*, 29(2), 301-318.
- Op de Weegh, S. (2004). *How to break through, a research on knowledge productivity focussing on breakthroughs at habiforum innovation projects*. University of Twente, Enschede.
- Patriotta, G. (2003). *Organizational knowledge in the making, how firms create, use, and institutionalize knowledge*. New York: Oxford University Press.
- Preskill, H., & Coghlan, A. T. (2003). An overview of appreciative inquiry in evaluation. *New directions for evaluations*(100), 5-22.
- Reynolds, M., & Vince, R. (2004). Organizing reflection: An introduction. In M. Reynolds & R. Vince (Eds.), *Organizing reflection* (pp. 1-14). Hampshire: Ashgate Publishing Limited.
- Rossi, P. H., Freeman, H. E., & Lipsey, M. W. (1999). *Evaluation, a systematic approach (6th ed.)*. Thousand Oaks (Ca): Sage Publications.

- Roth, G., & Kleiner, A. (1998). Developing organizational memory through learning histories. *Organizational dynamics*, 27(2), 43-60.
- Sauquet, A. (2004). Learning in organizations, schools of thought and current challenges. In J. J. Boonstra (Ed.), *Dynamics of organizational change and learning*. (pp. 371-388): John Wiley & Sons.
- Scharmer, C. O. (2000, October 20th). *Presencing: Learning from the future as it emerges, on the tacit dimension of leading revolutionary change*. Paper presented at the Conference on knowledge and innovation, Finland.
- Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.
- Seligman, M. E. P. (2005). Positive psychology, positive prevention, and positive therapy. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of positive psychology*. New York: Oxford university press.
- Senge, P., Scharmer, C. O., Jaworski, J., & Flowers, B. S. (2005). *Presence, exploring profound change in people, organizations and society*. London: Nicholas Brealey Publishing.
- Simons, P. R. J., & Ruijters, M. C. P. (2001). *Work related learning: Elaborate, expand, externalise*. Paper presented at the Dynamics and stability in VET and HRD, Enschede, The Netherlands.
- Swan, E., & Bailey, A. (2004). Thinking with feeling: The emotions of reflection. In M. Reynolds & R. Vince (Eds.), *Organizing reflection* (pp. 105-125). Hampshire: Ashgate Publishing Company.
- Van Lakerveld, J. (2005). *Het corporate curriculum, onderzoek naar werk-leeromstandigheden in instellingen voor zorg en welzijn*. Proefschrift University of Twente, Enschede.
- Van Lakerveld, J., Van den Berg, J., De Brabander, J., & Kessels, J. W. M. (2000). *The corporate curriculum: A working-learning environment*. Paper presented at the Annual meeting of AHRD, Raleigh-Durham, NC.
- Van Woerkom, M. (2003). *Critical reflection at work, bridging individual and organisational learning*. University of Twente, Enschede.
- Verdonschot, S. G. M., & Keursten, P. (2006, May). *Design principles for knowledge productivity*. Paper presented at the seventh international conference on HRD research and practice across Europe, Tilburg.
- Von Krogh, G., Ichijo, K., & Nonaka, I. (2000). *Enabling knowledge creation, how to unlock the mystery of tacit knowledge and release the power of innovation*. New York: Oxford University Press.
- Weick, K. E. (1995). *Sensemaking in organizations*. California: Sage.
- Whitney, D., & Trosten-Bloom, A. (2003). *The power of appreciative inquiry, a practical guide to positive change*. San Fransisco: Berrett-Koehler Publishers.