

Katrina Heijne &  
Han van der Meer

# Road Map for \* Creative Problem Solving Techniques

Organizing and  
Facilitating Group  
Sessions

Boom



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Katrina Heijne

Han van der Meer



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# Preface

In 2013, the first edition of *integrated Creative Problem Solving (iCPS)* was published. In this book we describe how to design a smoothly facilitated creative session by explaining the theory of creativity and how to facilitate a creative session. We also cover the main features of the most commonly used techniques, but not in detail. In this *Road Map* we will gradually explain the techniques we describe in our earlier books. First, we will describe the most popular of each main category of technique. Then, for each popular technique we will give a couple of variations.

Most authors in our field are not the most scrupulous when it comes to acknowledging earlier work. It is common to copy someone else's technique and simply rename it. Whenever possible, we try to avoid this by returning to the original writer on the technique and citing the source as comprehensively as we can.

We do not think this *Road Map* will ever be finished. In our field, new insights and new techniques are found almost every day. This is work in progress. Let us start now and lay the ground for the further growth of our profession: ***Creative Facilitation***.



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*Dedicated to Jan Buijs († December 1, 2015)*

# 1

## Setting the stage

Our book (Buijs and van der Meer, 2013) *integrated Creative Problem Solving (iCPS)* was the result of forty years of developing the practical procedures, methods and techniques in the field of Creative Problem Solving (CPS). iCPS originated at the Delft University of Technology (DUT), Faculty of Industrial Design Engineering (IDE). In the iCPS book, the focus is on explaining the underlying principles of facilitating a creative session. Methods and techniques are only explained on a theoretical level. With this ‘road map,’ we try to build on the iCPS principles and give a full description of methods and techniques: the ‘tools’ of the ‘facilitator.’ You can find the major techniques in this book. For the methods we refer to the website.



Before diving deeply into the practicalities of the facilitator’s techniques, it might be helpful to provide a short recap of the principles behind them. Each creativity technique is based on one or more of these principles. Understanding the principles will result in an increased understanding and more effective application of the techniques described in this book and finally in remodelling techniques to your personal style, your own toolbox, your own method.

First, some history is given, followed by our working definition of creativity. Then the text makes a major leap forward by presenting the Delft adjustment to the classical Creative Problem Solving (CPS) model. The chapter ends with the three basic principles for good facilitation.

### 1.1 Historical overview of creativity

Creativity is a complex and complicated phenomenon (Runco et al, 1999). It has to do with people’s talents and traits, it has to do with surprising new solutions to problems, it has to do with specific actions people take, and it has to do with circumstances and situations. It is value based: robbing a bank without being caught can be considered a creative act, but we do not want to teach our readers how to do it. And of course it is time bound. What was new one hundred years ago is now common practice. It is also context bound: what is new in one domain can be normal in another domain.

Within the domain of creativity and Creative Problem Solving, the 4P theory of Mel Rhodes (1961) is commonly used to distinguish all these different aspects. Rhodes

(1916 – 1976) divided the creativity domain into four specific aspects. Since all aspects have a label beginning with a ‘p’ his work is referred to as the ‘4P theory on creativity: person, process, press and product.’ In more detail:

- **Person:** This ‘covers information about personality, intellect, temperament, physique, traits, habits, attitudes, self-concept, value systems, defence mechanisms, and behaviour.’ (Rhodes, 1961, p. 307)
- **Process:** This ‘applies to motivation, perception, learning, thinking and communication... What are the stages of the thinking process?’ (p. 308)
- **Press:** This ‘refers to the relationship between human beings and their environment.’ (p. 308)
- **Product:** Rhodes makes a distinction between idea and product. ‘The word *idea* refers to a thought which has been communicated to other people in the form of words, paint, clay, metal, stone, fabric or other material. When an idea becomes embodied into tangible form it is called a *product*.’ (p. 309)

Since in practice we only find the ‘process’ part useful when we design tools for sessions, we will continue our journey on the theory of creativity along this path and use the working definition of the most cited author on creativity, Theresa Amabile:

‘Creativity is *the process* that leads to novel and useful solutions to given problems.’ (Amabile, 1996)

Creative facilitation is not suited for all types of problems. Usually two types of problems are distinguished: closed-ended and open-ended problems. Tudor Rickards (1974), of the Manchester Business School, has summarized the differences between these two types. See Table 1.1.

Open	Closed
Boundaries may change during problem solving	Boundaries are fixed during problem solving
Process of solving often involves production of novel and unexpected ideas	Process marked by predictability of final solution
Process may involve creative thinking of an uncontrollable kind	Process usually conscious, controllable and logically reconstructable
Solutions often outside the bounds of logic - can neither be proved nor disproved	Solutions often provable, logically correct
Direct (conscious) efforts at stimulation of creative process to solve problems is difficult	Procedures are known which directly aid problem-solving (algorithms or heuristics)

Table 1.1. Characteristics of open and closed problem situations (Rickards, 1974).

In the rest of the text, we will focus on open problems, thus leading to our working definition of creativity:

**Creativity is the process that leads to  
novel and useful solutions to given open problems**

One of the oldest descriptions of the creative process has been given by Graham Wallas (1926). He distinguishes four stages:

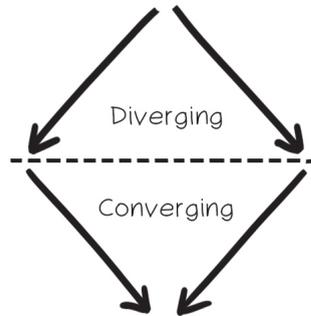
1. Preparation,
2. Incubation,
3. Illumination,
4. Verification.

In the first stage, the problem is 'investigated ... in all directions' (p. 91). In the second stage the problem solver is not consciously thinking about the problem. In the third stage, the 'happy idea' suddenly appears (p. 92). And in stage four, the idea is checked for its proper value. Wallas distinguishes four separate stages, which are by no means equal stages. Not equal in objectives, or in size. Preparation can take years, incubation months or also years, illumination can happen in a fraction of a second (the famous 'eureka-moment' or 'Aha Erlebnis'), and verification can again take a long or a short period. His process view gives a nice insight into the creative process an individual goes through, but it also previews what groups with a creative task have to do. Although in later works, a fifth and even sixth step can be found, the four-stage representation of the creative process is still the one most used (Sadler-Smith, 2015).

Research in creativity made a major leap forward in 1950 when J.P. Guilford (1897 - 1987) delivered his acceptance speech as the new president of the American Psychological Association. In this speech, he proposes to separate the diverging and converging capacity of the brain. Ever since, stimulating creativity and supporting people in Creative Problem Solving (CPS) has become an explicit academic and professional domain.

Diverging is at the heart of CPS. Getting many options in order to get one or two good ones for further development is the basic principle. The option-generating technique 'brainstorming' (Osborn, 1953) made this way of thinking popular. Alex Osborn (1888 - 1966), one of the founders of the major advertising agency BBDO, developed this technique in the early 1940s. Osborn lived in Buffalo, New York, USA, a city still benefiting from his fame by declaring itself to be 'the Cradle of Creativity.' Here he partnered with the State University, where he and his co-worker Syd Parnes developed the only Master in Creative Studies in the world. The State University has hosted, since 1954, the largest yearly conference on CPS under the name of CPSI (Creative Problem Solving Institute). The core messages of diverging in brainstorming are 'postponing judgment' and 'quantity breeds quality.'

generating in this way lots of options without judging any of them. The consequence of diverging is that you also have to converge later in the process. If you produce hundreds of options, you have to select a couple of good ones to continue with since it is impossible to develop all of them. This sequence of divergence (generating) and convergence (selecting) led to the well-known 'creative diamond': an expanding diverging phase followed by a narrowing converging phase. See Figure 1.1.



*Figure 1.1. Modelling the sequence of diverging and converging thinking in the form of the 'creative diamond'. Horizontal: the number of ideas; vertical: the time. Based on Guilford's and Osborn's thinking.*

In those early days of creativity research the emphasis was on diverging: if you could produce many ideas you had creative potential. Paul Torrance (1915 - 2003), professor in educational psychology at the University of Georgia, developed different tests to measure people's ability to diverge, among which the well-known TTCT: Torrance Tests of Creative Thinking (Torrance, 1974). The four main aspects to judge divergence are according to him:

1. Fluency: the number of options per time unit,
2. Flexibility: the number of categories the options are based on or fit in),
3. Elaboration: the depth or filling out of the option and
4. Originality: the degree of newness of the options.

One of the presuppositions of our approach to creative facilitation is that you can influence fluency and flexibility by using techniques and this will then lead to originality. A well-facilitated creative process will subsequently protect originality and foster elaboration.

Whereas Osborn and his followers of the Buffalo school focused on fluency and came from the advertising world, another group active in the 1950s focused on flexibility and elaboration and came from the world of technical invention. The foreman of this group, William Gordon (1919-2003), started this work in the Invention Design Group of the Arthur D. Little consultancy company and was joined a few years later by George Prince (1918-2009). Training groups consisting mainly of technicians to come up with technological breakthroughs, they experienced the

power of analogies and the mechanism of ‘forced fitting’ options from a completely different field to the problem at hand. Their approach to creativity is often referred to as ‘Synectics,’ the title of the book by Gordon published in 1961.

An important aspect of CPS is that it is always intended to be a group activity. Small groups of people execute the CPS process. From now on we will refer to this group as the ‘resource group’ or RG. It is the joint effort of this group to come up with interesting solutions for the originally stated problems. The group process is organized and managed by the so-called ‘facilitator.’ The facilitator is responsible for the CPS process. The resource group, the participants in the CPS process, are responsible for the content. They are going to solve the problem at hand. The facilitator helps them in achieving that. There is consensus among the academics and practitioners in the field of CPS that the ideal size of a resource group should be 5 to 8 people if it is to work effectively under the guidance of one facilitator. Larger groups should be split up and will thus need more facilitators (Isaksen et al., 2000).

In the American Buffalo CPS tradition (Parnes, 1967), the process the resource group will follow is not limited to one single creative diamond but consists of a sequential series of five separate diamond-shaped steps:

- Fact Finding,
- Problem Finding,
- Idea Finding,
- Solution Finding,
- Acceptance Finding

In our vocabulary we refer to ‘Fact Finding’ with the somewhat broader term ‘Information Finding,’ leading to the following linear CPS model.

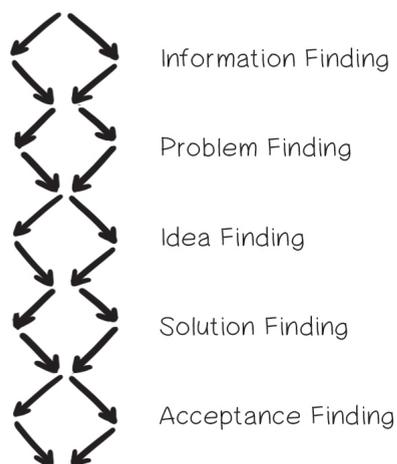


Figure 1.2. The five Buffalo CPS stages based on Parnes, 1967

## iCPS: Delft's expansion of the traditional CPS approach

The roots of Creative Problem Solving can be found in the United States and it is as such rather biased toward the culture of the United States. The traditional (linear) CPS approach as well as the current Buffalo variant, which is positioned as more iterative (Foursight model, see Puccio, 2010), remains a challenge for European CPS practitioners. *Integrated Creative Problem Solving (iCPS)* is the attempt of the Delft University of Technology (DUT) to cope with these challenges (Buijs and van der Meer, 2013). The main characteristics of iCPS will be elaborated in the following paragraphs in four steps:

- 1.2.1 The four sub-processes of iCPS: Instead of concentrating on the Content Finding process only, iCPS consists of four interdependent sub-processes: Project Management, Information Finding, Acceptance Finding and Content Finding.
- 1.2.2 Creative diamond 2.0: iCPS added a step of 'reverting' in the traditional two-step creative diamond of a diverging followed by converging step. This three-step creative diamond is called 'creative diamond 2.0.'
- 1.2.3 iCPS basic module: iCPS expanded the creative diamond 2.0 into the iCPS basic module. On top of creative diamond 2.0 a step called 'task appraising' has been added. After the converging step, a 'reflecting' step has been added. Thus the iCPS basic module consists of five steps: (1) task appraising – (2) diverging – (3) reverting – (4) converging – (5) reflecting.
- 1.2.4 The active role of the facilitator in both process and content: iCPS puts emphasis on the active role of the facilitator and the need for some content knowledge to be a good leader in the creative process.

### 1.2.1

#### The four sub-processes of iCPS

iCPS consists of four interdependent sub-processes: Project Management, Information Finding, Acceptance Finding and Content Finding. See Figure 1.3, below.

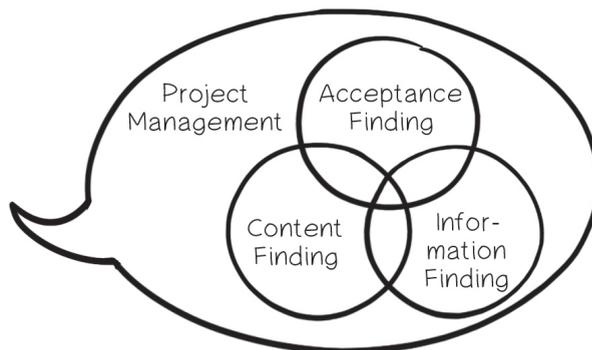


Figure 1.3. The basics of iCPS in 4 sub-processes

### **Project Management is the basis**

While executing CPS sessions over many years, we discovered that neither knowledge about the different steps in the process, nor the role of diverging and converging, nor the knowledge of the different creativity techniques was enough to run and organize successful creative sessions. The session in itself is a challenging endeavour and a complicated project in its own right. As a facilitator you first have to convince the ‘problem owner’ that a creative session could help to solve his problem. Secondly, you have to agree on which people you both want to invite to become members of the resource group. And thirdly, you have to organize and manage all the mundane business like setting a date, hiring facilities, finding the right materials and, of course, the budget and the deadlines. These practical aspects of organizing and running a creative session are crucial for success and should be nurtured. So we introduced the ‘project management’ process as one of the sub-processes of our approach. This is our first addition.

### **Information Finding: A continuous ‘reality check’**

The traditional Buffalo five-step approach to CPS starts with ‘Fact Finding’, which we refer to as ‘Information Finding.’ In this preparatory step, as much information is gathered as possible to understand the essence of the topic the problem owner would like to have solutions for. In our experience, this is highly valuable and most important but not enough. During a creative session, the members of the carefully selected resource group are relying on their own knowledge, skills and experience stored in their brains. They are encouraged to bring everything they think of to the table. So sometimes they say wrong or even non-sensical things based on a lack of information. Checking or producing this information during the session is non-productive. It will change the working climate from generating to analysing and will stop the production of new options. Therefore we introduced a separate sub-process of ‘Information Finding,’ actions carried outside the creative session to gain deeper knowledge on specific options or fields of options.

### **Acceptance Finding: A separate and main activity**

In the traditional Buffalo approach of CPS, ‘Acceptance Finding’ is the last step in their five-step approach (Parnes, 1967). Again in our own practices, we discovered that Acceptance Finding is not the last step in the process but often the first step in the row. As soon as you start talking to the problem owner about the composition of the resource group you are already engaged in Acceptance Finding. We, as facilitators, put a lot of effort into finding out who the relevant stakeholders of the problem to be solved are, both upstream and downstream of the problem. Inviting the relevant stakeholders to become members of the resource group influences the acceptance of the solution immensely.

We see Acceptance Finding as a form of co-creation. You co-create the solution together with the future users of the solution. It is a form of early user/stakeholder involvement. Of course there are also content-related aspects to the acceptance of the solution, but we found out that this organizational aspect is of much more

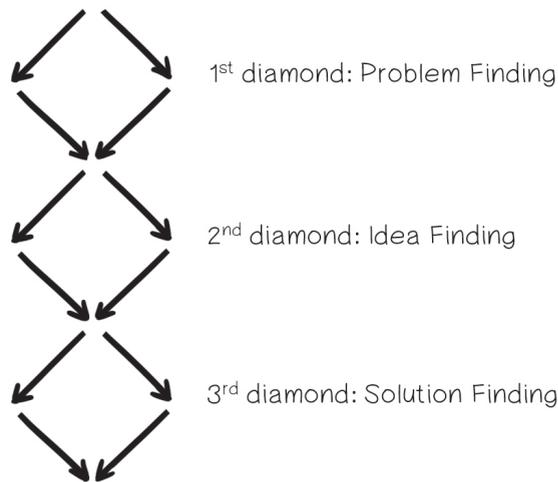
importance. That is the reason we separated the step Acceptance Finding from the overall CPS process and promoted it a separate sub-process alongside the earlier Project Management and Information Finding sub-processes.

### **Content Finding: The three-step core**

To distinguish our new core process without the Information Finding and Acceptance Finding from the traditional five-step CPS process, we gave it a new name: 'Content Finding.' Due to our European practice, we limited this Content Finding sub-process to only three diamond-shaped steps:

1. Problem Finding: Defining the problem,
2. Idea Finding: Generating and selecting options,
3. Solution Finding: Improving the options.

In the first creative diamond, the resource group explores and reframes the problem. In the second diamond, they generate and select promising options. In the third diamond, they make the transition from these promising options to implementation in the real world.



*Figure 1.4. The 3 diamonds of the Content Finding sub-process of iCPS*

#### **1.2.2**

### **Creative diamond 2.0**

In iCPS, the traditional two-step creative diamond is extended. Based on the Guilford notion of the early fifties, the creative diamond consists of two sub-steps: one for diverging (getting as many options as possible) and one for converging (selecting the most promising options out of the many options) (Guilford, 1950). In our practice, an in-between step has been developed. If the resource group has generated many options, say more than 100, the group and the facilitator will lose an overview of the options and jumping into converging may become a tricky approach.

In practice, most facilitators experienced this struggle and found a way to deal with this by adding (either consciously or unconsciously) an extra step in between diverging and converging. Another struggle that practitioners experience while leading the resource group from divergent thinking to convergent thinking is the huge switch in mindset they have to make. Divergent thinking and convergent thinking are two ways of thinking; they require totally different mindsets and different rules (see sections 1.4 and 1.6). Therefore, Tassoul and Buijs (2007) introduced an activity named ‘clustering’ as a kind of mental pause between diverging and converging. This ‘mental pause’ differs from incubation, since it is an active, deliberate approach. In this step participants are asked to look at all the options and produce a systematic overview in the form of five to seven clusters of groups of comparable options. During this activity no options are being generated or selected, so this in-between step is neither diverging nor converging. We decided to enlarge the creative diamond with this extra in-between step. Originally, this step was named ‘clustering’ (Tassoul and Buijs, 2007). However, since more techniques are available apart from the technique Spontaneous Clustering, we decided to call this extra sub-step ‘reverging.’ To distinguish our new three-step creative diamond from the original two-step diamond we have called it ‘creative diamond 2.0.’ See Figure 1.5.

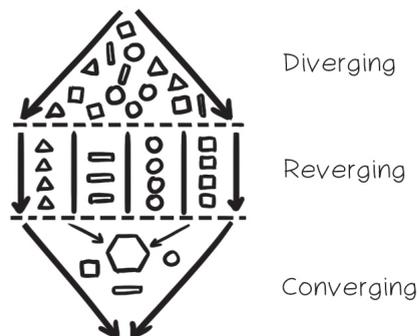


Figure 1.5. Creative diamond 2.0

We named the extra step ‘reverging’, as the prefix ‘re-’ refers to the four goals of reverging that we defined, all starting with ‘re-’, namely: revisit and rearrange options, in order to reveal and refine the problem and solution space; reset and resource group dynamics (see Figure 1.6).

### Revisit and rearrange option

During the reverging stage, the resource group gets the chance to revisit all options generated, in order to know exactly what the generated content entails. By rearranging the generated options the resource group will create structure and overview. The aim is to make sense out of the bulk of all the options. During the

activity of revisiting and rearranging the resource group will be guided towards the goals of reverging.

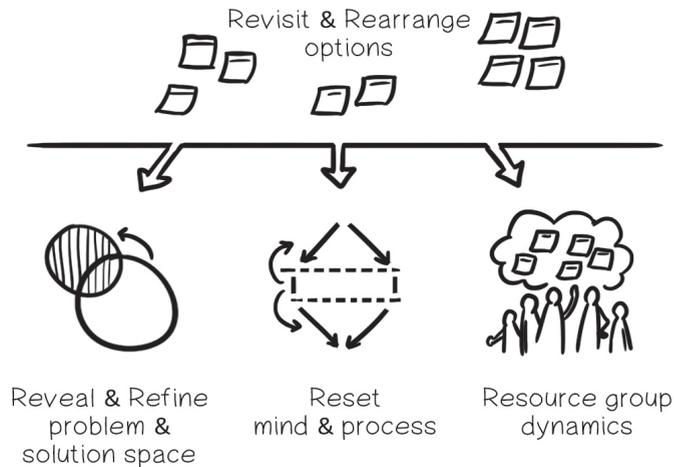


Figure 1.6. Goals of reverging

### Reveal and refine the problem and solution space

The reverging stage is about revealing the full spectrum and quality of options. Knowledge is expanded and generated options are enriched through connecting ideas and identifying relationships. Poorly stated options will get a chance of survival by explanation provided by the originator. New insights and perspectives are revealed, leading to a deeper understanding and further refinement of the problem and solution space.

### Reset mind and process

The reverging stage is a moment to reflect on the previous diverging stage and decide how to proceed with the next stage (for example: Do we have enough options to proceed to the converging phase?). If the next step is converging, the reverging stage provides the opportunity to reset the mindset and shift it from a diverging state to a converging state.

### Resource group dynamics

During the reverging stage, the resource group builds a shared understanding of the generated options and obtains a better grip on the problem space and the solution space. Reverging is about group dynamics: a complicated social process. Kaner (2005) refers to this as 'groaning.'

Two more things about our expansion of the original CPS approach. Sometimes there is a need for more than one track in the approach towards the solution. Most of the time, this need occurs in the session itself. So a rigid linear approach will not do. To provide for a flexible approach, iCPS uses a modular approach where the single creative diamond is the separate independent organizational element (Geschka and Lantelme, 2005). In order to do so, you have to expand this single creative diamond 2.0 with two extra steps, one at the beginning and one at the end. In the beginning, there is the need for finding out what this next diamond is all about. Is it for defining the problem (the first diamond), is it for improving the options (the third diamond) or is it for getting options (the second diamond)? This first extra step we call ‘task appraising.’ The resource group, including the facilitator, has to find out and agree on what this next task is.

After executing the content-related diverging, reverging and converging for this specific diamond, the group has to decide at the end whether they are happy with the results of their execution. If yes, they can step over to another creative diamond; if no, they can decide to redo this diamond (iteration) or take a step back to an earlier diamond. This is done in the ‘reflecting’ step. The group reflects on what has happened in the execution of this diamond, both on content as well as on process. Based on this reflection, they can make the next move.

So for managing the different diamonds, we expanded the creative diamond into the iCPS Basic Module with five sub-steps (see Figure 1.7).

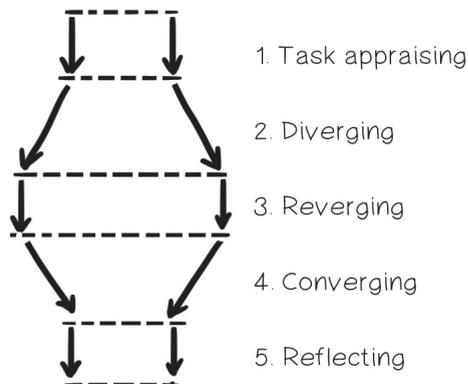


Figure 1.7. The iCPS basic module with five sub-steps

#### 1.2.4

### The active role of the facilitator in both process and content

We consider facilitation as a part of the Project Management sub-process. The facilitator is the project manager of the total overall creative process, including the running of all the sessions. In this task it is his or her duty to manage the process and the group of participants towards the optimal outcome. She or he is not just the 'pencil' of the group. No, she or he manages and steers the resource group (RG) to get the most out of them. In order to do so the facilitator must have content knowledge. In the Buffalo tradition the facilitator has no interest in the content. It is true that the RG is primarily responsible for solving the problem and the facilitator is primarily responsible for the process. But in order to do so she or he needs to understand the problem. If you do not know what the RG is discussing, you cannot interfere and steer it in another direction. If you do not know what the box is, how can you help them think outside-of-the-box? Analogies are great for helping a RG. To know which analogy could be of help, you need to understand the original problem. This is content. So we stimulate facilitators to be very active, both in process and in content. Some content knowledge is vital, not for solving the problem, but for being the better process consultant.

#### 1.3

### The three basic principles for good facilitation

A lot has been written on good facilitation of complex challenges, or open problems, as we prefer to call them. When we boil down all this literature and combine it with our practical experience, we come to three basic principles for a well-facilitated creative session. These basic principles are:

1. Role rigidity,
2. Clear problem statement,
3. Rules and techniques for each step of the creative diamond

#### 1.3.1

#### Principle 1: Role rigidity

The basic rule 'role rigidity' is about ensuring that the role division and corresponding responsibilities are very clear to everyone and are not being mixed (Treffinger, Isaksen and Dorval, 2006). However, before diving into that, it is helpful to picture the different roles within iCPS:

1. The problem owner (PO): The person who has an open problem and is or feels responsible for solving it. He or she is seeking professional help to get it solved.
2. The facilitator (F): The professional organizer and leader of the session. He or she is an expert on the four sub-processes and knows the relevant creativity techniques. The facilitator is the prime responsible person for organizing and running the creative session, including all preparatory and logistic actions.

3. The resource group (RG): The participants of the session. They are willing and ready to use their knowledge, experience and skills to help to solve the problem of the problem owner. They are, together with the problem owner, responsible for the content of the problem solving process.
4. The 'others': Not all stakeholders of the problem will be able to join the session, but later on in the implementation stage they will have to live with the consequences. Sometimes it is only later that all stakeholders will be known. So this group of 'others' can be a constantly changing group of people. These 'others' play an important role in the acceptance finding sub-process.

Sometimes we distinguish a fifth role:

5. The outsiders, the extras or the add-ons: People with special qualities in relation to the problem who might be interesting to ask to contribute to the creative session. In most cases it is about their content knowledge, like their knowledge of the same or analogous problems or situations.

It is important to differentiate those roles and to manage them. It often happens that there is no problem owner or that the roles of problem owner and facilitator are mixed; these situations are devastating for the quality of the outcomes of a session. The characteristics and responsibilities of the problem owner, facilitator and resource group are summarized in Table 1.2 below.

Problem owner	Facilitator	Resource group
<i>Characteristics:</i>	<i>Characteristics:</i>	<i>Characteristics:</i>
<ul style="list-style-type: none"> <li>- Involved</li> <li>- Motivated to find a solution</li> <li>- Competent and capable to implement results</li> </ul>	<ul style="list-style-type: none"> <li>- Capable of leading the process</li> <li>- Neutral</li> <li>- Flexible</li> <li>- Alert</li> </ul>	<ul style="list-style-type: none"> <li>- Diverse</li> <li>- Motivated</li> <li>- Acknowledges importance of finding a solution</li> </ul>
<i>Responsibilities:</i>	<i>Responsibilities:</i>	<i>Responsibilities:</i>
<ul style="list-style-type: none"> <li>- Initial question</li> <li>- Sharing background information</li> <li>- Decisions about the content</li> <li>- Follow-up</li> </ul>	<ul style="list-style-type: none"> <li>- Managing the process</li> <li>- Choosing the right techniques</li> <li>- Group dynamics and energy</li> <li>- Ensuring output is being reported</li> </ul>	<ul style="list-style-type: none"> <li>- Sharing Expertise</li> <li>- Content finding</li> <li>- Acceptance finding</li> </ul>

Table 1.2. Characteristics and responsibilities the problem owner, facilitator and resource group.

### 1.3.2

## Principle 2: Clear problem statement



In rational problem solving methods (see website) the emphasis is put on extensive problem analysis. An example is the Kepner-Tregoe Method (or KT-Method), developed by Charles H. Kepner and Benjamin B. Tregoe (1965). A significant part of the KT-method is about making a solid problem analysis and defining a precise problem statement. Stating the problem precisely is essential because all the work to follow ‘will be directed at correcting the problem *as it has been named*’ (Kepner and Tregoe 2013, p. 29). For Creative Problem Solving stating the problem precisely is equally essential. Therefore, we recommend dedicating time prior to the creative session to define the problem statement. Typically, this is done during the intake of the facilitator with the problem owner.

During the creative session this problem statement should be reformulated to ensure it is clear to the entire resource group. An additional benefit is that all participants will be engaged in the problem formulation, which will increase the quality and originality of problem solutions (Mumford et al., 1994).

The formulation of a problem influences the approaches people adopt to solve the problem and consequently their success in solving the problem (Ward, 2004). Ineke Walravens (1997) compares a problem statement with the negative of a photograph: when the negative is blurred, the photo itself will never be sharp. As mentioned already, the problem statement should be open-ended and invite people to come up with options. A more sophisticated set of guidelines for formulating an initial problem statement is to let it ‘SPARK’ (Heijne, 2011):

- Specific:** The essence in one question, one concrete objective,
- Positive:** No denials, no criteria,
- Ambitious:** Energizing, immersive,
- Relevant:** Need to find a solution, dedicated problem owner,
- Keep it simple:** Easy to understand, no jargon, no abbreviations

### 1.3.3

## Principle 3: Rules and techniques for each step of the creative diamond

Good facilitation is embedded in creative techniques. There are thousands of techniques. In this chapter we will cover the ground rules that lie behind these techniques and give a first introduction on the most well-known technique for the divergent stage called ‘brainstorming.’ All the main techniques for the three stages can be found in the following chapters.

## 1.4

### Rules and techniques for diverging

Divergence seems to be at the heart of most creativity techniques. Remember the four main aspects to judge divergence are, according to Torrance (1974):

1. Fluency: The number of options per time unit,

2. Flexibility: The number of categories the options are based on or fit in,
3. Elaboration: The depth or filling out of the option,
4. Originality: The degree of newness of the options

The techniques for diverging use these aspects in different forms. Originality cannot be forced upon the members of the resource group but is seen as an outcome of fluency and flexibility while elaboration is the outcome of a well-facilitated process over the three steps in Content Finding (Problem Finding, Idea Finding and Solution Finding). This leaves us with two major families of diverging techniques: fluency and flexibility techniques. Fluency techniques are also called association techniques and flexibility techniques are also called Creative Confrontation techniques. There are thousands of these divergent techniques only slightly different from one and the other. All of these techniques are based on the divergent mindset and its three ground rules. The divergent mindset is postpone judgment.

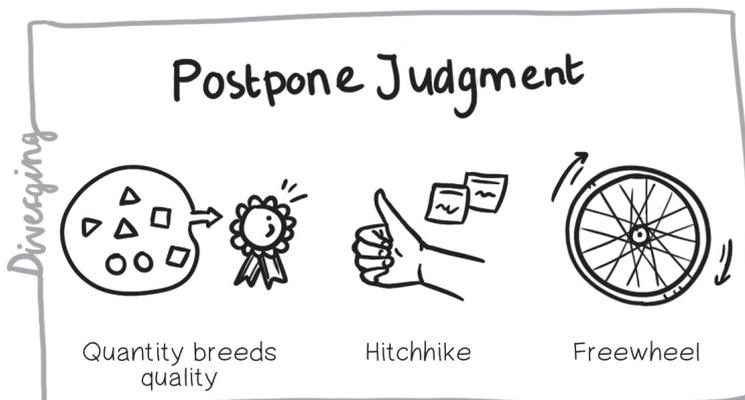


Figure 1.8. The mindset and three ground rules for diverging

#### 1.4.1

#### Divergent mindset: Postpone judgment

The best known technique for diverging is brainstorming. The story goes that Alex Osborn ‘invented’ this method by observing his colleagues during work at the advertising agency BBDO. He observed that if someone was making a suggestion or putting a new idea on the table, most colleagues reacted with expressions like: ‘that does not work,’ or ‘that is not what they expect of us,’ or ‘that does not fit their policy,’ or ‘that is way too expensive’ etc. This set of negative expressions is known as the ‘killer phrases’: easy ways to kill an idea. Indeed it is easy to kill an immature idea. By the way, the universal killer is absolute silence: just ignore what the other has just said. This really sucks all the energy out of the person with that new idea. As a solution for overcoming this negative behaviour Osborn (1953) suggested the divergent mindset: Postpone Judgment: *You may judge but **not now**, later.*



never get interesting new options (the second diamond), and without promising options there will be no development (the third diamond). This is best understood by experiential learning where inexperienced resource groups discover over time the huge importance of spending effort and time on getting and finding a proper problem definition (the first creative diamond).

As said before, experienced resource groups can easily get 120 - 150 options in half an hour in this diverging stage of the second diamond. Now they obey the first ground rule of diverging: 'quantity breeds quality', which is just another way to say 'thou shall truly diverge.'

As shown in Figure 1.10 generating options generally comes in three waves (Parnes, 1961): first there are the obvious, traditional, expected and common options (the first thirty to forty ideas). This first wave is also referred to as 'purge' or 'shedding the known.' The second wave of silly and idiotic options now follows without any attention to the usefulness of those ideas (again some thirty to forty ideas). This wave is also named 'social purging' since in newly formed resource groups there is a tendency at this moment in the process to start a 'competition' to find out who is the funniest person in the group. After this a third wave will come, the wave of the really challenging and novel options (the last forty-plus ideas). These options are usually combinations and extensions of the silly ideas produced earlier, but now their usefulness is included. This wave is also referred to as 'from silly to good.'

Prolonging the diverging over the three stages is called 'extended effort' as a symbol for the actions needed to stimulate fluency and breed quality by asking for quantity.

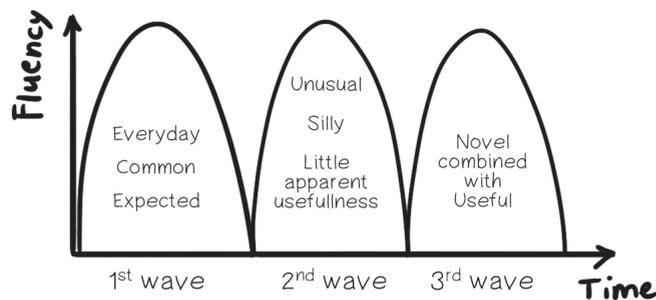


Figure 1.10. Extended effort, the three waves of ideation based on Parnes (1961).

Experienced resource groups know this three-wave ideation phenomenon and they behave accordingly. They immediately start sharing the obvious options as fast as possible, to get their brains free for fresh options. Knowing silly ideas will come up, really experienced group members will start right from the beginning with apparently 'silly' options that pop up in their minds, like 'I think of a purple banana.'

### 1.4.3

#### The second rule of diverging: Hitchhike

Characteristic for *Brainstorming* is the rule to produce many options in a short period of time. One of the explanations for this necessity of speed within the brainstorming procedure can be illustrated by using the metaphor of right- and left-brain thinking (Herrmann, 1991). The left brain is the part of the brain that wants to criticize what is being said and done. High fluency, in other words, high speed of idea generation, will clutter the left brain and will give mental space for right-brain thinking. Right-brain thinking represents making connections between loosely coupled ideas, domains, images and words; an essential engine for the production of silly and of good ideas. Building on other options or 'hitchhiking' is the second rule for diverging. Whereas Osborn's work focuses on fluency and the first rule 'quantity breeds quality', the second rule focuses on flexibility. The principles behind the second rule were described by Arthur Koestler (1964), who concluded most really new ideas are generated as a result of a collision of two (or more) incompatible frames of thought. The practical use of these mechanisms of the mind was described earlier by Gordon (1961) in his book on Synectics. The name Synectics comes from the Greek and means 'the joining together of different and apparently irrelevant elements.'

### 1.4.4

#### The third rule of diverging: Freewheel

In the application of the divergent mindset, we experience a big difference between experienced resource groups and inexperienced groups. If for instance the facilitator is making a writing error on his or her flip chart board, inexperienced group members will call attention to that fact, showing that they are much cleverer than the facilitator, as well as showing that they are very good in judging and evaluating (in our Western cultures, being critical is seen as a positive attitude). Or if someone mentions an idea that has been said earlier, inexperienced members want to show that they are fully involved and need to share this critical observation in public. Or if someone misinterprets a word – 'snow' instead of 'show' – they immediately want to correct this wrong understanding. During all these actions of judgment and evaluation (= converging), they are not able to contribute to the production of new options (i.e., diverging). The participants who are being criticized sometimes feel so threatened that they do not come up with new ideas anymore. So a double negative effect on ideation is the result.

Experienced resource groups react in a completely opposite way. They use every mistake, typo, misunderstanding or pun as a starting point to think outside the ongoing stream of ideas. They use all these 'wrong ideas' and 'mistakes' as stepping stones to come up with springboards for exciting new avenues of thought. This ability to let the mind wander freely and combine and explore all kinds of directions is the essence of the last ground rule for diverging: freewheel. Although it can be argued this rule cannot be forced upon an individual, we see some individuals feel

quite at ease with it, while others need strong facilitation here. (See for individual differences in style of problem solving, the work of Kirton, 1976, for example.) All individuals flourish under training and positive experiences.

The set of techniques relying on the ability of people to freewheel and use it deliberately can, for instance, be found in the technique 'Guided Fantasy' and its variants.

## 1.5 Rules and techniques for reverging

For the reverging stage a couple of creativity techniques exist, but they are much less elaborated than the creativity techniques for diverging. The most frequently used technique is Spontaneous Clustering (Tassoul and Buijs, 2007), which covers all revergence goals (see Figure 1.6) through an activity of rearranging all generated options from the divergence stage into clusters. There are usually more than a hundred options and with this number it is difficult to get an overview of the different directions those options explore. By deliberately creating an overview, five to seven clusters or families of related options will typically emerge. This is what we refer to as 'revisiting and rearranging options'. Of course there will always be some options that do not fit in a cluster. Those are put in a 'rest' category, which is by no means a weak cluster. Sometimes these unrelated options prove to be of outstanding quality. Once the overview is created, new insights will be gained. For instance, some clusters may contain only a few options, which could lead to an iteration of the diverging part to get extra options in that particular cluster. This is an example of the reverging goal 'reset mind & process.' The problem owner may also conclude that a particular area is not been explored at all. This may lead to reconsidering the problem statement by going back to the Problem Finding stage. Apart from resetting the process, this is also an example of the reverging goal 'revealing and refining the problem and solution space.' This reasoning is based on the content of the options. Activating the participants to do the clustering themselves will positively influence the necessary support in the later stages to implement the ideas or concepts. This process of building a shared understanding is included in the reverging goal 'resource group dynamics.'

Another approach that can be used in the reverging stage, apart from 'clustering,' is named 'sequencing' and is used to map out options along one or two dimensions. One dimension could be for example 'time to implement.' A powerful example of two dimensions is named C-Box, where options are mapped out along the dimensions 'originality' and 'feasibility.' The third approach is named 'gallerying,' where each option will be revisited one by one. Time is provided to clarify each option, so the entire resource group builds a shared understanding of all generated options. Frequently used techniques which take the gallerying approach are Idea Gallery and Elevator Pitch.

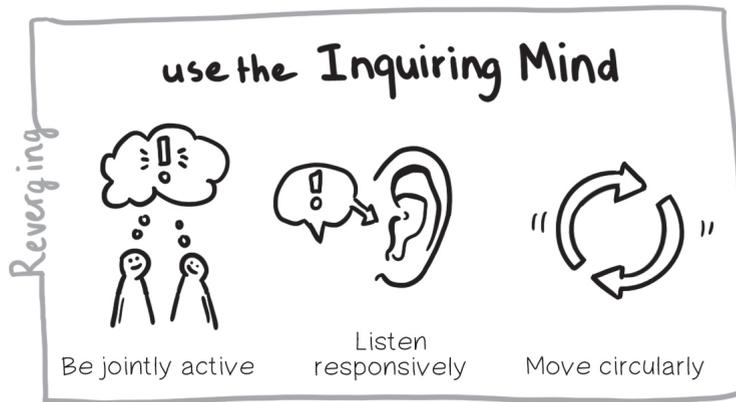


Figure 1.11. The mindset and the ground rules for reverging

Similarly to the example we just gave of clustering, each approach should be aligned with the goals of reverging. Equally important is that the techniques should embed or at least respect the mindset and ground rules of reverging to foster the right mindset within the resource group. Kalina (2018) refers to this mindset as ‘emergent thinking’, which involves ‘explaining, elaborating, exploring and mentally experimenting with ideas.’ The ground rules we describe below build further on Heijne and Smit (2018).

### 1.5.1 The revergent mindset: Use the inquiring mind

During the reverging activity all options are being revisited and rearranged. In order to rearrange them properly, it is important that the resource group understands the meaning of the options. However, sometimes options written on Post-its® are merely ‘sparks’ or ‘germs’ of ideas. Often, these options are neglected, because they are too vague. However, the resource group should be encouraged to get a basic conceptualization of the less obvious options. This could be established by asking questions like, ‘Could someone tell us more about this option?’ or ‘Could someone explain to us what this option represents?’ An open-minded and curious mindset should be established, in order to allow options to ‘grow on you’ and to increase the option’s chance of surviving the converging state. As such, the revergent mindset can be seen as a prerequisite for the convergent mindset: ‘use affirmative judgment.’

### 1.5.2 The first rule of reverging: Be jointly active

Reverging is a group effort. The aim is to develop a shared framework of understanding through the joint activity of revisiting and rearranging options. Therefore all participants of the creative session need to take part in the reverging process. If a participant stepped out for a moment and only looked at the results, she or he would miss a lot of tacit knowledge gained by the resource group, which

emerged during the interactions and conversations. So, keep the resource group together and involved.

In the *Nominal Group Technique* (NGT), developed by Delbecq and van de Ven in the 1970s, diverging and converging is done, logically, in a nominal group. However, during the reverging, the nominal group becomes a jointly active resource group, to promote shared understanding and identify common ground. A detailed description of the Nominal Group Technique can be found on the website.



### 1.5.3 **The second rule of reverging: Listen responsively**

The discussion during the revergence activity is what builds the shared understanding. Therefore, it is important to listen to each other with the intent of understanding, instead of replying. The facilitator should watch out for discussions that are not in service of the reverging activity or the problem statement. The conversations are just about explaining and understanding the options and how they relate to each other.

### 1.5.4 **The third rule of reverging: Move circularly**

Starting a reverging activity on so many options (e.g. 150+) can be overwhelming. Where to start? How to start? Then, be reminded that reverging is not a linear process but in essence is iterative. It does not matter where you start, just start. The task may seem difficult at times, but once you start doing the reverging activity you will find that value is being created along the way. New connections and relationships will emerge. Chaos will be turned into order. Trust the process, just start and enjoy!

## 1.6 **Rules and techniques for converging**

Like the reverging techniques, the techniques for converging are equally as unknown. Converging, or selecting options looks like an easy task, but in reality it proves to be a rather difficult one. So a good facilitator needs to guide the process in this stage with the same level of attention and care as he used in the previous two stages of the creative diamond.

According to economics, choosing among different options is very simple: first, you know all options; second, you have all information to base your judgment on; and third, you behave rationally and you strive for utility maximization. It is not, however, economics that will rule in a group but social dynamics. According to Prince (1970) people in (resource) groups behave both sensitively and aggressively. These patterns are basic and can hardly be controlled. In the analyses of his tape recordings of Synectic sessions, Prince found any negative remark by a group member will be paid back within twenty minutes by a negative remark to this



Creativity is one of the vital 21st century skills. As the subject of a large academic and practitioner community since 1950, there are literally hundreds of books and thousands of techniques on creativity.

In this book, this body of knowledge is boiled down for modern scholars and facilitators to one framework called iCPS, integrated Creative Problem Solving. For the techniques, the book focuses on techniques for groups and details 40 essential ones. This is the main part of the book. The set of 40 covers all the techniques in the field and offers the building blocks to construct group sessions. Guidelines for organizing sessions will help the reader position the building blocks and make the design for a smooth process.

The website, which you can find on [www.creativeproblemsolvingtechniques.nl](http://www.creativeproblemsolvingtechniques.nl), will offer even more details and practicalities to run magic sessions and courses.

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