

The prescriptive quality of 11 design principles for knowledge productivity

Suzanne G.M. Verdonshot

Kessels & Smit, *The Learning Company*; University of Twente, The Netherlands,
sverdonshot@kessels-smit.nl

Joseph W.M. Kessels

Kessels & Smit, *The Learning Company*; University of Twente, The Netherlands,
j.w.m.kessels@tsm.utwente.nl

This study explores the learning processes that contribute to knowledge productivity: gradual improvement and radical innovation of an organisation's operating procedures, products, and services, based on the development and application of new knowledge. The research is based on the assumption that innovation is the result of a series of powerful social learning processes. Previous research revealed a set of eleven design principles that reflect factors that really matter in an innovation process. The study at hand presents how these design principles facilitate the design of an innovation practice. Review workshops and design workshops were used to answer the main research question: How do the design principles facilitate the design of an innovation practice? The data reveals that the design principles do not work as prescriptive rules that in a specific combination, applied to a predefined situation, will result in certain effects. Every design principle offers a new perspective on the innovation practice. This new perspective helps to get new ideas for interventions in the innovation practice. After the design of these interventions it is mainly the facilitator who has an important role in making it a success. If he sees opportunities and is capable, then he can use the interventions to create breakthroughs in the innovation practice.

Keywords: Design; Design research; Innovation; Knowledge productivity; Workplace learning

1. Introduction

Our society is gradually becoming a knowledge society. Peter Drucker (1993) speaks of a revolution that is comparable to the industrial revolution that started in the 18th Century. This means that the traditional factors of production, labour, land and capital, make way for the factor of the production of 'knowledge'. By applying knowledge, people develop gradual improvements and radical innovations in new products and services, which provide the basis for economic growth. This shift from an industrial society towards a knowledge society requires a change in the way we look at learning and working. According to Kessels (Kessels, 1995, 2001) in an economy where knowledge is dominant, daily operations in organisations should be designed to support the process of *knowledge productivity*. This process of knowledge productivity entails: identifying, gathering and interpreting relevant information, using this information to develop new capabilities. When applying these capabilities the

process of knowledge productivity becomes visible in gradual improvement and radical innovation of an organisation's operating procedures, products and services. The process of knowledge productivity is based on powerful learning processes. In earlier research (Verdonschot & Keursten, 2006) we reconstructed 11 design principles that support this process of knowledge productivity:

1. Formulating an urgent and intriguing question
2. Creating a new approach
3. Working from individual motive
4. Making unusual combinations of subject matter expertise
5. Working on the basis of mutual attractiveness
6. Starting from strengths
7. Learning by creating something together
8. Enticing to see new signals and to give them new meaning
9. Connecting the world inside an innovation practice to the one outside
10. Approach the work process primarily as a social and communicative process
11. Developing new competencies

The main objective of developing these design principles is helping key players in innovation practices to turn their work environment into a powerful learning environment that supports knowledge productivity. Until now the design principles were validated as a descriptive tool (Verdonschot & Van Rooij, 2007): they are supportive in describing the elements that seem to matter in an innovation practice. However, in order to be able to deliberately influence and support these innovation practices, it is necessary to find out whether these design principles also have a prescriptive quality when designing innovative environments. This paper presents the results of an explorative study in which we examined the process of analysing and designing innovative work environments on the basis of these design principles. The aim is to examine how HRD practitioners can apply these design principles for knowledge productivity to design specific interventions that lead to gradual improvements and radical innovations in the day-to-day work environment.

2. Problem statement

Gradual improvement and radical innovation are for an organisation in the knowledge economy of crucial importance for lasting success. Gradual improvement and radical innovation are based on powerful learning processes. In earlier research we reconstructed a set of 11 design principles to improve knowledge productivity (Verdonschot & Keursten, 2006). These design principles were proven to be helpful in describing innovation practices (Verdonschot & Van Rooij, 2007). In this next phase in the research project we investigate how these design principles support professionals in their design of an innovation practice and to what extent their design interventions lead to breakthroughs in the innovation process. The research question is:

How do the design principles facilitate the design of an innovation practice?

3. Methodology

As the main objective of this study is to investigate the design process of suitable interventions in innovation practices, the main characteristic of the research design is creating an environment where participants become involved in analysing an innovation process and designing interventions to influence that process. Such research approach is also known as "design research" (Bereiter, 2002; Van den Akker *et al.*, 2006), "development research" (Van

den Akker, 1999) or “design science” (Romme & Damen, 2007; Van Aken, 2007). The difference between these design approaches is the context these approaches are developed in and for. Bereiter (2002) and Van den Akker (*et. al.*, 1999; 2006) refer to *educational* design research, in which they aim to improve educational policy and practice through research, whereas Romme and Damen (2007) and Van Aken (2007) aim to improve organisational performance by design science. Both approaches have in common that they aim to increase the practical relevance of the research they perform. This paper refers to the term “design research” as the approach to answer the research question above.

The complete design process consists of a cycle of three subsequent phases. Figure 1 visualises this cycle. In order to arrive at satisfactory solutions, design problems have to be identified (Churchman, 1971). The phase of analysis of the innovation practice refers to this. Since a design offers a solution not to a mere knowledge problem, but rather to a field problem (Van Aken, 2007), the phase of analysis comprises a review of the innovation practice. Based on the analysis of the actual situation an intervention can be designed. This is visualised in the phase of design. And, since solving an actual field problem not only entails the design of a solution but also the realisation of the designed solution in social reality (Van Aken, 2007), the next phase consists of the realisation of the designed interventions in practice. After this realisation one could analyse the innovation practice again to evaluate the effects.

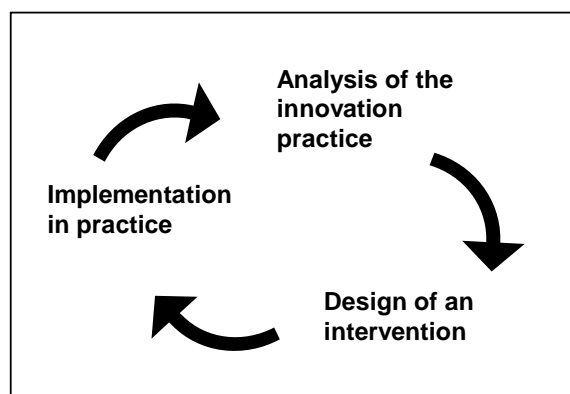


Figure 1. Visualisation of the design process

In this research two research activities are central:

1. Review workshops where participants analysed a given innovation practice and proposed interventions to enhance the innovation process.
2. Design workshops where researchers worked together with facilitators of actual innovation practices in order to design a next step for their innovation practice.

The respondents that we worked with in the review workshops were students and researchers in the field of Human Resource Development (HRD) and Knowledge Management (KM). The respondents that took part in the design workshops were all facilitators of actual innovation practices. The two research activities comprise different phases in the design process. The review workshops were used to find out how respondents work with the design principles in order to make an analysis of a given innovation practice and how they design interventions based on this. This research activity focused on better understanding of the transition from the phase of analysis to the phase of design (see Figure 1). The design workshops were used to investigate the complete design process. In this setting we worked with facilitators of innovation practices who not only analysed their own innovation practice and designed interventions for the problems they encountered in their innovation practice, but

also tried to implement these in practice. Table 1 displays the characteristics of the two research methods.

Research method	Review workshop	Design workshop
Relation with the complete design cycle	Emphasis on the transition from analysis of the innovation practice to the design of interventions.	The whole design process is investigated: the analysis, the design and the implementation in practice.
Description	12 review workshops in which researchers and students in the field of HRD and KM analysed a given innovation practice with help of the 11 design principles and designed interventions.	10 design workshops in which the researcher together with a facilitator of an innovation practice, analysed the innovation practice and designed interventions with help of the 11 design principles. After the design, the interventions were worked with in practice.
Participants	39 researchers and students	8 practitioners
Context	Given innovation practice	Their own innovation practice

Table 1. Overview of the differences and similarities of the methods used

The set of eleven design principles has a central place in both the review workshops and the design workshops. The set of design principles that were previously validated as principles that can be used to describe breakthroughs in innovation practices, formed a common framework and language that supported a constructive collaboration in the design process. The sections below elaborate upon the participants, the instruments, procedure and data-analysis of the review workshops and the design workshops.

3.1 Review workshops

A review workshop consists of four consecutive steps. These are summarised in Table 2.

No	Activity	Instrument	Result
1	Case presentation: Shedding light on Underground Five actors presented the case by reciting five monologues. The portrayed characters are involved in a town planning process in the context of multiple space use. They present their experiences and reflections in the innovation process. These monologues offer the participants the concrete context of an innovation practice.	Case presentation by means of five <i>monologues</i> (see Figure 2).	Participants learn about the innovation practice they will be working with in a direct way. The presentation in the format of enacted monologues offers a real life involvement of the case study, which enhanced the commitment to participate in the analysis and following design activities.
2	Analysing the innovation practice Using the context that is presented in the monologues, the participants analysed this case using the set of design principles. The respondents worked in groups of 3-4 people. In total, 12 circular scales were filled out.	The set of 11 design principles on cards that are to be positioned in <i>circular scales</i> .	Participants have made an analysis of the innovation practice with help of the eleven design principles. The placement of the cards on the circular scales was preceded by

			deliberation and making impressions and interpretations explicit.
3	<p>Design of interventions</p> <p>The participants are asked to design interventions that could enhance the process of knowledge productivity within the presented context. They are asked: imagine that you are the facilitator of this innovation team: What design question is at hand? What does this team need? What principle would you choose to work with? What intervention would you suggest?</p>	<p><i>Report sheets</i> with supporting questions.</p>	<p>On the basis of the supporting questions, the participants evaluate each design principle and deliberate on possible interventions. This can be considered as a social learning process that leads to proposed interventions and their underpinning to improve knowledge productivity in the given case study.</p>
4	<p>Discussion and closing</p> <p>The workshop is closed by discussing the interventions that the participants designed. The participants were also asked how they experienced the workshop and what suggestions they offer for improvement.</p>		

Table 2. Protocol of the review workshop

Selection of participants

9 Students in the field of HRD (Human Resource Development) and 30 researchers in the field of KM (Knowledge Management) attended the review workshops. These respondents all have affinity with the subject of knowledge productivity and innovation and were eager to learn more about the concept of knowledge productivity. Their motivation was an important reason to work with them.

Instruments

Three instruments were used:

- **The monologues:** The monologues describe five persons involved in an innovation practice in the context of innovative space-use in a town planning process. The monologues are dramatised texts, based on the data we collected in the research until now (Verdonschot & Keursten, 2006). Figure 2 summarises the context of the monologues and the characters that play a part.
- **Circular scales:** As a data collection instrument we applied a set of circular scales. The participants were asked to place cards, with design principles as labels, in the rings according to the degree they found these active in the innovative practice: from very much attention for a principle (inner circle) to absence of a principle (outer circle). This instrument is based on the method of 'mapping' as described by Van der Waals (2001). The rings resemble a five-point Likert scale.
- **Report sheets:** A form with supporting questions that guided the design process of the participants. The questions helped the participants to define the design question, to choose design principles to work with and to propose a design for the needed interventions.

Procedure

The review workshops took approximately 4 hours and were given at two moments in time. Nine students in the field of HRD attended workshops in May 2005. From these workshops it became clear that there was a need for some extra support in the phase of the design of the

interventions. In the second round of the review workshops the report sheet was introduced to offer the participants some extra guidance. The second round of review workshops took place during the ISMICK-conference at the University of Stellenbosch SA, in August 2006. Thirty researchers in the field of KM attended these workshops. In both series of workshops the respondents as a group were first asked to listen to five theatrical monologues that set the scene. While working in groups consisting of 3-4 participants the respondents filled out the circular scales. They could make use of handouts that contained a detailed description and examples from practice for each of the design principles.

The monologues illustrate the perspectives of five stakeholders in a process of innovation. The innovation process is about a district of a city where the public activities are increasing. More and more companies are moving to this district, because of its nice site. This increasing activity is a threat to the characteristic part of the city that this district also contains: the companies need lots of space. Besides the physical space they need, they also attract traffic-streams. In addition there is a threat to the nearby green environment. This area attracts a lot of local visitors in the daytime, especially on weekends. These people are drawn to the rhododendron -garden and the specialty shops of local entrepreneurs.

These developments create a tension. On the one hand there is a need of space for the companies to settle and a need of increasing infrastructure for this district. On the other hand there is an urge to preserve the unique characteristics of the district and the green area. For some years, the local government has had the ambition to rearrange this city-district in order to facilitate these conflicting developments. They have been looking for cooperation with different parties. Even though there was a collective ambition regarding district renovation, no innovation process has started since then. Therefore the alderman of town planning initiated a new approach.

In the monologues, the following participants involved in this innovation process will be speaking:

- George Brown is an employee in the civil services of Green Area and Construction Control
- Willy Freeman is real estate developer at a large construction company
- Rosemary Wiggins is an inhabitant of the district
- Kim Liong is the owner of a typical stationery shop in the district
- Tom Banks is alderman for town planning and the initiator of this new approach

Figure 2. Content of the monologues

Data analysis

A statistical as well as a qualitative analysis of the circular scales was performed to see how the respondents had interpreted the innovation practice that was given to them. The report sheets were analysed for an overview of the design principles that were chosen to design interventions with. The third analysis was performed to learn more about the kind of interventions that were designed.

3.2 Design workshops

Selection of participants

In this phase we invited facilitators of real life innovation practices to use the design principles for the design of interventions for their innovation practices. Previously, these facilitators participated in the parallel research that lead to the development of the set of eleven design principles (Verdonschot & Keursten, 2006). Eight facilitators had their own innovation practice at that moment and all of them participated in one or more design workshop.

Instruments

The report sheet, a sheet with questions to guide the design workshops, forms the main research instrument. The questions in the report sheet are:

- What is happening at this moment in the innovation practice?
- What are the starting points?
- What is the design question?
- How does the design look like?
 - o What design principles do you want to work with?
 - o What intervention does the design require?
- What do you expect to happen?
- How did it work out in practice?
- Did something else (unexpected) happen?
- What would be a next step?

Procedure

Each design workshop was attended by one of the researchers and one of the facilitators. The meeting was guided by the questions on the report sheet. The aim was to design a next step for the innovation practice the facilitator is involved in. After the design workshop the researcher filled out the report sheet and checked this with the facilitator. For the facilitator this report sheet served as a reminder for the action to be taken in practice. For the researcher this sheet was the format to report the steps in the design process and to report how the implementation of the proposed design worked out in practice (last three questions). The evaluation of the results was done by means of a short telephone-interview after the intervention took place.

Data-analysis

The analysis of the report sheets shows what design principles were chosen by the facilitators to design interventions with and how they realised the interventions in practice.

4. Results

The next section discusses the results of the review workshops. This is done in three parts. First it shows the results with respect to the step of analysis, then it elaborates upon the transition from analysis to design and third, it presents the designs that were made. This section is followed by a section that presents the overall results of the design workshops.

4.1 Review workshops

Analysis of the given innovation practice

Table 3 shows how the design principles were scored in the phase of analysis. The circular scales were converted into a five-point-scale (the middle ring is assigned number 1, the second ring number 2, etcetera; cards that were placed in between two rings got score .5). Three observations are prominent:

- Design principle 1 (Formulating an urgent and intriguing question) is scored very differently.
- The different groups assigned Design principle 3 (Working from individual motive) a place in the centre.
- Design principle 11 (Developing new competencies) is assigned a place in the outer rings. This principle is not recognised very well in the case description.

- Design principle 5 (Working on the basis of mutual attractiveness) is found quite important.

Design principles	Mean	σ	N
Design principle 1 Formulating an urgent and intriguing question	3,13	1,68	12
Design principle 2 Creating a new approach	2,71	1,30	12
Design principle 3 Working from individual motive	1,41	0,47	12
Design principle 4 Making unusual combinations of subject matter expertise	3,54	1,12	12
Design principle 5 Working on the basis of mutual attractiveness	2,58	0,67	12
Design principle 6 Starting from strengths	3,13	1,13	12
Design principle 7 Creating something together	2,38	1,13	12
Design principle 8 Enticing to see new signals and to give them new meaning	3,54	1,42	12
Design principle 9 Connecting the world inside an innovation practice to the one outside	3,25	1,06	12
Design principle 10 Approach the work process primarily as a social and communicative process	2,33	1,35	12
Design principle 11 Developing new competencies	4,13	0,93	12

Table 3. Overview of means and standard deviations of the scores per design principle

From analysis to design

It became clear that the design of interventions is not an activity often deployed by the participants. The support they were given during the workshop determined the success of the research activity for an important part. After the first three workshops a report sheet was introduced with questions that could guide the process of designing interventions. The report sheets were filled out by the participants and it became clear that this structure facilitated them in the process from analysis to design. The interventions were described more accurate and their choice for the design principles to work with was better motivated.

The dominant strategy for intervening is to choose an outlier principle and to get that one more to the centre. There were three groups that chose the principle to work with from one of the two inner rings. One of these groups wanted to use the one from the inner circle as a lever for another, more on the outside. Another group explained: “*these ones are already so in the centre, we expect a lot when working with these*”. These two strategies seem to be based upon different hypotheses about the way the design principles work. Whereas the first group seems to believe that in an innovation practice each of the design principles should get attention, the second group proceeds from the belief that the design principles resemble capabilities of the

innovation practice. They believe that the most is to be expected from the application of these capabilities one is good at already.

The design of the interventions

The three design principles that were chosen most often to design the next step are Design principles 1 (Formulating an urgent and intriguing question), 9 (Connecting the world inside an innovation practice to the one outside) and 11 (Developing new competencies):

- Design principle 1 (Formulating an urgent and intriguing question) was chosen as a principle to work with by the respondents who had placed the principle in the phase of analysis in the outer circles. Examples of the proposed interventions are drawing and comparing dreams for the future; combining the individual questions in order to define a combined question that defines the next objective.
- Design principle 9 (Connecting the world inside an innovation practice to the one outside) was often chosen to work with. The respondents motivate their choice for Design principle 9 by explaining their belief that the process is ready to start off with a new phase. One group formulates this as follows: *“theoretically they have made decisions on their approach to the problem. However, at the moment there is lack of commitment and transparency resulting in an inability to make decisions for future development”*). The interventions aimed to support this step in the process, although they were quite diverse. Some propose to ask an important person to pick up the project, or to replace people in the team. Others propose to develop a physical model of the proposed buildings (*“our idea is that a physical model would allow the recognition of pros and cons for such building and foster creative thinking for the project”*).
- Design principle 11 (Developing new competencies) is chosen quite often to work with. This might have to do with the fact that respondents placed this principle in the outer rings when analysing the innovation practice. However, the interventions that they subsequently designed are not always clearly linked to Design principle 11. E.g. one group proposes to *“bring in a project facilitator to give structure and to tie it to the institutional”*. This is an intervention that might have been linked to Design principle 9 (Connecting the world inside an innovation practice to the one outside) as well. One of the interventions that is clearly linked to Design principle 11 comes from the group that proposes to give new responsibilities to the people in the innovation practice.

An intervention that more than three groups came up with is the design of a scale model or physical design of underground offices, which enables a comparison of various alternatives. Two groups do this in order to support Design principle 9 (Connecting the world inside an innovation practice to the one outside) and one group does this in order to promote Design principle 7 (Learning by creating something together).

Six of the groups focused on the introduction of a new phase by bringing in structure and moving people in and out the innovation group. They thought the innovation practice had an inward focus and that it was about time to make a next step where they could be more focused on the outside world. In making this step several groups found it important that the connection with others is made (e.g. politicians and experts), two groups found it necessary to choose a facilitator for the process, and one group proposed to make a financial plan to support the next step.

4.2 Design workshops:

The phases of the design process (see Figure 1) are used to present the findings of the design workshops.

Analysis of the innovation practice

- In defining the design question at hand, the researcher plays an important role. The researcher helps the facilitator to think the process through. The researcher asks questions and summarises what the facilitator brings up. The analysis of the innovation practice is thus a collaborative activity of the researcher and the facilitator.
- The respondents start to analyse their innovation practice with help of the design principles as soon as they are asked to select the design principles they want to work with. They then use the design principles to describe the actual situation in the innovation practice. This is not hard for them at all.

Design of an intervention

- After the analysis of the innovation practice with help of the design principles the facilitators choose without doubt one, two or three principles to work with. The considerations that play a role in their choice are:
 - o An analysis with respect to content: often they choose one design principle that illustrates the problem, and two or three as a lever to create a breakthrough. In the various design workshops the design principles that function as a lever are different every time.
 - o Apparently they choose design principles that match their own preferences and capabilities.
- Two design principles were chosen quite often. Design principle 3 (Working from individual motive) is chosen five times, and Design principle 6 (Starting from strengths) is chosen three times. Design principle 11 (Developing new competencies) was never chosen as a design principle to work with. This is remarkable, as this design principle was favourite in the review workshops.
- The design that the facilitators make together with the researcher consists of a description of what they want to realise, the technique or way of working to be used (e.g. '2x2-questions' (a special question technique); the use of interviews), and the structure of the meeting in which this will be done.
- Some respondents experienced the design workshops as more difficult than others. The respondents that found it easy, chose often ways of working they were familiar with. For them the workshops seemed to have the function of focussing on what they wanted to achieve in the innovation practice. They used the design workshops to prepare themselves for the next meeting in the innovation practice. The exact design seemed to be less important than the act of engaging in a design workshop. Together with the researcher they used the available time to analyse their innovation practice, to articulate their ambitions and to design concrete ways of realising this. The majority of these respondents were enthusiastic to participate in another design workshop.
- The respondents that found it rather difficult to participate in the design workshop tended to choose interventions that were new for them and that were not so easy to put into practice in the next meeting they had with their innovation practice. These respondents were not so enthusiastic to participate in another design workshop.

Implementation in practice

- None of the respondents implemented the intervention in practice exactly the way they designed it. In practice they were confronted with a slightly different situation for

- which they felt the need to do something else than planned. However, they did use elements of the original design in almost all cases. The respondents that do not make use of the preparations in the design workshops at all, are the ones that found it difficult to participate in the design workshop in the first place. Their designs often required a complete different setting that was not available the next meeting they were in. The respondents that did use elements of the original design and that were enthusiastic about the design workshop used the telephone-interviews to explain elaborately how they experienced the next step in their innovation practice and to what breakthroughs they thought it had lead.
- The respondents that did use elements of their design, but did not exactly implement their initial plan, were not bothered by that. They did not consider the time that they took for the design workshop as a waste. It could very well be that the design that they made fulfilled the function of a compass. It helped them to give meaning to the events that happened in the innovation practice and it helped them to decide how to deal with these events.
 - It was hard to trace back the breakthroughs that the respondents reported to the specific design principle they deployed. However they found it very easy to analyse the breakthroughs with help of the design principles. In these cases the design principles served as descriptive principles that helped the respondents to reflect upon their experiences.

5. Conclusion

The results from the review workshops and the design workshops show some interesting differences and communalities. When choosing principles for a design that deliberately intends to create breakthroughs, participants in the review workshops refer either to design principles in the outer circle (considered as not yet active in the case study, and therefore potentially powerful), or design principles from the inner circle, that have already proven to be successful. However, participants in the design workshops choose principles on the basis of a strong personal affinity. Apparently, practical experience in facilitating innovation practices leads to a different preference of design principles than when this choice is based on merely critical and analytical thinking,

Nevertheless, Design principle 3 (Working from individual motive) is undoubtedly favourite with participants in the review workshops as well as with those attending the design workshops. It is believed to have powerful potential to bring about breakthroughs in innovation practices.

On the other hand, Design principle 11 (Developing new competencies) is not regarded as very helpful. In the review workshops, participants find it difficult to use this design principle as a framework for analysing an innovation practice. Facilitators of innovation practices do not choose this principle as a promising basis for new interventions. Although new competencies are generally recognized as important prerequisites for bringing about radical changes, the deliberate development of such competencies is not regarded as a potential strategy to be implemented in innovation practices. It is plausible that respondents associate the development of competencies with training or formal schooling. Such kind of activities is not easily put forward in the context of innovation teams. A broader view on the learning environment in an innovation practice might shed new light on this design principle.

The design principles help the respondents to get new ideas for interventions for the innovation practice at hand. In the design workshops it appeared that there are some facilitators who are enthusiastic and make plans to bring it into practice. There is another

group that is not easily inspired by the design workshops. The latter group experiences that it is not easy to implement the proposed interventions in practice. But also the first group experiences difficulties in doing so. Although they are enthusiastic about this the design, they face difficulties in putting the design principles into practice.

Practice is not so easy to shape with help of design principles. Apparently, the design principles do not work as prescriptive rules that in a specific combination, applied to a predefined situation, will result in certain effects. It becomes clear that not the design principle but rather the skilled facilitator creates breakthroughs in the innovation practice.

However, the design principles do perform specific functions:

- Every design principle offers a new perspective on the innovation practice. This new perspective helps to generate new ideas for interventions in the innovation practice.
- The design principles help to think through what one wants to realise in practice and how that can be recognised when it happens. Because you know what to expect, you are more sensitive for weak signals that occur in practice and that resemble or differ from what you expected. It seems as if the design principles bring focus and facilitate the interpretation of what is happening in practice.
- The mental preparation that is done in the design workshops strengthens the facilitators' self-confidence. During a meeting with the innovation team he can be completely concentrated on what is happening in the group.

After the design of these interventions the facilitator has an important role in making it a success. If he sees opportunities and is he capable in doing so, he can use the interventions to create breakthroughs in the innovation practice.

It appears that designing interventions on the basis of the eleven design principles can be very inspiring and helpful in preparing facilitators for their work in their innovation practices. However, the design itself is not equivalent to the skilful and successful implementation of the related interventions. Therefore, the need emerged to develop a safe learning environment for facilitators who wish to experiment with new interventions. In the next step of the research project we offer facilitators not only the opportunity to design interventions on the basis of the eleven design principles, but also an opportunity to enact the proposed interventions. Here, in a simulated game experience, they can freely experiment with new actions for their own case, feel and see the results and improve their design and competencies. This experimental game environment offers the opportunity to quickly run through the three general phases of the design cycle as depicted in Figure 1, learn from the experiences and adjust the interventions to the need of their practice. It is possible to go through the design cycle several times, something that normally is not feasible in the real life innovation practice.

It seems as if in this new phase of the research project Design principle 11 (Developing new competencies) is deliberately practiced by the facilitators themselves.

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