Asta Raami

INTUITION

unleashed

**On the application and
development of intuition
in the creative process**

A? Aalto University

INTUITION UNLEASHED

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**On the application
and development of intuition
in the creative process**

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To all those
who have dared
to open the door
and also to those
who are still
looking for it.

accessing oneself

conscious 10%

90% intuitive

in wicked problem solving conscious reasoning is not enough

augmented & distributed cognition

embodied knowledge

play

knowledge building

co-creation

A HUGE UNTAPPED
POTENTIAL OF
THE HUMAN MIND IS
REACHABLE THROUGH
AN INTENTIONAL USE
OF INTUITING.

impossible goals

seeing remote possibilities

awareness

promisingness

sprouts

sensations

courage

guts

disturbing obstacles

hunches

research understanding

imagination

releasing biases like fears and emotional attchments

access to insights

beyond oneself

sharing

verbalizing

ABSTRACT

Intuition is often described as being one of the most important tools of creation among designers, artists and researchers. It is an integral part of human thinking and, together with reasoning faculties, it forms the basis of thinking. Even in everyday life all individuals need intuitive faculties, but in complex cognitive tasks, such as visioning, creating and problem solving, the role of intuition is fundamental. Even though intuition is superior to conscious reasoning in some specific situations, these different modes of thinking can often be best utilized when combined.

Both reasoning and intuitive faculties need exercising and practice "in order to fully exploit their potential. However, formal education and even design studies are strongly based on the development of reasoning faculties and intuition is ignored, hence its potential is lost. Even if intuition is used, the argumentation has to be based on rationalization.

This study concerns intuitive processing and the related pedagogy as researched through the experiences of designers and people frequently relying on their intuition. The data were collected from intuition coaching courses, interviews with designers and highly intuitive persons, and include my own experience as a teacher and a designer. The data include designers' descriptions of their intuitive experiences, the ways that they understand and utilize intuition, as well as their thoughts on developing intuition further.

The outcomes reveal that highly intuitive personal experiences are usually extremely meaningful to the person concerned and that they have an essential role when creating. Yet they are kept private due to the common tendency to hide and deny intuition. The outcomes suggest that bringing these experiences into consciousness, and especially sharing them with others, helps an individual to build a deeper understanding of the personal creative process. As a result, it also strengthens professional expertise and personal self-esteem.

The data strongly support the current understanding that intuition is a continuum that can be developed. One of my main interests was researching if intuition can be developed with coaching, or even along the direction of an intentional tool. This means that intuition is not just random coincidence or emotion based on an arbitrary vibe. If using intuition as an intentional tool, its accuracy and reliability need to be examined. Even though these aspects are challenging to evaluate, the outcomes based on designers' experiences suggest that there is the possibility of such an evaluation. Hence, I have collected and developed practical applications that may help in intuition development.

Keywords:
Intuition, creativity, design, learning, experience, higher education, coaching, development

Useat suunnittelijat, taiteilijat ja tutkijat kuvaavat intuition käytön olevan yksi tärkeimmistä luovan prosessin työvälineistään. Intuitio on erottamaton osa ihmisen ajattelua ja yhdessä rationaalisen ajattelun kanssa se muodostaa ajattelun perustan. Jokapäiväisessä elämässä ja arkitoiminnoissa kaikki ihmiset tarvitsevat näitä molempia ajattelun muotoja, mutta monimutkaisissa kognitiivisissa toiminnoissa kuten visioinnissa, luomisessa ja ongelmanratkaisussa intuition rooli korostuu. Tietyissä tilanteissa intuition on todettu tuottavan ylivertaisia tuloksia tietoiseen päättelyyn verrattuna, mutta usein parhaimmat tulokset syntyvät näitä kahta ajattelun muotoa yhdistämällä.

Sekä intuitiivinen että rationaalinen ajattelu tarvitsevat harjoitusta, jotta niiden potentiaalia voi hyödyntää. Kuitenkin virallinen kouluopetus tähtää rationaalisen ajattelun kehittämiseen, samalla kun intuition harjoittaminen sivuutetaan ja sen potentiaali hukataan. Jos intuitiota käyttää, niin perustelut pitää pystyä esittämään tietoisen päättelyn tuloksina.

Työni tavoitteena on ollut tutkia intuitiota ja sen kehittämistä suunnittelijoiden ja runsaasti intuitiota käyttävien henkilöiden kokemusten kautta. Aineisto on kerätty intuitiovalmennuksen kursseilta sekä suunnittelijoita että intuitiivisia ihmisiä haastattelemalla. Lisämateriaalina olen käyttänyt omia kokemuksiani opettajana ja suunnittelijana. Aineisto sisältää suunnittelijoiden kuvauksia heidän henkilökohtaisista intuition kokemuksistaan ja oman intuitionsa luonteesta sekä näkemyksiä oman intuition kehittämisestä.

Tulosten mukaan erityislaatuiset ja hyvin henkilökohtaiset intuition kokemukset ovat erittäin merkityksellisiä kokijalleen ja niillä on tärkeä rooli luomisessa. Näitä kokemuksia ei yleensä jaeta muiden kanssa vaan ne pidetään yksityisenä tietona, sillä kulttuurissamme on varsin yleistä piilottaa ja kieltää intuition käyttö. Tutkimuksen tulokset viittaavat siihen, että tuomalla nämä erityislaatuiset kokemukset osaksi tietoista ymmärrystä, ja erityisesti keskustelemalla ja jakamalla kokemuksia muiden kanssa, kokija voi rakentaa syvempää ymmärrystä omasta luovasta prosessistaan. Samalla vahvistuu myös oma ammatillinen asiantuntijuus ja itsetuntemus.

Tutkimuksen tulokset vahvistavat vallitsevaa käsitystä intuitiosta jonkinlaisena kehitettävänä kykynä tai ominaisuutena. Yksi kiinnostukseni kohteista on ollut tutkia voiko intuitiota kehittää valmentamalla, ja voiko intuitiota käyttää tahdonvaraisena työkaluna, jolloin intuitio ei olisi vain sattumanvarainen tapahtuma tai tunnepohjaista toimintaa. Jos intuitiota käytetään tietoisena työkaluna, pitää intuition oikeellisuutta ja luotettavuutta pystyä arvioimaan. Vaikka näitä ominaisuuksia on hyvin vaikea arvioida, suunnittelijoiden kokemuksiin perustuvat tulokset viittaavat mahdollisuuteen intuitiivisen tiedon luotettavuuden arvioinnista. Näiden pohjalta olen koonnut yhteen ja kehittänyt käytännön applikaatioita, jotka voivat auttaa sekä intuition kehittämisessä että intuitiivisen tiedon luotettavuuden arvioimisessa.

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FOREWORD

A friend of mine, a film director, described how, once, when she came home from work, she threw herself down on the hallway floor, with her jacket still on, and cried, because creative work was so oppressive. Her husband looked at her and asked whether she was sure she wanted to do such work for the rest of her life. For her, there was no other choice, since she had her heart set on this work. This is not a rare story among designers doing work connected to feelings of deep meaningfulness and humanity. Often, as in this case, these same individuals are extremely talented, they are well respected by their peers, they have enthusiasm for their work, and, through their design, they have so much to give to other people. My experience is that with such struggling and mental distress, connected with the challenge of creating, design students often feel alone.

On top of the emotional stress, many designers have highly personal experiences of intuition. Facing these ambiguous or unexplainable experiences, while keeping them hidden, creates anxiety too. Over the past few years, as a teacher of creative process development, I have heard many stories of intuitive experiences. Some of these have opened my eyes while others have even challenged my

personal world view. While researching intuition, a growing number of people have approached me, saying *"I did not want to tell this in front of the others, but with you I can share my experience"* or *"I can tell you, but let's shut the door first"*. Without my own extraordinary personal experiences, I would not have been able to openly listen, accept or understand these stories.

The driving force in my research has been the desire to help those individuals who struggle with the process of creation. Usually this includes encountering and understanding oneself, as well as opening up to the process of intuiting. All designers I have researched have experiences of intuition and some of these happen to be extraordinary by nature. The common tendency to keep these experiences private and hidden causes unnecessary individual suffering, especially for those who are already well capable of utilizing intuition during the creative process. Therefore, it is important to bring all forms of intuition to the fore as an equal component with conscious reasoning.

There is an increasing interest in the topics related to intuition and human consciousness both among the public and researchers. In April 2014, I had the opportunity to discuss intuition with the Millennium Technology Prize winner, Stuart Parkin, and I asked him about its role with regard to his technical invention. He answered: *"Intuition is everything!"* To him, intuition guides towards new possibilities, highlights the importance of ideas and identifies the way to new solutions. In 2014, there were at least two petitions published in respected international journals calling for an open study of all aspects of consciousness, including unexplainable and extraordinary experiences, and signed by more than 200 world-famous researchers.

In order to research the area of intuition and to develop a wider understanding of intuitive experiences or even to demystify them, I have been forced to widen my own perspective. I have oriented myself to different fields of science and diversity of sources, including also areas on the margins of the scientific field. Combining various perspectives has been essential when approaching or trying to understand varying intuitive experiences. Hence, the research has taken a long time.

At the same time, it has become more apparent that truth-loving

research is far from easy. The challenge does not lie only in the difficulty in having ambiguous intuitive experiences and in the struggle to verbalize them and make them understandable. It is equally hard to face the academic power play, stagnation, dogma belief or mental rigidity – issues often invisible and optimally excluded from research. Therefore, I am grateful to those students, colleagues, friends and strangers who have shared their intuitive experiences with me and who have continued to encourage me by underlining the importance of making the area visible and bringing it into the public domain.

The most important reason for researching intuition is because of its potential. Intuition is a superior way of acquiring information in some situations and its capacity is enormous. Further, recent research outcomes underline that there are forms of knowing we do not yet understand and hidden potential we do not utilize. All this shakes the very foundations of knowing – what can be known and how. The world now faces challenges that are greater and more complex than ever before. Time is running out to resolve some of these problems. In order to understand or solve these problems, reasoning and analysis are simply not enough. We need intuition to exceed the limits of the known and to look for new frontiers. Often, the best results are achieved when both reasoning and intuition are integrated. While the current understanding states that reasoning is dependent on the work of intuition, my study states that this process can be reversed. Intuition can be used intentionally to acquire information – in the best case, any kind of information. To this end, designers have an important shared role.

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INTRODUCTION

This work handles designers' personal experiences of intuitive processing and the related pedagogy, as researched through the experiences of designers and those people who frequently rely on their intuition. The research is based on five peer-reviewed articles and a case study that reveals one personal design experience. Each of the articles outlines a specific aspect of designers' intuitions. The research data were collected from intuition coaching courses, interviews with professional designers and highly intuitive individuals, and include my personal experiences as a teacher and a designer. The data were collected and handled qualitatively using a phenomenographical research method.

This thesis is divided into two sections. The first section of the introduction examines the theoretical background and the concept of intuition in general, presenting current scientific understanding on the issue. The remainder of the introduction focuses on experiences of intuition based on my research with designers and people who use a lot of intuition.

The perspective of the work is phenomenon based. The multifaceted phenomena of intuition require the integration of various do-

mains and perspectives. The work searches for a shared discussion between different fields of design, as well as between design and other scientific domains in the area of intuition. Since the area of intuition is insufficiently researched in the area of design, I have elaborated the concept of intuition for the purpose of increasing an understanding of the designer's intuitive experiences. Therefore, the introduction approaches intuition from a wide angle, where intuition is put into perspective with creativity, cognition, knowledge, perception, consciousness, as well as with emotions, embodied cognition and empathy. With this approach, the work aims at building as versatile as possible an understanding of designers' intuitions. I have also found it beneficial to present some cutting-edge scientific results in order to make extraordinary experiences of intuition more understandable and natural. Further, I look at the difficulties and effects of active intuiting among people who use intuition as a central part of their creative process.

Currently, even though intuition is still commonly considered an untrustworthy type of information, the topic of intuition has raised increasing interest in the area of scientific research. The combination of intuitive and rational faculties can no longer be dismissed as irrelevant, purely mystical or anachronistic in the current age, but is intertwined in various types of thinking in different fields of research (Anthony, 2003; Shefy & Sadler-Smith, 2004). Further, numerous internationally known scientists from various fields (biology, neuroscience, psychology, medicine and psychiatry) have written a on the importance of the post-materialistic scientific approach, including research on the subjective dimensions of the human experience (Beauregard et al., 2014). These scholars underline that the strictly materialistic ideology of science implies that "the mind is nothing but the physical activity of the brain and that our thoughts cannot have any effect upon our brains and bodies, our actions, and the physical world. The ideology of scientific materialism became dominant in academia during the 20th century. So dominant that the majority of scientists started to believe that it was based on established empirical evidence and represented the only rational view of the world" (Beauregard et al., 2014, p. 272). Therefore, it is essential that advances occur in the scientific study of the mind and spirituality.

Indeed, the area of open-minded consciousness research has now been identified as a high priority by numerous accredited scholars; another petition signed by more than 100 world-famous researchers from various scientific domains calls for an open study of all aspects of consciousness, including unexplainable and extraordinary experiences (Cardeña, 2014).

Intuition in short

Intuition is an integral part of human thinking (Kahneman, 2011; Kahneman & Tversky, 1982). Every human is intuitive, whether or not a person is aware of it, since the nature of the human brain is inherently intuitive (Laughlin, 1997). All humans continuously use intuition in their everyday life, but intuitive processing is usually subliminal and random. Typically, intuition is intertwined with conscious reasoning and these two different thinking modalities form the foundation of all human thinking (Kahneman, 2011; Kahneman & Tversky, 1982). In addition, human decision making is often based on these intuitive non-conscious processes, such as associations, affections, habits, memory and feelings, for example liking or disliking (Glöckner & Witteman, 2010). Yet people prefer to give the impression that decisions are based on pure conscious reasoning.

The role of intuition is imperative in radical breakthrough innovations and in creative ideas involving extreme novelty. Many Nobel laureates mention that intuition is the primary thinking mode used for discoveries while conscious reasoning is used for argumentation (Keller, 1983; Larsson, 2001; Marton, 1997; Shavinina, 2003, 2009). The role of intuition has been acknowledged also in other areas, for example in mathematics, business and linguistics (Agor, 1989; Bastick, 2003; Bunge, 1962; Fischbein, 1987). According to linguistics, language is not transparent but opaque, since it operates partly outside of one's awareness (Hassin, Uleman, & Bargh, 2005). Further, "a consistent system of reasoning cannot be sufficient to reason about reason. Intuition is needed to guide the blind steps of logic and give purpose to this direction" (Bastick, 2003 p.3).

Currently, intuition is used as a common label for completely different types of information, varying processes and diverse out-

comes, all of which makes the use of the term difficult. In addition, there is a lack of a shared vocabulary and coherent concepts, which makes intuition research challenging (Glöckner & Witteman, 2010). Therefore, I have handled the concept of intuition in a very detailed manner and I have included a glossary to inform on the terms used.

Currently, there is not enough knowledge on how intuition is constructed or how it can be best developed. The overview of intuition and creativity development is handled in the literature by intertwining traditional knowledge forms and non-traditional scientific research as well as writings of highly intuitive practitioners. In the area of design research, there is a dearth of research or references specifically connected with intuition development or the pedagogy behind it. Therefore, I have widened my scope to include references from other domains and I present methods used by highly intuitive individuals.

Currently, intuition has such a cultural stigma that it is not possible to include it as an equal thinking component alongside conscious reasoning. The reasons for this may lie partly in the difficulty in articulating and researching non-conscious processes, or in the ambiguity of the phenomenon itself. (Glöckner & Witteman, 2010; Mayer, 2007; Tart, 2009) In order to illustrate both the importance of and the difficulty in describing intuitive experiences, I have included a generous selection of examples describing intuitive experiences by Nobel laureates, since they clarify some essential aspects related to the processes of creating and inventing.

Formal education usually focuses firmly on the development of reasoning faculties, although the importance of intuition has been recognized for decades (Bastick, 2003). In particular, if creative thinking needs to be promoted, intuitive thinking skills need to be recognized and exercised (R. Root-Bernstein & Root-Bernstein, 2003). Of course the teaching of arts and crafts is versatile; nevertheless intuition is not systemically and intentionally included as part of the artistic thinking process and its development. Intuition is considered something minor, random, biased and, in some areas of education, even harmful. In the best cases, intuitive skills may develop unaided alongside other education. In the worst case, the lack of use may lead to the dwindling of such skills, just as can happen to biological

senses (Sheldrake, 2012). In both of these cases, the potential of intuition is ignored and lost. This is alarming, since, in some specific situations, intuition is superior to conscious reasoning and brings better results (Gigerenzer, 2007; Klein, 1998).

Some forms of intuition are prone to bias (Kahneman & Tversky, 1982), but this is not the whole truth. It is arguable that some of the results of intuition can be evaluated for their reliability and accuracy, intuition can be used intentionally, or it can even give exact and detailed information (Davis-Floyd & Davis, 1997; Dunne, 1997; Kautz, 2005; Monsay, 1997; Shefy & Sadler-Smith, 2004; Targ, 2012). However, intuitive processing needs to be practised, developed and used intentionally – just like conscious reasoning and analytical thinking – to result in more reliable outcomes (Davis-Floyd & Davis, 1997; Monsay, 1997; Shefy & Sadler-Smith, 2004).

The current research strongly suggests that intuitive skills can be developed (Hogarth, 2001; Kautz, 2005; Seligman & Kahana, 2009; Shefy & Sadler-Smith, 2004). In an optimal situation, intuition and conscious reasoning can be utilized as equal components of thinking and decisions can be made based on the most useful and applicable information. Including intuition development as part of design education would support educating multi-talented design experts who are capable of versatile thinking and solving problems seemingly impossible based on rational analysis alone.

Modes of knowing related to intuiting

In this study, I present intuition as a mode of knowing. I approach the experiences of designers' intuitions from two perspectives: from a practical grass-roots aspect and from a theoretical aspect. The theoretical component presented in the beginning lays the foundation for understanding the intimate intuitive experiences described in the results. The emphasis is on real and concrete experiences, in their authentic form.

Many designers have very personal intuitive experiences that are often reported as forming the centre of the creative process (Mäkelä & Numkulrat, 2011; Seitamaa-Hakkarainen, Laamanen, Viitala, & Mäkelä, 2013; Uusikylä, 2008). This makes reflection on intuition and

other internal processes extremely meaningful. According to the student-centred, constructivist approach to learning, understanding and integrating, the student's personal perspective is essential for any meaningful learning experience (Bruner, 1960, 1986; Gardner, 1991; Rogers, 1980; Rogers & Freiberg, 1994). However, due to the nature and difficulty in verbalizing intuitive experiences, these personal experiences are often not researched at a more general level (Petitmengin-Peugeot, 1999).

Framing of the study and the objectives in short
The research has two objectives, which are:
1) To research designers' intuitive experiences and their intuitive processing as a mode of knowing, and
2) To determine whether intuition can be developed through coaching.

The research is based on data collected from intuition coaching courses and interviews with designers. I researched how designers describe their intuition and how they verbalize their personal intuitive experiences. I collected accounts of designers' personal intuitive experiences, including highly personal and extraordinary experiences that are seldom talked about. I also interviewed some very intuitive individuals in order to build a more coherent understanding of the processes of intuiting.

My main focus is to build an understanding of how designers can better connect with their intuition in order to utilize and develop its potential. On a practical level, this means researching whether intuition can be used as an intentional tool, which means that intuition is not just a random emotional-based coincidence but instead an intentional process where a person can attune to the intuitive information. Due to my personal interest in intuition development, I researched those natural, innate, personal ways of intuiting that designers use. Further, I studied whether a single course on intuition development can help a person to better connect with their intuition, and if intuitive skills can be developed through coaching. The overall objectives and the specific objectives researched within each article are summed up in the methodology section. Based on this experience, I have developed a working model of intuition as a

skill continuum, presented methods for evaluating the reliability of intuition, as well as outlined guidelines for intuition development. These are presented at the end of the introductory section.

Foundations of the research
The foundations for this research lie in a research project – *Intuition in Creative Processes* – carried out during 2008–2012 and funded by the Academy of Finland. During that time, I worked closely with my colleague Samu Mielonen and we spent countless hours orienting ourselves to the topic, which was at that time still on the periphery of research here in Finland. One of the major problems we faced was the lack of sufficient terminology and concepts in the area of intuition. The term "intuition" was used confusingly, labelling different phenomena, varying processes and diverse outcomes. At the same time, there was a lack of proper terms describing the intuitive experiences and the process of intuiting. Some of the essential components of designers' intuitions – such as extraordinary experiences – were not even acknowledged by the current psychology as being worthwhile areas for descriptive study. This led to a situation where the prevailing terminology was inadequate. The focus of our research work was designers' personal creative processes; hence we had to prioritize the authentic experiences described by designers and start to search for new words and terms to describe this area. In situations where we could not find proper terms to explain intuitive experiences, we started to search for descriptions of similar experiences outside of the traditional scientific field. Therefore, we ended up using references outside of academic peer-reviewed publications, both in coaching and in peer-reviewed articles. The focus of the work is on the *utility* of intuition among designers – instead of on its *validity* – such as assessing what defines "real" or "true" intuition and what specific type of intuition is used by designers.

The structure of the thesis
The thesis starts with the presentation of background theories dealing with the different qualities of intuitive and reasoning faculties,

as well as opening up the concept of intuition. I have included some alternative explanatory models of intuition presented in the literature, since they were used as part of coaching sessions and many design students have found them useful. Even though these models may not be considered as being scientific truths, they seem to have an important and justifiable role for some designers when searching for a deeper understanding of their personal intuiting process.

The text continues by revealing the challenges of working with intuition, including the lack of a shared vocabulary and the influence of cultural stigma. The ambiguity of the concept of intuition is handled through different forms of knowing related to the process of intuiting. All these forms of knowing have been reported over and over again in the designers' descriptions of their intuitive experiences.

Data setting, data collecting and data analysis are handled briefly, as most of the research data have already been dealt with in the articles. The results are presented and reflected on in great detail, since it was not possible to discuss the research data in such depth in the articles. Further, when observing all the data, they seem to integrate and form a new continuum, which is not obvious from the individual articles. The articles offer a narrower and more focused overview of individual cases. To be able to approach, scrutinize and illustrate this continuum, I needed to include even some original descriptions of intuitive experiences. Further, I needed to reflect these through the theoretical background outside the domain of design research. Therefore, the very beginning of the thesis looks at the concept of intuition at a detailed level.

An issue that constantly caught my attention and that finally became apparent during the intuition coaching courses was the challenge of how to approach the process of creation. In particular, some design students felt the internal pressure to partake in the act of creation so overwhelming that I wanted to pay special attention to this issue and discuss it.

The intuitive experiences, some of which were also mentioned in the articles, are often included in this text as original quotations. This allowed me to reinforce the essence of the intuiting process at a level of detail that was not possible in the articles. Further, it seemed to be the only way to illustrate the original experiences in as authen-

tic a form as possible, without the biasing effect of explanations and interpretations. At the same time, it allows the reader to make their own interpretations and conclusions of the material. I felt more comfortable including the authentic experiences than using and referring to an artificial or false framework – even if it causes some repetition and overlapping with the articles.

The cornerstones of intuition development and the exercises used in coaching sessions are examined here in more depth than in the articles. However, the concrete intuition development exercises at a detailed level are not presented, since they were not the objectives of the study and they were always customized for the group and the special needs of the individuals.

I also present some preliminary ideas on how the accuracy and reliability of intuition can be evaluated. These aspects were also not the objectives of the study but through the discussions and interviews with some designers and highly intuitive individuals they became apparent. Further, these aspects turned out to be of great importance while elaborating on the process of intuiting.

Based on these aforementioned objectives and aspects, this research aims to build an understanding of designers' intuitions and the pedagogy related to intuition development. In general, the work aims at making intuitive processing more acceptable and legitimate. This includes making the highly personal and extraordinary experiences of intuition more visible and acceptable, which may help designers, design students, educators and other individuals to build an understanding of intuition and its potential. In an optimal situation, the work is able to support and build an understanding of the creative design process of designers and help to develop design education in general.

1

DESIGN-INTENSIVE AREAS AND INTUITING

The fundamental role of intuition is acknowledged in various fields of research. In the area of cognitive and positive psychology the role of the mind's non-conscious faculty is said to be profound in all creative processes (Boden, 1994, 2010; Csikszentmihalyi, 1996) and intuition is seen the "the first and a necessary stage of creativity" (Bastick, 2003, p. 309). Numerous studies on art, science, and business have proved that intuition has a central role to play in the development of creative and novel ideas (Agor, 1989; Bunge, 1962; Fischbein, 1987). Research related to innovations and problem solving emphasize that the act of creation is rooted in intuiting (R. Root-Bernstein & Root-Bernstein, 2003; Shavinina, 2003).

Many designers and artists have intuitive experiences and they underline the significance of intuition in the process of creating (Uusikylä, 2008). Sometimes these intuitive moments are described as Eureka experiences or Clicking-in moments, but intuition is much more than these (Arvidson, 1997; Bastick, 2003; Glöckner & Witteman, 2010; Shefy & Sadler-Smith, 2004).

The current design research suggests that the most talented designers, when compared with less talented designers, use more intu-

itive faculties while working and that they are more capable at using different cognitive styles. Contrary to the common suggestion that successful design is based on a wide range of ideas, the studies on expert designers reveal that successful outcomes are usually derived from a strict narrowing of multiple ideas as well as from frequent switching between different types of cognitive activity. Therefore, successful design is not based on extensive problem analysis but on competent problem scoping. (Cross, 2004; Schön, 1988) In this process, the tacit components of design seem not just to feed the invention of new ideas, but in themselves become a source of building knowledge (Cross, 2004; Suwa, Gero, & Purcell, 2000).

Research with design students suggests that talented senior design students prioritize early in the process, seek less information, process information immediately, and build an image of the problem sooner than their less talented colleagues. The less talented students gather more information, but sometimes this is merely a substitute activity. (Cross, 2004; Cross, Christiaans, & Dorst, 1994) Creative designers usually have a certain amount of curiosity and self-confidence, which allow them to abandon familiar references, concepts and models and seek new directions and unusual goals (Burnette, n.d.-b). Further, intuitive thinkers use fewer stereotypes than conscious thinkers, since it is hard to avoid "jumping to conclusions" when a person thinks consciously (Dijksterhuis, Bos, Nordgren, & van Baaren, 2006).

The students who think holistically seem to benefit from an easy access to different modes of thinking, which creates a head start compared with analytical thinkers (Roberts, 2006). Nelson & Stolterman (2003) argue that design knowledge tends to emerge from conscious not-knowing, therefore, in the process of designing, an initial state of intentional ignorance or emptying of the mind is needed to be completely open to a prevailing situation. They also argue that, since design strongly intertwines rational and intuitive processes, the chosen means to acquire knowledge affect directly the knowledge production. Whether the information is acquired and processed through intuition or analysis leads to different types of knowledge building. The form of inquiry leads to a specific body of knowledge since it influences the constitution of the knowledge and

what is gained through the process (Nelson & Stolterman, 2003).

These research studies suggest that the intuitive features of design activity are the most essential and effective components in design creation (Cross, 2004). Since the conscious and intentional use of intuitive faculties, or their development, are not usually integrated in design education, most of the design students are left to struggle alone with the challenges of integrating reasoning and intuitive faculties while creating. To support creativity and intuiting can therefore be seen as an investment in the future, since it develops the important meta-level skills of thinking and designing. Therefore, it is essential to continue building deeper knowledge in existing design practises and especially to support students' creative design processes in education – which is an area currently identified as being undeveloped in higher education (Pedgley, 2007).

design students are left to struggle alone with the challenges of integrating reasoning and intuitive faculties while creating.

The responsibility of designers and wicked problems

The design process is considered one of the most challenging cognitive tasks since it requires multidimensional use of the highest cognitive skills (Seitamaa-Hakkarainen, 2008). Further, several studies report design expertise as being different from expertise related to other areas (Cross, 2004; Cross et al., 1994). Design combines conceptual, material and immaterial dimensions (Laamanen & Seitamaa-Hakkarainen, 2014; Seitamaa-Hakkarainen, 2008) as well as includes embodied processes where eye, hand and mind collaborate (Seitamaa-Hakkarainen, Huotilainen, Mäkelä, Groth, & Hakkarainen, 2014). Design is not just concerned with designing tangible artefacts, but includes models, processes, or systems that can be as wide ranging as designing the structures of nations. Together with the natural world around us, these designs create the world's current reality (Nelson & Stolterman, 2003).

Designers aim at creating better future solutions (Seitamaa-Hakkarainen, 2008). Designing is a combination of power and responsibility, including service to other people and to humankind as a

whole. Designers have the potential to bring forth and design both the immaterial and the tangible world in almost any possible way. Therefore, designers are responsible for spearheading the process. The way the world is currently designed is founded on a series of design solutions and human judgments made in the past. Designers have the responsibility to aim for the best by creating a world of functionality, quality, beauty and integrity. At the same time, they have to be aware that not everyone will use the power of design for these same ends. (Nelson & Stolterman, 2003)

In design literature, problems are usually divided into three major categories: well-defined problems, ill-defined problems, and wicked problems (Rittel & Webber, 1973). These are illustrated in Table 1. In well-defined problems, there often is a shared understanding of the problem itself, as well as an optimal outcome. The solution can usually be optimized. An ill-defined problem needs a formulation of the problem in the first place, since it may turn out to be several problems instead of one, or a totally different problem than the one initially envisaged. Solutions may also be many, instead of one. There may be several satisfying alternatives, which are different yet equally good. In the ill-defined type of problems, the solution can be satisfying in many different ways and professional experience greatly improves the outcome (Rittel & Webber, 1973).

The most challenging type of problem is defined as a *wicked* problem (Rittel & Webber, 1973). This type of problem cannot be exhaustively formulated; hence, there are many explanations for the same problem, and every formulation is a statement of a solution. The design process is infinite – every problem is a symptom of another problem, and every solution usually leads to a new problem. It is difficult to know what components of a problem are relevant and what information will be useful until a solution is attempted (Lawson, 1997). Every problem is unique, so neither the experience plays a crucial role nor can the list of operations be fulfilled. In many situations, the problem is urgent, there is a need for immediate actions, and the problem solver has no right to be wrong (Rittel & Webber, 1973).

"One of the essential characteristics of design problems is that they are often not apparent but must be found" (Lawson, 1997, p. 54). Every problem has a structure of its own. Good design depends upon

PROBLEM TYPE	CHARACTERISTICS	SOLUTIONS
Well-defined problems	Goals known Constraints known Solutions known Success criteria known Optimal solution	The solution can be optimized
Ill-defined problems	Problem? Solution? Success criteria? Multiple solutions	Solutions cannot be optimized but can be satisfactory
Wicked problems	Incomplete, no formula Contradictory Changing definition No stop rule Unique, no cases Solution > a new problem Unknown / No optimal solutions	Solutions can be at most actionable

Table 1.
Well-defined,
ill-defined and
wicked problems
in design.
(Rittel, Horst,
Melvin & Webber
1973)

the designer's ability to act according to this structure and not to adapt a pre-given structure to the problem (Lawson, 1997). Tame and *wicked* problems are not governed by the same logic. The strategies developed into tame problems are not just different in degree, but above all are different in kind from wicked problems, which have a complexity, ambiguity and epistemological uniqueness of their own (Nelson, 2003, p. 17). Further, there is no single correct approach or methodology for finding, defining or solving these problems.

In the world there is an increasing amount of complexity, including, for example, social, economic and environmental issues. These many factors have become intertwined more than had been the case, hence the problems that the world is facing have become more com-

Design-intensive areas
        and intuiting   Intuition Unleashed

plex. There are many new challenges never seen before: environmental problems related to sustainability as well as long-term political and economic problems. On top of these remain the long-standing challenges such as poverty, hunger and ignorance of dignity. There appear to be more and more unstable components in the puzzle. In order to solve one part of the problem, the whole setting transforms and new problems arise, often more difficult ones that have been lying underneath. To be able to solve problems like this, a person needs to be able to surpass the limits of the known. The prevailing paradigm predefines the future problem space, which then narrows and initiates possible future solutions. However, if one wants to search for radical breakthrough innovations, with extreme novelty, then searching beyond the current paradigm is crucial. To succeed in this process, the use of intuition is imperative (Gigerenzer, 2007; Klein, 2004).

Generally, design students tend to be overly optimistic and wishful in their estimation related to the complexity of problems and to the required time needed to delineate the solutions. Further, it is very easy to look at a new design problem as being all too shallow and ignore the underlying difficulties (Lawson, 1997). Therefore, it is essential to include wicked problem solving in design studies, allowing students to orient themselves to complex problem solving and to the use of their intuitive faculties.

In the challenges described above, intuition typically leads to better solutions than pure conscious reasoning since often there is too much information, actually an overload of it including contradictory information, yet at the same time there exists a lack of essential information (Bastick, 2003; Glöckner & Witteman, 2010). A person is often not even aware of the lack of information or what they could possibly know. Most of the problems faced by designers – as well as by the world – are like this: entangled knots with countless variables. Further, while the world continues to change more rapidly, third-level students need to be prepared to handle future, as yet unknown, situations (Marton, 2014).

In the situations described above, the capacity for rational, analytical thinking is not enough. The analytical mind chokes with too many options, and it starves when there is a lack of information, or

when it cannot envision options beyond imagination. In the worst case, there is a simultaneous overload and a lack of information, as well as critical time limits to make decisions. With such constraints, the intuitive faculties can operate with higher accuracy than conscious reasoning. (Dijksterhuis et al., 2006; Frank, O'Reilly, & Curran, 2006; Gigerenzer, 2007; Klein, 1998)

Intuitive faculties can filter usable outcomes from numerous amounts of raw data, give new directions to possible solutions, and exceed the limits of conscious reasoning. It is true that if intuition is considered just a random feeling, any sort of emotional vibe, or a "talk-box" inside a head, then its accuracy and reliability can be questioned with good reason. Intuitive faculties need development just as reasoning faculties do. Rationally thinking: developing intuition is smart, since it enables an individual to better integrate both of the innate thinking capabilities, the conscious and the non-conscious. Therefore, we need new types of thinking, various forms of intelligence, and the courage to look at the potential of intuition while searching for methods to develop it.

Rationally thinking: developing intuition is smart

2

THEORETICAL BACKGROUND: INTUITIVE AND REASONING FACULTIES

Intuition is natural, and the majority of human thinking is intuitive – whether one is aware of it or not. A person cannot exclude intuition even though they might want to. They may believe they are relying only on conscious reasoning, ignoring the presence of intuition. They may wish to think and act purely rationally since in many situations only rational explanations are accepted. Alternatively, they may think they are relying on intuition even though their decisions might be based on fears or wishful thinking. Since the process of intuiting takes place in the non-conscious faculties of the mind, at least some parts of the process will always remain unknown or mysterious for the person experiencing the intuition. (Klein, 1998; Laughlin, 1997)

Researching intuitive faculties and intuitive insights might seem impossible, but thoughts and processes around the intuitive moment can be researched, that is, before and after intuitive insights (Klein, 1998; Petitmengin-Peugeot, 1999; Plessner, 2008; Policastro, 1995, 1999). Intuition has been researched with people suffering from specific neurological damage. Antonio Damasio, an expert in the area of cognitive neuroscience, has researched people whose in-

tuitive thinking faculties have been damaged and as a result their ability to make good decisions, or to make any decisions at all, has been severely compromised (Damasio, 1994). These individuals tend to make decisions that are contrary to their best interests and are unable to learn from previous mistakes. Lack of intuitive thinking has been illustrated with the following example: when an individual whose intuitive thinking has been damaged due to an accident goes to a grocery store to buy mustard they keep on comparing the ingredients without being able to make a decision about which one to buy (Gladwell, 2007). These and several other research results in the area of neurology and neuroscience confirm that if those parts of the brain that are associated with a specific type of intuitive thinking are damaged, one is impaired in making decisions, one has great difficulty in integrating emotions into decision making and, therefore, simple everyday life is difficult or even impossible (Bechara, 2004; Bechara, Damasio, Tranel, & Damasio, 1997; Volz & von Cramon, 2008).

Conscious and non-conscious faculties
There are several theories about how the human mind is divided into different levels of consciousness and some of these are even contradictory. Since it is not the purpose of this study to focus on the psychological or neurological aspects of the human mind, but rather to research designers' intuitions on a practical level, I use an unrefined approach to divide the human mind into two main components, conscious and non-conscious faculties. The term non-conscious I use as a general label to denote all the unconscious and subconscious mental processing. The conscious and the non-conscious parts of the brain work constantly together and form the functioning and powerful basis of human thinking.

A significant part of human thinking, including intuition, takes place in non-conscious, implicit and non-linguistic levels of the mind (Kahneman, 2011; Lakoff, 1999; Varela, 1999). The human nervous system comprises a complex, multi-layered, distributed network of billions of cells acting in myriads of ways and most of this processing is non-conscious (Laughlin, 1997). According to some

sources in neurophysiology and medicine, the subconscious mind in particular is a huge storage reservoir of once learned and experienced memories, as well as a store of many processes unreachable to the conscious mind. This includes body controls, sensory functions, interaction with physical and social environment as well as genetic inheritance (Laughlin, 1997; Lipton, 2005)

The conscious mind, in turn, contains all the reasoning faculties and is sometimes labelled as "the self" or "me". It thinks linearly in time as well as understands the world as a physical and material dimension (Kahneman, 2011; Lipton, 2005; Tart, 2009). The conscious mind is self-reflective and with so-called higher-level consciousness a person is capable of meta-level reasoning (Hayles, 2014).

The dual-process model of the mind

In current mainstream psychology, the most prevailing theory of the human mind and thinking is the dual-process model. This model divides human thinking into two major faculties with completely different operation modes: intuitive (system 1) and reasoning (system

PERCEPTION   INTUITION   REASONING
               system 1   system 2

CONTENT

fast   slow
parallel   serial
automatic   controlled
effortless   effortful
associative   flexible
slow-learning   **CREATIVITY**   rule-governed

PROCESS

percepts   conceptual representations
current   past, present and future
stimulation   can be evoked by language
stimulus-bound
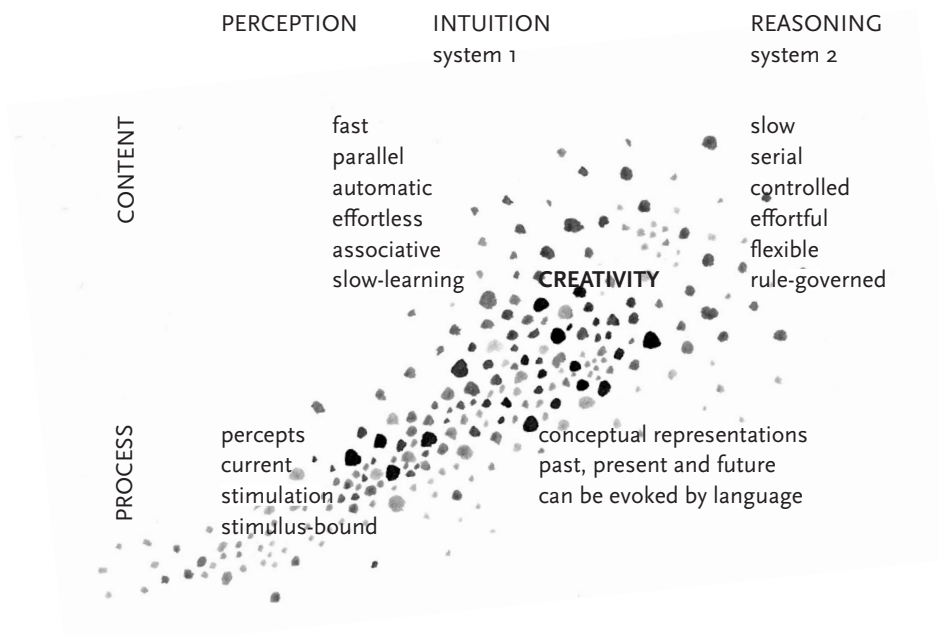
Figure 1. Dual-process model of thinking inspired by Kahnemann, 2003.

Intuition Unleashed   **Theoretical background:**   **37**
                                                intuitive and reasoning
                                                faculties

2). Both of them are integral and essential parts of everyday human thinking (Evans & Frankish, 2009; Kahneman, 2003). This is illustrated in Figure 1.

Conscious reasoning operates with conceptual representations, language and linearity, including time modes of the past, the present and the future. It is slow, serial, effortful, analytical, controlled and based on rules that are often jointly agreed by humans. (Lipton, 2005)

Intuitive thinking is based on perceptions and presence and is strongly stimulus bound. It is fast, parallel, associative, automatic, effortless, and can process huge amounts of information simultaneously. It is described as a slow-learning process requiring hundreds of repetitions and a lot of practice – for example when a child is learning to talk or walk. At the same time it is entirely natural and innate. In the dual-process model, intuition is considered an umbrella term, excluding conscious reasoning, but including all forms of non-conscious activity, such as instincts, fears, automatic reactions and over-learned skills – which are not of interest for the purpose of this study. Therefore, this model is too imprecise when researching designers' intuitions connected with creativity. (Kahneman, 2011; Kahneman & Tversky, 1982)

If greatly simplified, the difference between these two different thinking modalities can be illustrated as follows: when reasoning consciously, a person consciously knows that they are thinking the thought, and when intuiting a person knows without knowing how they know. (Evans & Frankish, 2009)

Human thinking constantly, and mostly automatically, hovers between these two different processes. When working on challenging cognitive tasks, such as visioning, creating, inventing and complex problem solving, an individual needs the integration of both of these thinking modalities.

Utilizing the intuitive and reasoning faculties
The conscious mind, at its best, can process only a fractional amount of the incoming information. However, its limited capacity can be consciously used to focus on some specific chosen point – while its non-conscious faculties are doing something else. When the con-

scious mind is imagining, dreaming of the future or reflecting on the past, the non-conscious parts of the mind are constantly working: observing the present situation, managing the behaviours required at the moment, regardless of the conscious mind's assistance. (Hassin et al., 2005; Lipton, 2005)

The non-conscious parts of the mind can be at least partly consciously managed, often through reflection taking place after an event. For example, rules of thumb are typically non-conscious but can be elevated to the conscious level (Gigerenzer, 2007). Bruce Lipton, a cell biologist and a former researcher at Stanford University's School of Medicine, states that a person can intentionally support the unfolding of the non-conscious parts of thinking and acting. In such situations, the observing conscious mind can intentionally stop undesirable behaviour, and consciously choose a new, different operation mode. Therefore, the conscious mind can be considered as the foundation of free will – meaning that people are not just forced to act in accordance with their previous habits, instincts or behavioural scripts (Lipton, 2005). It is beneficial to observe one's personal patterns of acting and thinking and, hence, develop consciousness of the models in use, whether in designing or in other areas of life. However, that is not always easy. Previous habits, such as ways of thinking, reacting and acting, which are stored in the non-conscious parts of the mind, may start to dominate at the moment when a person's conscious mind is not sufficiently alert. Nevertheless, as soon as the person starts to become aware of their non-conscious behaviour, they can consciously change their previous habits and instead begin to utilize the potential of the non-conscious. (Lipton, 2005, p. 138)

According to Unconscious Thought Theory (UTT) presented by the psychologists Ap Dijksterhuis and Loran Nordgren, both modes of thinking have particular advantages: conscious thought can follow strict rules, whereas non-conscious thought is better suited to integrating numerous decision attributes (Dijksterhuis et al., 2006). Since designing and complex problem solving require both these processes, complex decisions can best be made by engaging in periods of both conscious and non-conscious thought (Dijksterhuis et al., 2006). Dijksterhuis, together with his research group, has re-

searched customer behaviour when purchasing complex products. The results reveal that under complex circumstances, the quality of decisions does not deteriorate even though the complexity of the task increases if a person allows the non-conscious thoughts to lead to decisions (Dijksterhuis et al., 2006, p. 1006). His studies suggest that the integration of conscious and non-conscious thinking modes works better when intuitive thought follows conscious reasoning. (Dijksterhuis et al., 2006; Nordgren, Bos, & Dijksterhuis, 2011; Nordgren & Dijksterhuis, 2009)

observe internally how the mind works since that is something each individual can utilize when developing intuition.

From the perspective of intuition development, it is important to acknowledge the different qualities of these two faculties, rational and intuitive, and their varying processes. It is beneficial to observe internally how the mind works since that is something each individual can utilize when developing intuition. A method quite often used when looking for intuitive insights is to keep the rational mind busy while accessing information about intuitive faculties (Surel, 2007). Still, as long as a person is totally unaware of the role, potential or working of the non-conscious, it may dominate a person's behaviour in accordance with the habit learned earlier. Unfortunately, learned behaviours, beliefs and habits picked up from other people, such as teachers, peers, or parents, may not support the objectives of the person (Lipton, 2005, p. 139).

Several studies on Nobel laureates reveal interesting points of view related to acquiring scientific knowledge. The case examples reveal processes of knowledge building and understanding through combining intuitive and rational faculties (Keller, 1983; Larsson, 2001; Marton, 1997; Shavinina, 2003, 2009). The intentional utilization of non-conscious faculties may be illustrated with an example. A Nobel laureate in physiology or medicine, Barbara McClintock, described that her scientific work was strongly based on intuitive, non-conscious thinking. While researching the genetics of maize she became so adept at recognizing the outward signs that she could just look at the maize plants and know what the microscopic observation of the cells' nuclei would later reveal (Keller, 1983, p. 102). She described her experience of knowing with the plants as a *"feeling for*

the organism" (Keller, 1983).

McClintock described (Keller, 1983, p. 102–103):

> *"Before examining the chromosomes, I went through the field and made my guess for every plant as to what kind of rings [chromosomes] it would have – would it have one, two, or three, small or large, which combination? And I NEVER MADE A MISTAKE, except once. When I examined one plant I was in agony. I raced right down to the field. It was wrong; it didn't say what the notebook said it should be! I found that... I had written the number from the plant adjacent, which I had not cut open. And then everything was all right."*

According to McClintock, her mind worked "like a computer" – processing and integrating complex data rapidly, perfectly and non-consciously, in ways she could not be conscious of. When she was able to find the error, it caused immediate relief. She continued: *"That made me feel perfect, because it showed to me that whatever this computer was doing, it was doing it right."* (Keller, 1983, p. 102–103)

She described a state of total confidence, a complete understanding and a feeling of integration with the maize plant. She pointed out that she could not train anybody to do that processing of information since it happened subconsciously. McClintock described:

> *"When you suddenly see the problem, something happens that you have the answer – before you are able to put it into words. It is all done unconsciously. This has happened too many times to me, and I know when to take it seriously. I'm so absolutely sure. I don't talk about it, I don't have to tell anybody about it, I'm just sure this is it."* **(Keller, 1983, p. 102–103).**

The issues the conscious mind picks to be noticed are presumably significant to the perceiving person – for some reason. At any given time, numerous units of information pass through the mind but only a fraction is noticed. All the rest is processed without awareness, for example stimuli from the surrounding world as well as the body's internal signals. The non-conscious mind processes several orders of magnitude more information than the conscious mind. The estimations of the ratio are rough and speculative but, for example,

Dijksterhuis et al. (2005) mention that, depending on the task, the capacity of consciousness can be 40-50 bits per second maximum, while the human senses alone can handle 11 million bits per second, of which 10 million is through visual sensing. Buying a house would require 6.6 billion bits to be processed, which means that it would take 4 years to make the decision with consciousness alone (Dijksterhuis, Aarts, & Smith, 2005). (Lipton, 2005; Zimmermann, 1989)

Katherine Hayles, a professor of literature specialized in the relations of literature, science and technology, argues in her forthcoming book: *"It is likely that nonconscious cognition shifts through the information and forwards to consciousness only the decision points where reason has to be invoked"* (Hayles, n.d.). She emphasizes that the reasoning faculties strongly depend on the support of the non-conscious and continues:

> *"Nonconscious processing, while distinct from consciousness, is in constant communication with it [environment] and supports consciousness precisely by limiting the amount of information with which consciousness must deal, so that consciousness, with its slower speed and more limited processing power, is not overwhelmed. The point is not that humans are not capable of reason (obviously a very easy fallacy to refute), but that reason is supported by and in fact requires nonconscious cognition in order to be free to work on the kinds of problems it is well-designed to solve"* **(Hayles, n.d.)**.

It is interesting that the current cutting-edge research – especially in physics – suggests that all organisms, including humans, are able to communicate through subtle sensing, for example reading the environment by evaluating the energy fields (Lipton, 2005; Sheldrake, 2011, 2012). In many cases, the non-conscious mind receives information our reasoning faculties do not even fully understand. Humans tend to be so dependent on language and external communication that other communication systems are usually bypassed or ignored. As with any biological function, such as the use of the senses, lack of use leads to a reduction in function, whereas active use enhances the skill (Sheldrake, 2012). Lipton (2005) mentions that the Aborigines in Australia are able to sense water lying deep beneath

the sand, and Amazonian shamans communicate with the energies of their medical plants. (Lipton, 2005, p. 90; Sheldrake, 2011, 2012)

When McClintock was asked how it was possible for her to know, to be creative in an unknown way and to convince others, she answered:

> *"WHY do I know? Why were I so sure of something when I couldn't tell anyone else?" "You weren't sure in a boastful way; you were sure in what I call a completely internal way... What you had to do was put it into their frame. Wherever it came in your frame, you had to work to put it into their frame. So you work with so-called scientific methods to put it into their frame after you know. Well, [the question is] how you know it. I had the idea that the Tibetans understood this how you know".*
> **(Keller, 1983, p. 203)**

Intuition may originate from various sources. The process of intuiting may be based on the various forms of knowing mentioned above, and combine different sources of information, whether the information comes from the mind, body, thinking, memory, environment, feelings, embodied cognition, senses or extended senses. Often it includes expert-based knowledge, as in McClintock's case. Sometimes the intuitive faculties of the human mind may even know something that the reasoning faculties are not at all aware of; research, for example in the area of presentiments, strongly supports this proposition (Bechara, 2004; Bem, 2011; McCraty, Atkinson, & Bradley, 2004a, 2004b; Radin, 2006a, 2006b; Sheldrake, 2011). Due to the fact that these extraordinary experiences happen, it is important to research the nature of the mind as widely and openly as possible so that, for example, experiences such as extraordinary intuitive sensations are not ignored, denied or invalidated (Cardeña, 2014; Tart, 2009).

In an optimal situation, intuitive and reasoning faculties can be consciously utilized and integrated. Probably the most common terms describing this union are intuitive intelligence (Shefy & Sadler-Smith, 2004; Surel, 2007, 2012) and integrated intel-

> In an optimal situation, intuitive and reasoning faculties can be consciously utilized and integrated.

ligence (Anthony, 2003). The question is not just how to develop and listen to intuition, but rather how to combine intuition with reasoning faculties. Shefy and Sadler-Smith underline that it makes no sense to talk about intuition *versus* rational thinking, but only about intuition *and* rationality (Shefy & Sadler-Smith, 2004). However, intuition has to be heard and taken into account before it can become part of our understanding. Many times the rational mind may block intuitive information even before a person is aware of it. Some recent references highlight the importance of educating the rational faculties so that they do not interfere with intuitive processes (Järvilehto, forthcoming; Surel, 2012).

Challenges in capturing the non-conscious
The general challenge of intuition research is to find a model that can partly capture the non-conscious parts of thinking, which is a paradox in itself since it is difficult to apply a ratio to the non-conscious. Currently, there is neither a coherent understanding of how intuition works nor where it comes from. Rather, there are several hypotheses concerning this and it is obvious that processes vary since there are various sources of intuition. According to Glöckner and Witterman (2010), besides the ambiguity of the concept of intuition, there are great challenges to modelling intuition. There is a multiplicity of models, as well as an associated imprecision, which originates partly in the difficulty of tracing non-conscious processes.

Models used in psychology and decision research are simply not sufficient since they are not modelled for capturing implicit, non-conscious processes. In the dual-process model, intuition can also be considered automatic intuitive processes or simple deliberate short-cut strategies (T. Betsch, 2008; Glöckner & Witteman, 2010). None of these are within the scope of this study.

The heuristics models note that this mode of thought is so prone to systematic biases and errors that intuitions derived from it should be rationally analysed (Kahneman, 2003; Plessner, 2008). This definition also excludes the possibility of domain-independent intuition since it relies exclusively on learning from direct experience (Harbort, 1997). While heuristics biases are certainly undeniable, the ex-

posing of intuition to constant rational judgement poses a paradox. Rationally over-analysing intuition has been shown to reduce the accuracy of intuitive judgements (Nordgren & Dijksterhuis, 2009). In practice, this paradox becomes a problem, like a double-edged sword, when a person cannot know when the analysis exceeds the limit and becomes over-analysis, or when the situation leads to poor intuitive awareness through little or low-quality feedback (Hogarth, 2001, 2008; Shefy & Sadler-Smith, 2004). However, the heuristics tradition is a useful reminder for the development of intuition: if intuition is seen as a holistic, non-conscious representation matching process of past experiences, then proper feedback is critical to the development of intuition accuracy (Plessner, 2008). Naturally, this evaluation cannot be carried out on all types of intuition, which makes evaluation of accuracy challenging (Piatelli-Palmarini, 1994).

Some dual-process intuition-analysis experiments suggest that people believe in intuition because of the ease with which it arises, even when it is clearly incorrect (Hardman, 2009). Another finding suggests that the more rational counter-evidence is presented, the less people trust their intuition, even when the evidence is incorrect. Further, not following one's intuition leads to a lower confidence in the judgment made (ibid.).

These additional findings, while not being full models, are helpful for intuition development. First, they remind us that the feelings of correctness accompanying intuition are not necessarily a good measure of the accuracy of the intuition. Second, they remind students of the detrimental power of doubt: any intuition, regardless of how strongly experienced and whether it is correct or not, can be swept aside with enough doubt. Here it is useful to remember that doubt and post-intuition rational analysis are not the same, even though it is common for doubt to follow prolonged critical analysis of intuition.

From the point of view of intuition development, in an optimal situation, a person has enough courage and trust for intuitive experiences to arise and to be attentively sensed. Afterwards it is critical to analyse the accuracy and reliability of intuition to a sufficient degree, yet retain an emotional belief in the meaningfulness of such experiences. In my study, the challenge is to find models or

hypotheses that can support and help in understanding the intuitive insights and highly personal experiences of intuition. The role of models and theories seems to be important for approaching and accepting the various dimensions of intuition.

Many of the psychological models do not make sense out of the personal experiences of intuition. At the moment, there are no refined scientific models of the mind explaining the extraordinary nature of highly personal intuitive experiences. To circumvent these limits, design practitioners and educators have often turned to alternative models of intuition. However, these models pose several challenges. The field of these alternative theories often lacks coherence: the models agree neither with the field of scientific research nor with each other. In addition, the terminology is often difficult to understand and information may be presented in an ambiguous way. However, on a practical level, often these models help designers to accept and understand their personal intuitive experiences. Even though the models are hypothetical or tentative, they often help to build new knowledge around intuition and expand understanding to areas previously unexplainable.

3

THE CONCEPT OF INTUITION: THE AMBIGUITY OF THE PHENOMENON

Intuition still lacks a clear identification and definition. Usually, it is considered a sudden, flash-like, immediate form of knowledge, or an insightful solution to a problem that pops, seemingly unbidden, into consciousness (Bastick, 2003; Dörfler & Ackermann, 2012).

Psychological literature describes intuition as a form of tacit, expert-based knowledge. It is considered to be an instant and rapid process of knowing that relies, at least partially, on non-conscious knowledge structures. (Bastick, 2003; Glöckner & Witteman, 2010; Polanyi, 1958)

In line with current understanding, intuition is a phenomenon of complex information integration processes. Like creativity, the mental processes are mapped at some higher level in a person's mind, enabling them to imaginatively explore their skills space (Bastick, 2003). However, creative people usually cannot tell how their novel ideas came about (Boden, 1994, 2010). Intuition is typically used as a general label for a set of phenomena that is most likely based on completely different cognitive mechanisms (Glöckner & Witteman, 2010). Most of these definitions agree that intuition is based on automatic processes that rely on knowledge structures

acquired through different kinds of learning. They operate, at least partially, without people's awareness and result in feelings, signals, or interpretations (Glöckner & Witteman, 2010). Instead of searching for the best definition of intuition, it is beneficial to consider the different types of intuitive knowledge and define what type of intuition is in question.

It is confusing that the term *intuition* is used as a general label for varying forms of knowledge, processes and outcomes (Arvidson, 1997; Bastick, 2003; Dane & Pratt, 2009; Glöckner & Witteman, 2010; Kautz, 2005; Monsay, 1997; Sinclair, 2011). The term is used to describe different *types of knowledge*, for example subconscious knowledge, instinct, embodied cognition or expertise-based information (Bastick, 2003; Glöckner & Witteman, 2010; Kautz, 2005). It is also commonly used to describe various *processes of intuiting*, such as emotion-based action, automation, non-verbal sensing, direct knowing and *experiences* such as "a feeling of certainty", "something is not matching", or such *sensations* as goosebumps and gut feelings. A person may have an intuition that a certain direction is promising, or their intuition may indicate that there is something wrong. The term *intuition* is also used when talking about the *outcomes or results* of a thinking process. These can be, for example, ideas, insights, inspirations, answers or visions.

Since the term intuition is currently used loosely, I feel that the phenomenon behind the word needs to be opened up at a more detailed level. In 1978, Tony Bastick, an intuition researcher in the area of psychology, undertook extensive research on the most common current scientific databases at that time, and carried out a computer-aided literature search that included 2 692 000 scientific articles (Bastick, 2003), 91 of which mentioned intuition in the title or as a descriptor. Of these, 24 studies were specifically on intuition. While researching these, Bastick found 20 properties connected to intuition and insight. The following list presented by Bastick (2003) reveals the properties and the frequency of occurrence in parentheses.

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1. Contrast with abstract reasoning, logic, or analytic thought (16)
2. Sense of relations (16)
3. Recentring (13)
4. Influenced by experience (12)
5. Emotional involvement (10)
6. Preconscious process (10)
7. Subjective certainty of correctness (8)
8. Global knowledge (8)
9. Transfer and transposition (7)
10. Understanding by feeling – emotive not tactile (6)
11. Empathy, kinaesthetic or other (6)
12. Preverbal concept (5)
13. Quick, immediate, sudden appearance (4)
14. Associations with creativity (4)
15. Intuition does not need to be correct (4)
16. Associations with egocentricity (3)
17. Hypnogogic reverie (3)
18. Innate, instinctive knowledge or ability (2)
19. Incomplete knowledge (2)
20. Dependence on environment (1)

The most common property of intuition is contrast with logic or analytic thought, which was mentioned 16 times. This leads Bastick (2003) to infer that intuition depends most importantly on understanding not only through empathy, but also through feeling, instinct and hypnogogic reveries. The state of hypnogogic reverie is the seemingly chaotic associations of images and ideas that occur during very relaxed states and sleep-like situations (ibid., pp. 341). This state is often mentioned by many Nobel laureates as an essential part of their mental processing (Keller, 1983; Larsson, 2001).

A sense of relations is mentioned equally often in Bastick's list of intuition research. In this kind of intuition, one thing leads to another and their relation to the whole creates a causal, meaningful relationship in a particular situation. Intuition seems to come from a physiognomy of the whole situation or a field of knowledge, aligned with the property of global knowledge. It may also involve empathic projection or kinaesthetic empathy. These moments may include recentring – a new permutation of relations between ideas – and a novel and unconventional combination of similar emotional sets. (Bastick, 2003)

Bastick (2003) continues that the extreme form of recentring is the famous Eureka experience. Often it manifests as a sudden revelation (Marton, 1997). A Eureka experience type of insight is often preceded by a rather long incubation period. Usually, an individual has involved themselves in the problem for a long period of time with-

out being able to solve it, and, hence, has "shelved" or forgotten the problem. Sometime later, the person will suddenly become aware of the solution. During the incubation period, the non-conscious mind has been "reasoning" or working with the information until the solution pops up in the person's mind. The process may even seem mystical; it can consist of structured steps that are invisible due to a lack of detailed documentation (Kolko, 2009). However, the process is very different from that used in conscious reasoning (Bastick, 2003). Typically, there is a real world event or coincidence that works like a fuse and causes a mental process leading to a Eureka experience. The classic examples are Newton observing the falling apple, Archimedes taking a bath and James Watt watching a kettle boil. Bastick (2003) describes these physical situations as kinaesthetic experiences that trigger the recentring type of insights that result in Eureka experiences.

P. Sven Arvidson, a researcher of the philosophy and psychology of human nature, points out the difference between a Eureka experience and a Clicking-in experience (Arvidson, 1997). A Eureka experience is preceded by a period of inattention, whereas a Clicking-in type of experience follows a period of intense concentration. In the area of neuroscience, Edward Bowden and Mark Jung-Beeman, together with their co-workers, have researched insights and the circumstances that occur just before the Aha! moment, when there is a change in focus that quietens the visual input and switches attention to internal activation. They suggest that it may be that any behaviour that encourages quieting of thoughts can be helpful in gaining insight. This process seems to be similar to a large domain of cognition that also handles perception and language processing (E. Bowden, Jung-Beeman, Fleck, & Kounios, 2005; Jung-Beeman, 2008).

Most typically, intuition is connected with expertise-based knowledge. In a typical situation, non-conscious and at least partly hidden preconscious, as well as preverbal processes, lead to solutions that seemingly pop into consciousness. Often, there may be emotional involvement or personal feelings included such as subjective certainty of correctness. An educational psychologist and a developer of phenomenography, Ference Marton (1997), mentions that often the moment of insight has been described as a jigsaw puz-

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zle falling into place.

Intuition is often seen initially to be vague, global and not fully conscious but a proactive perception of the sought solution (Marton, Fensham, & Chaiklin, 1994). Intuitive insights are usually said to involve some transposition of previous learning and, therefore, make transferability perhaps the most important criterion of intuitive insight. Intuition may also involve mental leaps or analogies, when a person sees one thing as if it were another (Bastick, 2003; Holyoak, 1995). Several Nobel laureates describe intuitive qualities as including a strong sense of direction and a feeling of certainty, as in the example of Michael S. Brown who, in 1985, was awarded the Nobel Prize in Physiology or Medicine:

> *"And so... as we did our work, I think, we almost felt at times that there was almost a hand guiding us. Because we would go from one step to the next, and somehow we would know which was the right way to go. And I really can't tell how we knew that, how we knew that it was necessary to move ahead."*
> **(Marton et al., 1994, pp. 461–462)**

Erella Shefy and Eugene Sadler-Smith (2004), who researched intuition related to organizational behaviour, differentiate between different forms of intuition. They point out that, in order to understand intuition, an individual needs to differentiate between insight, instinct and incubation. Intuition sometimes leads to insight but not always. In their definition, an insight literally means seeing the solution to a problem or identifying the required components and their inter-relations, while intuition may remain a hazy unvalidated hunch. Incubation is an unconscious processing of information, which may precede intuition, leading to insight and, finally, to a Eureka experience. Instinct is, in turn, an inbuilt evolutionary reaction related to survival. (Shefy & Sadler-Smith, 2004)

Bastick (2003) states that egocentricity is an increasingly developed, controlled and projected form of knowing, resulting in the appropriate empathic projection, which is an ability of an adult intuiter. Usually, egocentric people are not so reliant on the analytic stage of creativity, instead they have enough courage to be active creators, with an independency of others' opinions. This is interesting since

many other sources mention egocentricity and egoism as a possible biasing feature of intuitive information (Peirce, 2013; Tart 2009). However, Bastick (2003) states that empathic projection is a form of developed egocentricity that occurs when a person is able to internally create a space into which they can project empathetically. Thus, it seems that these contradicting arguments are rooted in similar processes of empathizing and in a high degree of individualism, while using loose and incompatible terminology.

The above examples illustrate the complexity related to the experiences of intuition and the difficulty in verbalizing the experiences. Further, they illuminate the difficulty in identifying the underlying properties and mechanisms and the challenge of research. The list of properties shows that many qualities connected with intuition and insight actually overlap. Therefore, behind a single property there may be varying foundations – or the same foundation may underlie several properties.

3.1. DEFINING INTUITION

The latest intuition research reveals that the term "intuition" is still used as a common label for different types of information, processes and outcomes that are not always clearly identifiable. Many scholars state that there are different types and aspects of intuition and different processes embedded in the act of intuiting (Arvidson, 1997; Bastick, 2003; Dane & Pratt, 2009; Glöckner & Witteman, 2010; Kautz, 2005; Monsay, 1997; Sinclair, 2011). There is a considerable lack of clear typology and terminology in the area of intuition research, which often causes a misunderstanding regarding concepts, as well as transposition in the forms of intuition, the processes behind intuitive experiences and intuitive outcomes.

Andreas Glöckner and Celia Witteman, decision-making researchers, advise that researchers investigating intuition should define what kind of processes they are researching (Glöckner & Witteman, 2010). Often, it is not useful to argue as to what kind of intuition is "real" or "true", but instead to clarify which kinds of pro-

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cesses, forms or outcomes of intuition are in question.

Glöckner & Witteman (2010) have categorized the processes of intuition into four general types: *associative intuition, matching intuition, accumulative intuition* and *constructive intuition.* Each of these is a mental activity that is based on a slightly different information integration process. According to Glöckner & Witteman (2010), associative intuition has its roots in automatic and implicit recording of frequencies that may activate a previously successful behavioural option. This may include recording of values, for example in the form of learned habits to like or dislike. Often, people acquire affective reactions towards opinions before they are conscious of them (Bechara et al., 1997). Matching intuition relies on more complex learning and information retrieval processes, which may contain multiple exemplars and complex pattern-recognition processes. Both of these models stress the importance of learning and focus on automatic information integration processes. In accumulative and constructive intuition, the role of information integration is stressed. In accumulative intuition, the information is constantly inspected and added up whilst comparing overall evaluation with thresholds, that is, weighted sums of the importance of the information available. In constructive information, the evidence is not only added up but mental representations go beyond existing information. Summing up, all of these different types of intuition make use of partly non-conscious processes, such as pattern recognition, memory traces and currently perceived information, and often the only awareness is of the result.

Evelyn H. Monsay, a professor of physics, divides intuition into categories of physical intuition, sensible or naïve intuition, visual intuition, spatial or geometric intuition, kinematic intuition, intellectual intuition and metaphysical intuition, which requires a wide understanding of the domain of expertise (Monsay, 1997). In action, these types may overlap and a person may use several of them at the same time. Physical intuition refers to intuition used by physicists, which makes progress in physics much easier. However, it should not be confused with sensible intuition, which is rooted in sensing and common sense, and which usually gives rise to errors based on naïve experiences. Spatial or geometric intuition is based on visu-

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al intuition, including the realms of imagination. Abstract creative imagination includes properties from metaphysical or even mystical intuition. According to Monsay, the type of intuition also directly relates to the reliability of the intuition. Where naïve intuition is unreliable, metaphysical intuition is more likely correct.

Even though all these forms of intuition may contain varying underlying processes, they do, however, ignore an essential element. Hence, I find the above categories limited and the definitions too vague when describing designers' intuitions. Based on my personal experience and further supported by the stories told by many designers, intuition has aspects that are neither included in the models nor in the definitions mentioned earlier. For example, none of these definitions includes the possibility of intuition coming outside of personal expertise or experience. This may be information that provably can have originated outside of self, for example information that the person cannot possibly know (Radin, 2008; Surel, 2012). Monsay (1997, p. 112) also stresses that, based on creativity theories that suggest a shift in paradigm, *"intuition must reach beyond what is understood, and beyond the current framework: hence, this intuition must be meta (i.e. beyond) –physical"*.

William H. Kautz, a former researcher at Stanford Research Institute (SRI International) and founder of the Center for Applied Intuition (CAI), has, since the 1970s, been carrying out outstanding research on so-called highly intuitive individuals. Kautz is among those few researchers who acknowledge a specific type of intuition, which he calls "true" intuition**,** as opposed to other types of "general intuition" in current psychology. Kautz (2005, p. 8) states that

> *"intuition is the mental process of acquiring information and knowledge directly into the mind, without the use of reasoning, sensing or even memory (in the usual sense of that word). This definition implies that, if one is to show that a piece of new information is truly intuitive, he must demonstrate that it could not have been obtained by one of these other three means."*

This form of intuition excludes expertise based, learned and memorized forms of thinking, and, at the same time, includes the possibility of intuitive information emerging from thin air. Of course, in

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many situations, it is very difficult to prove where the intuitive information comes from. Yet there is research that investigates this specific type of knowing, which is provable as having originated outside of self, and this research attempts to model such intuition.

In this study, I define intuition as a mode of knowing, since my objective is not to research a specific type of intuition, but to focus on the application and development of designers' intuitions, as well as to determine whether intuition can be developed with coaching. Therefore, the specific type of intuition that each individual uses is treated like a personal continuum, where intuition evolves and develops. I acknowledge all those types of intuition that help an individual in the process of creating and designing. This means, I have neither focused on the specific types of intuition that designers use nor excluded other types of intuition. I stress the *utility* of intuition as a process and designers' *experiences* of it, meaning that a person can utilize and benefit from intuition. I do not focus on the *validity* of intuition, that is, whether the intuition is correct or true as such, or if the way of using intuition or the concept of understanding the process of intuiting takes place within a certain framework. The most important aspect is that a designer can better benefit from and develop their personal intuition.

> I stress the *utility* of intuition as a process and designers' *experiences* of it, meaning that a person can utilize and benefit from intuition.

3.2 INTUITION AS A MODE OF KNOWING

Intuitive knowing may be challenging to articulate and benefit from in a shared design process. It may be hard to convince others of one's personal and intuitive mode of knowing, since it does not always fit the most common modes of knowing. Further, sometimes intuitions are based on random emotions or quick whims that cannot be evaluated either by a designer or by others – instead it becomes a question of belief. This leads to a situation where the decision cannot be analysed, questioned or evaluated properly.

However, there are ways to examine different modes of knowing and, hence, develop an overall evaluation of information. The main methods of acquiring information are through experience, authority, reason, as well as revelation and noetic knowing. All of these modes of knowing have their benefits and impediments; they may offer valid and reliable information but also contain vague, unreliable or false information. The scientific method – which, in this case, targets building an understanding of intuitive experiences – is "a way of combining these various approaches to understanding so that their weaknesses tend to cancel each other out, but their strengths tend to add up" (Tart, 2009, p. 42).

All humans learn from experience, which is an excellent approach to learning. Many of the skills and knowledge used by designers benefit from robust professional-based experience – including intuitive processing. As is obvious, learning through experience is time consuming, and it most definitely does not guarantee that a person actually *learns*. For example, gut feelings are inevitable but learning from them is not self-evident (Shefy & Sadler-Smith, 2004).

Consulting an authority can often be an excellent and efficient way of learning. In the area of design, there is a long and continuous learning tradition of a master teaching students. Most likely, besides factual information, there also passes much tacit and intuitive information. Expertise is difficult to transfer through teaching and explaining, because it is "primarily conveyed through action and best by becoming a member of a community of experts" (Enkenberg, 2001, p. 498). The human brain's ability to "learn" perceptions is so advanced that a person can actually acquire perceptions indirectly from teachers and other persons (Sheldrake, 2011, 2012). Once a person accepts the perceptions of others as "truths", *their* perceptions become hardwired into their own mind, becoming *their* "truths" (Lipton, 2005). So, a person can pass different types of tacit information to others, which may even enable others to change their perception of physical issues – this will be illustrated later in the text. However, authorities can be biased, wrong or even lie. In such cases, the brain downloads misperceptions and errors. Further, in the area of intuition, an authority's personal way of understanding may be so different or limited that the authority, as such, cannot

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be relied upon (Tart, 2009).

The way of reason is to use logic in thinking, to come up with a solution using calculations, rationality and analysis. This is the process of coming to know, which is often seen as the most respected type of knowing, even if it does not always work well in reality. The stereotype of a scientist as a strictly rational operator and science as a purely logical process strengthens the common belief in rationality (Sheldrake, 2012) – and denies the role of intuition and noetic knowing. So even those altered-state revelations frequently described among designers, artists and among scientists, in retrospect, are often described as logical thinking (Bastick, 2003; Tart, 2009).

The three methods mentioned above are the most common modes of knowing. However, regarding intuition, it is important to include revelation or noetic knowing, which is not always formally recognized or accredited as a mode of knowing. This mode of knowing can also be considered as an internally obtained knowledge coming from inside the body (Davis-Floyd & Davis, 1997). Revelation is strongly related to intuitive knowing and involves the use of intuitive faculties, or getting into an altered state of consciousness, where an idea or understanding reveals itself.

Several studies on the history of modern science show that many brilliant ideas come to people who are in some sort of altered state – for example dreams, reveries, extraordinary insights, meditation, or drug-induced states – yet revelation is seldom officially acknowledged as a creative method in formal science (Bastick, 2003; Larsson, 2002). However, when talking about intuitive knowledge and especially "true" intuition, as described by Kautz, the noetic form of knowing becomes the most important one (Kautz, 2005).

Through revelation and noetic knowing the answer, understanding or idea usually appears suddenly, with clarity, force or assertiveness. An individual may just *know* something will work or is true (Keller, 1983). However, "*just because something feels deeply true does not make it true*" (Smith, 2005; Tart, 2009, p. 242). The essential scientific approach to such feelings is to indeed take them seriously, but with caution and the conscientiousness to *test* them. Therefore, it is essential that a researcher looks "at *all* data, *all* experience, not just those things that make us happy because they fit the beliefs and the-

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ories we've already adopted" (Tart, 2009, p. 290). The *feeling* of just knowing is indeed not enough. An individual needs to present information and evidence so that it is real, visible and understood by others also.

From historical to current radical views

Many ideas related to intuition have already been presented by several philosophers, psychologists and other scholars – in one form or another. The psychiatrist Carl Jung constructed his theory about the collective unconscious, the philosopher Immanuel Kant argued about mathematical intuition, the philosopher Henri Bergson marked out the way to immediate experience and perception related to intuition, while the phenomenologists Edmund Husserl and Maurice Merleau-Ponty continued and further developed some of these ideas. The continuity between these ideas and the connection to cutting-edge science is interesting, but since it is not the purpose of this study to delve into a philosophical or historical discussion, I have picked just a few of the most interesting ideas. (Flynn, 2011; Jung & Jung C. G, 1959; Lawlor & Moulard Leonard, 2013; Shabel, 2014)

According to Henri Bergson, the body is the centre of perceptions and intuition is a process of entering into oneself. In this process of self-sympathy, individuals seize themselves from within, and the self-sympathy develops heterogeneously into others (Bergson, 2007; Lawlor & Moulard Leonard, 2013). Bergson states that, in fact, there is not a separate interiority and exteriority or distinction between inside and outside, since these are only distinctions between the part and the whole. *"To ask whether the universe exists only in our thought, or outside of our thought, is to put the problem in terms that are insoluble, even if we suppose them to be intelligible"* (Bergson, 1991, p. 25).

Bergson states that intuition is fundamentally unrepresentative since it places us either above or below representations.

> *"Pure intuition, external or internal, is that of an undivided continuity. We break up this continuity into elements laid side by side, which correspond in the one case to distinct words, in the other to independent objects. But just because we have*

thus broken the unity of our original intuition, we feel ourselves obliged to establish between the severed term a bond which can only then be external and superadded". **(Bergson, 1991, p. 183)**

To reach this wholeness and to fill these intervals between senses by restoring the broken continuity elements, individuals need to educate their senses, which means a process of harmonizing their senses with each other. For Bergson, the greatest error is that knowledge of the body and spirit is excluded. This leads to a situation where the difference between pure perception and memory is seen only in the difference in intensity and not in nature. Bergson underlines that the difference is fundamental. (Bergson, 1991, p. 49,67)

On a practical level, restoring the original purity to intuition and, hence, accessing the real requires relinquishing certain habits of thinking and even of perceiving, which is far from easy. The inaccurate conceptions individuals harbour about sensible quality and space are so deeply rooted in the mind that it is important to *"attack them from every side"* (Bergson, 1991, pp. 185, 212). One of the main errors is that people imagine that perception is a kind of photographic view of things. According to Bergson, consciousness only attains certain parts and certain aspects of those parts of reality and the discernment aspect of our perception chooses the aspects to be seen. For him, the question is not how the perception arises but how it is limited. (Bergson, 1991, p. 38,40)

Maurice Merleau-Ponty, like Bergson, emphasizes the role of the body as a centre of perception. While Bergson states that the reality of things is not constructed or reconstructed, but can be touched, penetrated, lived and dissolved by intuition, Merleau-Ponty argues that perception is a production of subjective synthesis and the experience is reconstructed (Bergson, 1991, p. 69; Merleau-Ponty, 1962). He writes, *"the real is a closely woven fabric"* where the "external world" is imprinted on the subject. (Merleau-Ponty, 1962, p. x)

Francisco Varela, whose background is in biology, philosophy and neuroscience, continues, with his colleagues, the tradition of Bergson and Merleau-Ponty by integrating perception with modern science and the mindfulness tradition. He argues that the current science *"holds a potential for the profound transformation of human*

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awareness" (Varela, Thompson, & Rosch, 1991, p. 6). While Husserl argued that "the life-world was really a set of sedimented, background *preunderstandings* or (roughly speaking) assumptions, which the phenomenologist could make explicit and treat as a systems of beliefs", Varela and his colleagues call for enlarging the perspective and integrating the non-western traditions related to experience and reflection (Varela et al., 1991, p. 18). According to them, the Buddhist doctrines of no-self and non-dualism can make a significant contribution to cognitive science. (Varela et al., 1991)

Varela and his co-workers argue that, currently, there is a gap between science and the human experience. *"In our present world science is so dominant that we give it authority to explain even when it denies what is most immediate and direct – our everyday, immediate experience"* (Varela et al., 1991, p. 12). Therefore, they demand embodied (mindful) and open-ended reflection, where body and mind are brought together in a reflection that is an experience in itself. Through this mindful awareness, the chain of habitual patterns, thoughts, or preconceptions can be both observed and truncated, yet leaving the process open-ended. They argue that lack of awareness is not in itself a problem, but "the lack of discrimination and mindfulness of the habitual tendency to grasp", of which an individual can become aware. In order to succeed in this, they emphasize five essential components to be aware of and to practise: *contact* between the mind and the object, a *feeling* tone of it, a *discernment* of it, an *intention* toward it and *attention* to it. Attention and intention interact such that intention directs consciousness and attention focuses as well as holds consciousness on the object. (Varela et al., 1991)

In the area of social sciences, intuition is connected with tacit knowledge (Polanyi, 1958). This form of knowing indicates that *"we can know more than we can tell"* (Polanyi, 1966). Tacit knowledge is difficult, sometimes impossible, to transfer to another person by means of writing or verbalizing it. According to Polanyi (1966), it is not only that such knowledge cannot be articulated and transferred by verbal means, but also that the knowledge itself is rooted in a tacit dimension. People are often unaware that they possess tacit knowledge, or that it might be valuable to others. And, even if they are aware of this, they often have difficulty verbalizing it. Often tacit knowledge is

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formed alongside professional expertise over a long period of time.

In current scientific research, one radical working theory of information transmission is based on fields that contain and store information. The biologist Rupert Sheldrake (2011) claims that in a process where a person learns a skill from another person, words play a minor and subordinate role. It is hard to learn skills from books, but done alongside a person who already has a particular skill, learning takes place quite easily.

By observing and assisting the master at work, the apprentice learns not only the articulated knowledge but also the tacit dimensions connected with the area of expertise. Effective transfer of tacit knowledge generally requires extensive personal contact, regular interaction and trust, which are all present in the old tradition of apprenticeship (Goffin & Koners, 2011). Tacit knowledge can only be revealed through practice in a particular context and transmitted through social networks where it can be, to some extent, "captured" through a network or a community of practice (Goffin & Koners, 2011; Schmidt & Hunter, 1993).

According to Sheldrake, the learner is often able to access a master's tacit dimension, which he calls the "morphic field" of the skills. According to Sheldrake's hypothesis, the memories of an individual are not stored inside their head but rather in these morphic fields. Such fields also underlie the so-called extended mind. In other words, human behaviour and mental activities physically take place during brain activity, but the activities extend far beyond the brain. Sheldrake uses a mobile phone analogy as an example. Mobile transmissions are based on electrical activity in the phone's circuits and electronic components. Yet a mobile phone emits and receives radio waves reaching far beyond the material structure of the phone by using electromagnetic fields. Similarly, there is information transfer between humans. The fields of human perception and behaviour are rooted in brain activity, but the activity extends far beyond the physical brain and is directed by attention and intention (ibid.).

These morphic fields can also organize human behaviour, and, while extending into the environment, the fields link a person's body to the surroundings where it acts. Human learning can therefore be facilitated by the morphic resonance of various individuals

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who have previously practised these skills (ibid.). For example, a person may resonate with another person on the other side of the table, or even on the other side of the country. The working theory presented by Sheldrake could be one tentative approach to extraordinary and highly intuitive experiences. According to Sheldrake, the idea presented by Jung and other depth psychologists has a similar theory of pooled, non-conscious memory with the collective subconscious (Jung, 1956; Jung & Jung C. G, 1959; Sheldrake, 2011, p. 323).

Sheldrake states that the reason why a person has their *own* private memories is that the person resonates much more with themself than with any other person. In other words, they are more similar to themself in the past than to anyone else. At the same time, a person is also similar to the members of the different social groups they belong to, for example the people sharing their language and culture. (Sheldrake, 2011)

Professional expertise-based intuition
One of the most credited and accepted types of intuition is based on professional expertise, which can be considered as a continuum. As presented in the previous sections, its form varies from tacit knowledge to pattern recognition and constructive intuition. In this type of intuition, emotions may play a significant role, as well as various types of pre-conceptual ways of knowing. It is important that a person is able to differentiate between pure emotion-driven action and actions based on learning or expertise – otherwise the behaviour may be rooted in irrational decisions and primitive urges (Bereiter, 1993; H. Simon, 1987).

The development of emerging professional expertise requires usually at least 10 years of active practice in order to result in the accumulation of a case example database, personal experience and personal mental models in a person's non-conscious faculties (Bereiter, 1993; Ericsson, 2008; Ericsson, Krampe, & Tesch-Römer, 1993; Gladwell, 2008). The development of expertise requires the dedicated application of the individual, otherwise the performance will be modest (Cross, 2004; Ericsson, 2008).

Figure 2 illustrates some types of expertise-based intuition. On

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EVERYDAY INTUITION
Associations
Feelings
Emotions

VISIONARY INTUITION
Surpassing expertise
Working with self
Connectedness with the target

EXPERTISE BASED
INTUITION
Tacit knowledge
Pattern recognition processes

DIRECT KNOWING
INTUITION
Oneness
Connectedness
Receiving information

the left side of the figure, there is the simple everyday intuition that all humans use constantly. Often, this kind of intuiting is based on associations, feelings and emotions (Bastick, 2003; Glöckner & Witteman, 2010).

The most often mentioned form of expertise-based intuition is tacit knowledge, but it may include different forms of embodied cognition and varying pattern recognition processes. It may also include the accumulation of evidence, random sampling or automatic construction of mental representations. The information may be derived from memory traces combined with current information, mental representations, or comparison with exemplars, prototypes or images. (Glöckner & Witteman, 2010)

Domain-specific expertise obviously needs to surpass the limits of single cases and requires mental operations on a more abstract and conceptual level (Cross, 2004; Ericsson, 1999, 2006). Often mental representation and the processes to construct the interpretation are completely non-conscious and only the result enters awareness. Yet some references mention that these intuitive insights may express themselves in the form of emotions as well as a "sensation" or a "feeling" connected with intuition. (Bastick, 2003; Bereiter, 1993;

Figure 2. Variation of intuitive experiences: from professional expertise and tacit knowledge to highly intuitive and extraordinary experiences. (Bastick, 2003; Glöckner & Witteman, 2010; Kautz, 2005; Keller, 1983; Larsson, 2001; Mayer, 2007; Shavinina, 2009)

Glöckner & Witteman, 2010; Hogarth, 2001, 2008)

Expertise in design seems to be different from other forms of expertise, since many creative experts define and handle problems as ill-defined problems, while other experts tend to solve problems by adopting the easiest approach (Cross, 2004). Many talented expert designers do not concentrate excessively on problem analysis, rather they let their expertise and intuition focus on quick problem scoping and sketching. For these reasons, design expertise is frequently identified differently in a problem structuring, formulating and solution-orienting approach (Cross, 2004). Schön (1988) suggests that the most fruitful approach for architecture students is to make connections with exemplars and to consider both the scientific and the artistic side.

When moving from expertise-based intuition towards visionary intuition and experiences of direct knowing, the area of intuitive knowing seems to expand to encompass issues outside of professional expertise. At the same time, the descriptions used by designers seem to become more personal and atypical, such as "*deep inner voice*", "*heart knows*" or "*head like a cone*". Exceptional and visionary researchers and inventors, for example Barbara McClintock, Nicola Tesla, Linus Pauling and Albert Einstein, are famous for this kind of revolutionary knowing. These individuals were able to surpass the limits of current knowledge, be ahead of their own time and even capable of visioning into the next century.

Scientific intuition seems to be a special type of intuition since it is able to simultaneously grasp the whole while being rooted in profound knowledge of its individual parts (Marton et al., 1994). However, the numerous studies on Nobel laureates reveal some interesting aspects. There are some characteristics that are common to these types of visionary researchers and inventors. Many of these persons were not only brilliant domain experts in their own area of research, but also challenging personalities with high degrees of individualism. Several sources report these individuals as having exceptional ways of working, including, for example, a feeling of being "*united*" with the research target, special ways of "*working with self*", or an exceptional capacity to visualize and mentally handle multiple dimensions. (Keller, 1983; Larsson, 2001)

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Towards the right side of Figure 2 the experiences become more extraordinary or highly personal, including sensations such as "*being stared at*" or "*having invisible connections with other persons or distant locations*". Typically, these experiences are very hard to verbalize and they may even include non-bodily feelings or extrasensory perceptions. The right side of the figure refers to "direct knowing" intuition, which usually means receiving large quantities of specific information coming from outside the area of personal professional expertise. In the case examples found in the literature, these persons report feelings of "*oneness*" or "*forgetting self*" (Dossey, 2013; Keller, 1983; Mayer, 2007; Peirce, 2013).

Even though Figure 2 illustrates some types of intuition, the current literature hardly mentions the relationships between these different types, or how intuition, more specifically, is constructed or develops. What seems to be obvious, based on current research, is that the degree to which intuition is used and the quality of its use vary (Glöckner & Witteman, 2010; Hyppänen, 2013). A person may be very intuitive in some areas of intuition but not in others, or a person may develop extraordinary intuition without first developing professional intuition. Further, personal growth possibilities and experiences are often seen as the most important aspects of intuition (Davis-Floyd & Davis, 1997).

Alternative explanatory models of intuition
Many designers report highly intuitive or even extraordinary experiences of intuition. References to such intimate or spiritual experiences of intuition can be found both in western and eastern traditions, such as in anthroposophy, yoga literature and Buddhist traditions (Acarya, 1982; Steiner, 1995). Also, in the current literature – including scientific and alternative literature – these kinds of experiences are frequently mentioned (Bastick, 2003; Davis-Floyd & Davis, 1997; Dossey, 2013; Kautz, 2005; Myss, 2005; Peirce, 2013; Shefy & Sadler-Smith, 2004; Targ, 2012). However, most of the common explanations defining intuition inadequately model these intuitive experiences. Yet models explaining such experiences can be found, but usually they are not part of the scientific mainstream. Therefore, I re-

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fer to them as alternative explanatory models of intuition.

In literature, highly personal and extraordinary experiences have often been interrelated with noetic knowing. Noetic originates from the Greek word *noēsis/noētikos*, meaning inner wisdom, direct knowing, or subjective understanding ("IONS, Institute of Noetic Sciences," 2014). Due to the lack of a better term, I use the term "noetic" to describe inner knowing, which sometimes may include sensations that do not originate in normal sensory perception, which is rooted in the physical environment.

In alternative explanatory models, noetic knowing and unusual intuitive experiences are commonly seen as being natural and understandable. There are several tentative models and hypotheses as to how to understand and categorize the inner mental faculties of human beings. Some sources divide the modes of knowing into "levels of awareness", such as physical, emotional, mental and spiritual levels (Boucouvalas, 1997; Vaughan, 1979). One current theme in the area of developmental psychology is to describe the structures of consciousness as fields or developmental layers (Wilber, 1980, 1997, 2007).

Layer models of consciousness can be further extended to field models that also model intuition at a very high level. Barbara A. Brennan, a former atmospheric researcher at NASA, presents a model of anthropogenic energetic fields (Brennan, 1987). She extends the layer model to visual observations of the energetic field around humans. The field 'vibrates and can be sensed by touch, taste and smell, and, with sound and luminosity, is perceivable to more subtle or so-called 'higher senses'. This and other fields can act as a source of knowing for people, even if they are unaware of this. If a person has a so-called highly developed consciousness, they may sense different types of vibrations and energy levels, sometimes including sensations such as non-bodily feelings. This kind of person may 'know' things, but doesn't always know how they know. The model suggests that other entities can influence us and this vibration can be sensed through various senses, and that each different type of vibration is felt differently. (Brennan, 1987; Peirce, 2009, 2013)

In some yoga traditions, for example, consciousness is divided into several layers, which become more subtle as one moves further from the physical body (Acarya, 1982). This means that conscious-

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ness does not end in the physical organs but continues further out in a form of energy or information. All these out-of-body dimensions can be divided into different layers of consciousness, one of which is referred to as a layer of intuition that is separate from the logic and rationality of the conscious mind (Acarya, 1982, p. 21). In most eastern tradition model types, intuition is seen outside the realms of what usually is thought of as the conscious and subconscious minds. In yoga literature, intuition is the name often used for those faculties of the mind that lie beyond the domain of the ego and self – that is, outside of the personal identity. According to these models, when an insight or information trickles down from the so-called level of pure transcendental awareness into the conscious mind, a person finds themself confronted with knowledge and experiences that the rational mind cannot account for (Acarya, 1982; Nabhaniilananda, 2005, p. 81).

William H. Kautz (2005) presents a working model based on his wide research on highly intuitive individuals. His model describes how the human mind works when it generates and communicates intuitive information (Kautz, 2005, p. 31-32). The model also clarifies how intuition relates, for example, to reasoning, memory, imagination, thoughts and dreams, all of which Kautz, as well as other scholars, mentions as being different processes from intuiting (Burnette, n.d.-c). Kautz's model presents a separation of the mind based on three parts – conscious, subconscious and superconscious – which are separate, though the conscious and the superconscious are connected to the subconscious mind. These three parts of the mind can be readily distinguished through their different and recognizable functions.

The conscious mind is the reasoning agent and controller and is responsible for memory as well as imagination. It has a very limited amount of memory, but it utilizes the material derived from the huge memory stores of the non-conscious mind (Dijksterhuis et al., 2005; Zimmermann, 1989). The subconscious part of the mind stores everything ever seen, heard or experienced by each person. The superconscious mind can be considered as a vast knowledge reservoir, but most likely it is much more than just a store of information (Kautz, 2005). The superconscious mind has various names depending on

the domain: Charles T. Tart, a psychologist, calls it the transpersonal realm; a philosopher of science, Ervin László, labels it the Akashic Record or the Akashic Chronicle; and Ken Wilber, a thinker who integrates western and eastern psychology in the area of consciousness studies, uses the term atomic consciousness and suggests that the transpersonal realm is a part of the emergent-unconscious (Laszlo, 2004, 2009; Tart, 2009; Wilber, 1980, 1997). According to Kautz (2005), the superconscious is the source of all knowledge that cannot be acquired by sensing and memory. He goes on to say that the intuitive phenomenon, such as direct knowing, originates there.

According to studies related to extraordinary knowing in the area of medicine and biology, the superconscious mind is not limited to an individual but is shared by everyone (Dossey, 2013; Sheldrake, 2009, 2011, 2012). It is not limited by boundaries of time, space or linearity. Some research and experiences even suggest that if a person has intimate access to the superconscious mind, they are able to seek directly and subjectively experiences on whatever issue they wish to know, with some limits (Kautz, 2005; Peirce, 2013). This kind of knowing allows one not only to know *about* something but to truly *know* it, even "*become*" it, which means a person experiences is somehow united with the information. These experiences are also mentioned by some Nobel laureates (Keller, 1983; Larsson, 2001). The idea of revolutionary inventions and direct knowing originating in the superconscious is supported also by several practising intuitive individuals (Kautz, 2005; Peirce, 2013; Wilson, 2009). However, the simpler and more modest perspective is to think about it as an enormous information and knowledge database containing answers to endless questions.

Figure 3 illustrates Kautz's model of the human mind. Each downward pointing cone represents the mind of a single individual. The bottom of the cone, below the dashed line, represents the conscious mind. The subconscious mind is just above it, continuing up to the superconscious mind, separated with another dashed line. The superconscious mind is open-ended and shared, at least partly with other people, even though people feel mentally separated from others due to the limitations of the conscious mind.

In this model, intuition can be driven from the superconscious

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mind to the conscious mind, which is illustrated with an arrow. This working model allows experiences such as "*mind-to-mind*" links, as well as the flow of intuitive information to be shared with others. When intuition is driven from the superconscious mind, there usually are disturbances, which Kautz labels "*residues*". These obstacles can be, for example, conditioned patterns, unreal attitudes, beliefs, or emotional blocks and obstructions. They distort and bias all mental activity – rational thought, perception, feelings, imagination, the formation of beliefs and especially intuiting. Based on his research, Kautz states that "*these obstacles are the only serious barriers to the intuitive process*" *(Kautz, 2005, p. 33)*. However, intuition works even if these disturbing elements are present, though not so accurately. (Kautz, 2005)

The psychologist Charles T. Tart (2009) has been investigating scientific explanations for experiences of a spiritual nature, including a variety of supernatural phenomena. According to Tart, the human mind is obviously something more than just a physical organ. There exist highly personal experiences, which are hard to understand and explain from a purely materialistic point of view. Yet science cannot ignore the existence of these experiences, since people have had these experiences and hundreds of experiments have been carried out in this area, for example case studies on accessing non-local in-

**Figure 3.
A model of the mind presenting the formation of intuitive experiences and disturbances caused by residues by William H. Kautz 2005, p. 31-32.**
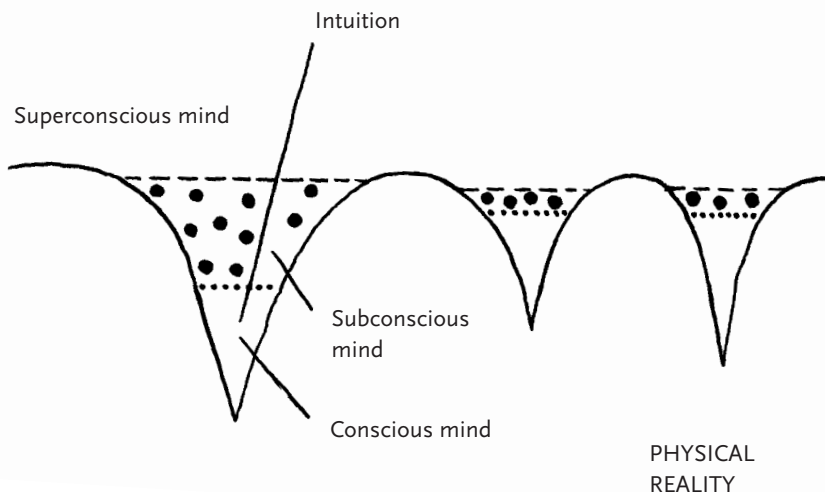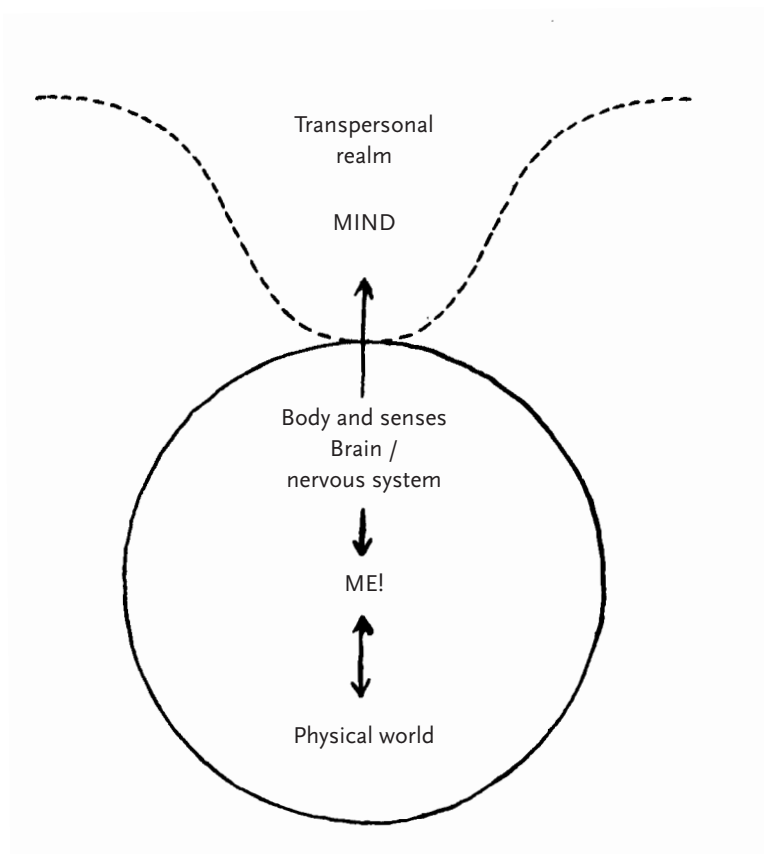
Intuition

Superconscious mind

Subconscious mind

Conscious mind

PHYSICAL REALITY

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Transpersonal
realm

MIND

Body and senses
Brain /
nervous system

ME!

Physical world

formation (Dossey, 2013; Radin, 2006a, 2008). Often extraordinary intuitive experiences are labelled as paranormal, though sometimes the term supernormal is used. Extraordinary experiences exist and are normal, though are not yet so well understood that there are solid scientific models fully explaining them. Tart (2009) seeks a possible scientific hypothesis using the best of the essential scientific method, yet excluding scientism, and looks at the data and the facts concerning these experiences rather than for explanations that fit the philosophy of physicalism.

Figure 4 illustrates a working model presented by Tart, where he illustrates the process behind extraordinary experiences. According to Tart, a person can be connected to the spiritual realm, or so-called transpersonal realm, through their mind. He states that the human "mind" is integrated with the body, brain and nervous system. Al-

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though this "mind" is of a different nature from ordinary matter, the extraordinary intuitive experiences link the transpersonal and the physical. (Tart, 2009)

In Tart's model "*our mind has an intimate and ongoing relationship with our body, brain and nervous system through a process where "mind" reads the physical state of brain and uses psychokinesis to affect the operation of the physical brain*" (Tart, 2009, pp. 239–240). In the model, an individual is an emergent system he labels "ME!" standing for "Mind Embodied". Tart describes "ME!" as being a simulation, expressing the transpersonal nature of humans and that it is derived from the external physical world around us. Humans live "inside" this simulation and identify themselves with it, and erroneously interpret it as a direct and complete perception of reality and themselves. (Tart, 2009)

However, those individuals who have been "out" – meaning exceeding the physical reality – in various ways are convinced that the ordinary self is indeed just a limited point of view, not the whole reality (Tart, 2009). While being "out", a person is able to access information outside of their personal expertise, knowledge, experiences or memory. Tart's model displays a strong similarity to Kautz's model of the mind.

All the models presented above share a view where the human mind is not limited to a single individual but instead extends to the shared consciousness. Whether or not these models turn out to be true is not the main issue. A feeling of being connected to information outside one's physical body, synchronicity events and acts of apparent mind-reading roughly match the theories of layers, fields and mind-matter interactions. In these models, consciousness is seen as part of the bigger fields that link us to other people and things (Guiley, 2001). As such, they serve as working models when researching intuitive experiences described by designers, enabling wider perspectives outside of a purely materialistic world view. Further, the models seem to match many experiences described by designers. However, the variety and lack of coherence in the terminology used in these models, reveals that this area requires further research and modelling.

> they serve as working models when researching intuitive experiences described by designers

3.3 FACTORS AND FEATURES OF INTUITIVE PROCESSING

As outlined at the beginning of this chapter, intuition is connected to several different properties. In the following pages, I present some elements that I have found to be important and that are closely related to the process of intuiting among designers. These factors and features do not inclusively represent the properties behind designers' intuitions but are examples of the complexity in which the process of intuiting among designers is rooted.

Embodied knowledge and emotions

Intuition requires a special attitude in order to be noticed and acknowledged as a meaningful part of the creative design process. Several scholars emphasize that designers need to reflect their personal thinking process, actions and feelings, since the highly personal forms the centre of the creative process (Mäkelä & Numkulrat, 2011; Seitamaa-Hakkarainen et al., 2013).

From a phenomenological perspective, intuition can be considered to be one type of knowledge formed in the pre-reflective states of a person. Bringing this knowledge into consciousness requires observing and valuing these perceptions even if they are vague and ambiguous. Therefore, it is important to examine these pre-reflective and embodied dimensions of being a human. (Husserl & Husserl, 1999; Merleau-Ponty, 1962) However, this does not mean a state of stagnation, but rather being aware of one's orientation while designing. The act of perceiving can be considered as a movement of consciousness, where the elements derived from imagination, emotions, memories, sensations and embodied knowledge interrelate within the present moment (Lakoff, 1999; Merleau-Ponty, 1962; Varela, 1999).

Intuitions are often seen as being affectively charged and linked with emotions (Dane & Pratt, 2009). In everyday life there are expressions such as "women's intuition" or "vibes" that are often considered to be based on emotions. The usefulness of emotions in relation to intuiting divides practitioners as well as researchers. Some researchers see emotions as being extremely valuable when intuiting (Bastick, 2003; Glöckner & Witteman, 2010). Yet many sources

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seem to share the opinion that intuition differs fundamentally from emotions (Ray & Myers, 1989; H. Simon, 1987; Vaughan, 1989). Several practitioners underline that if intuiting is reliable, all emotions are excluded; if emotions exist, many intuitive individuals describe the intuition as being unreliable and somehow "contaminated" (Myss, 2005; Peirce, 2013). Therefore, one suggested approach is to consider existing emotions as a possible form of raw data. In the area of creative design emotions can generate important and meaningful information (Seitamaa-Hakkarainen et al., 2013). Further, a person can consider emotions as being valuable, highly accurate and beneficial and, hence, evaluate the meaning and significance of existing emotions instead of ignoring them (Hogarth, 2001, 2008). For example, Herbert Simon (1987) stresses that it is important to differentiate between "non-rational" emotion-based decisions and professional expertise-based intuition where emotions are connected with learning and judgment, and therefore play a significant role.

Some research indicates that women seem to be no more intuitive than men, but intuition seems to sometimes correlate with age. Elderly businessmen seem to display more courage in decision making, to trust intuition based on their expertise, while younger businessmen are more reliant on conscious reasoning and external verifications (Lappalainen, 2012). However, some research in the area of innovation management suggests that intuitive processing is more dependent on personality type than on the amount of expertise, especially in decision-making style and practices (Bastick, 2003; Hyppänen, 2013).

As presented previously by Bergson, human senses inevitably require education to restore continuity where breaks have occurred in the process of perceiving and, therefore, the senses need to be harmonized with each other (Bergson, 1991). Since the centres regulating the autonomic nervous system are located in the brain stem, hypothalamus and limbic nuclei, and not in the cerebral cortex, the nervous system is totally independent of an individual's will (Damasio, 1994). Varela and his co-workers also argue that the organism it-

{ human senses inevitably require education to restore continuity where breaks have occurred in the process of perceiving

self "*chooses the stimuli in the physical world to which it will be sensitive*" (Varela et al., 1991, p. 174).

Recent research in cognitive neuroscience provides some valuable instruments and methods related to the embodied design process and brain imaging. However, this is not always a univocal process – it can include both challenges and opportunities (Seitamaa-Hakkarainen et al., 2014). Some sources state that the human body is able to sense and "think" before the actual mental thinking takes place through feelings, emotions and sensations (Massumi, 2002). Some experiments indicate neural coupling: while people are discussing, the speaker's brain activity is spatially and temporally coupled with the listener's activity. However, the connection disappears if the communication fails (Stephens, Silbert & Hasson, 2010). There are several recent research studies on pre-sentiment experiments conducted in this area (Bem, 2011; Radin, 2006a, 2006b). For example, the latest neurocardiological research has revealed that if there is a sufficiently threatening future event, it may cause a change in the heart's activity and pre-alert a person (McCraty et al., 2004a, 2004b). This process is faster than the mind can perceive and bypasses the standard thought processes. Indeed, according to this cutting-edge science, the human heart has neural cells that may store information. These neurons form similar neural networks as the neurons in human brains and can store information for short or long periods of time (McCraty et al., 2004a, 2004b). This is aligned with research involving heart transplant patients that suggests that the heart may store very detailed and accurate information that can be transferred with the organ (Pearsall, Schwartz, & Russek, 2005). The human heart also plays a significant role in emotion-related causes of illnesses (Honkasalo, 2009). Dennett (2013) introduces a thinking tool he labels intuition pumps, in which heart-related information can be exploited to support intuitive processing (Dennett, 2013).

All this suggests that utilizing intuitive information (which may be derived from several varying sources), as well as examining the forms and qualities of incoming data on a personal level, is extremely important. Some scholars and highly intuitive practitioners describe intuition as a communication channel of multiple systems of

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knowledge, which may be manifested as mental thoughts, embodied sensations, emotional feelings, spiritual experiences or a visceral sense (Boucouvalas, 1997; Myss, 2004).

Visual perceiving

Abilities based on visual sensing, such as the ability to make detailed visual observations and the ability to visualize, are important properties for a designer. Traditionally, visual perceiving, combined with sketching and drawing, was considered fundamental to the process of designing (Goel, 1995). Many Nobel laureates and other exceptional inventors underline the role of visual intuitive experiences and the importance of "seeing". Some describe seeing as a way of perception, for example imagining being an electron or a chromosome, while others describe the act of seeing as visualization and active use of the imagination. (Holton, 1978; Keller, 1983; Larsson, 2001) Nikola Tesla has been often mentioned as the most impressive example of a user of mental imaging. Tesla's mental images of inventions were so vivid that he could run the detailed mental models in his mind for weeks and examine them with his mind's eye (Monsay, 1997, p. 110).

According to the literature, Einstein was led to the idea of relativity by the vision of travelling on a light beam. Later, he commented: "*During all those years there was a feeling of direction, of going straight toward something concrete. It is, of course, very hard to express that feeling in words… But I have it in a kind of survey, in way visually*" (Holton, 1973, p. 358). Holton mentions that Einstein's mathematics was to be "*seen*" and to him "*the objects with which geometry deals seemed to be of no different type than the objects of sensory perception*" which can be seen and touched"." (ibid., p. 638)

Barbara McClintock, a Nobel laureate mentioned earlier, practised intense and systematic observation and interpretation for years. McClintock had built a theoretical vision, a highly articulated image of the world within a cell. As she watched corn plants grow, or examined the patterns on the leaves and kernels, or looked down the microscope at their chromosomal structure, she saw directly into an ordered world of mental images. McClintock's way of perceiving information was strongly based on visual perceiving, yet including

some other dimensions. She viewed her system as "*integrating what you saw*". She simultaneously read the environment with her physical eyes as well as with her mind's eye. The physical spots McClintock saw on the maize kernels represented for her a hidden genetic meaning that she could read simultaneously. For McClintock, the eyes of the body *were* the eyes of the mind. Sometimes McClintock described the material as "not integrating", which meant there was something wrong – an experience described also by many other professionals (Gigerenzer, 2007; Klein, 2004; Keller, 1983).

This can be illustrated with an example of when McClintock was examining *Neurospora* mould. She was unable to discern the individual chromosomes under the microscope, so she took some time out and meditated beneath giant eucalyptus trees. She said she "*worked on herself*". She described shedding a few tears, but mainly she was intensively and non-consciously thinking – until suddenly she knew everything would be fine. As soon as she was ready, she returned to the laboratory, and the miniscule chromosomes were now visible under a microscope, not only by her, but by others as well! During the five following days she solved everything and contributed more to the research being carried out than the original research group had during the three previous years. McClintock described:

> *"The point is that when these things happen – when you get desperate about something and you have to solve it – you do solve it and you know when you've solved it. You do something with yourself! You find out what's wrong, why you are failing – but you do not ask yourself that. I don't know what I asked myself; all I knew was that I had to go under those eucalyptus trees and solve what it was that was causing me to fail."*
> **(Keller, 1983, p. 148)**

After meditating and knowing that "*everything was going to be all right*", she found that, where before she had seen only disorder, now she could easily pick out the chromosomes.

> *"I found that the more I worked with them the bigger and bigger [they] got, and when I was really working with them I wasn't outside, I was down there. I was part of the system.*

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I was right down there with them, and everything got big. I even was able to see the internal parts of the chromosomes – actually everything was there. It surprised me because I actually felt as if I were right down there and these we my friends."
(Keller, 1983, p. 117)

Through telling this story, she spoke about the deepest and most personal dimension of her experience as a scientist. A little later, she spoke of the "real affection" one gets for the pieces that "go together": *"As you look at these things, they become part of you. And you forget yourself. The main thing about it is that you forget yourself."* (Keller, 1983, p. 115-117) McClintock explains that she doesn't know how she is able to know, she describes having always just an *"exceedingly strong feeling"* for the oneness of the issues. *"Basically, everything is one. There is no way in which you draw a line between things. What we [normally] do is to make these subdivisions, but they are not real."* (Keller, 1983, p. 204)

"In order to "*see*" what McClintock "*saw*", Evelyn Witkin, a student of genetics, had to learn more than a new "*language*"' – she needed to share in McClintock's internal vision. In that sense, "*seeing*" in science is not unlike "*seeing*" in art. Based on vision, our most public and our most private sense, it gives rise to a kind of knowledge that requires more than a shared practice to be communicable: it requires a shared subjectivity." (Keller, 1983, p. 148-149) Witkin describes: *"Just looking over her shoulder, looking at the spots, you could visualize what was going on – she made you see it. She was even able to convey it to someone who was completely outside the field. She was able to make it real."* … What McClintock was finding was *"completely unrelated to anything we knew, it was like looking into the twenty-first century."* (Keller, 1983, p. 137)

The experiences described above underline the importance of various forms of perceiving and processing information while making breakthrough scientific inventions. The ability to see things even when they exist only in the mind is an important resource for all creative work. Larsson (2001) describes what the physiologist August Krogh, who was awarded the 1920 Nobel Prize in Physiology or Medicine, referred to as his "visual thinking":

"I did a considerable part of my work while I lay in bed in the evening. There I tried to imagine the processes which I should

try to understand and the experiments I should perform. I found that I could see quite complicated arrangements before me, with all the details of their functions. My fruitful ideas came seemingly out of the blue, but the way in which I worked through them in my thoughts was a conscious, rational process. I never made sketches, and I do not to this day, not even rough sketches, not before I have completed the arrangement in my thoughts, since I felt that a sketch would hinder my ideas from flowing freely, and limit me to a certain solution of the problem." **(Larsson, 2001, p. 103)**

Robert A. Milikan, who was awarded the Nobel Prize in Physics, saw electrons. Gerald Holton, who has been researching scientific imagination, points out three critical factors in Millikan's style of research: his capacity to look with fresh, clear eyes at what was actually going on; his intense powers of visualization, which assisted in drawing conclusions; and behind these, an unanalysed, yet preconceived, theory about electricity which gave him eyes with which to look and interpret. (Holton, 1978, p. 38)

Empathy

Current research acknowledges the correlation between empathy and intuition (Bastick, 2003; Kujala, 2010; Preston & de Waal, 2002). Some scholars see empathic projection as a necessary and fundamental component of intuition and an indispensable ability for intuiting (Bastick, 2003; Preston & de Waal, 2002). According to Bastick (2003, p. 280), empathic projection is like a "two-way channel of empathy and projection which allows the person to use his body as an intuitive processor", therefore the person may 'simultaneously' project feelings on a temporary identification. A person can also empathize with an object – it does not have to be another person.

Bastick (2003, pp. xxix) mentions that intuitive individuals have developed some fundamental abilities that allow the intuitive process to take place. These include, first of all, sufficient empathy with the problem, including the caring for and involvement of the context. This setting enables a person to create a sensitive personal relationship with and ownership over the issue. Secondly, the intuitive process requires adequate primary process thinking, that is, a free

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flow of ideas, free information recall, preverbal contents and free associations, all of which are characteristic of children and dreams.

Already in 1939, J. L. Stocks describes in his book *Reason and Intuition*, the term "intuition" as being used synonymously with the term "empathy" in the area of mathematics. He also promotes understanding of the "wholeness" and that "he feels it in himself; he understands his wholeness in and from his own being", which are components often linked with empathy (Stocks, 1939).

The ability to empathize is mostly a non-conscious activity; hence, intuition is seen as being integral also to social interaction (Bastick 2003). For a designer, these abilities are fundamental. As a member of a team, a designer needs to have the ability to listen to co-designers and customers. Penney Peirce, a highly intuitive practitioner, describes experiences of listening to customer's thoughts through utilizing information obtained from vibrations and empathy (Peirce, 2009).

Varela (1993) underlines the survival value of human perception, which provides and ensures the optimal fit to the world (Varela et al., 1991, p. 180) In many life-threatening situations, intuition seems to work extremely well and to give inexplicably accurate information (Klein, 1998). Also among medical professionals, the role of intuition and empathy has been recognized and valued (Huttunen, 2013). Some sources mention together with empathy "the feeling of connectedness", which is seen as a prerequisite for the emergence and the credibility of intuition (Davis-Floyd & Davis, 1997; Dossey, 2013). Robbie Davis-Floyd, a cultural anthropologist, and Elizabeth Davis, a health-care specialist, have researched intuition used by midwives whose ability to evaluate the reliability of intuition is crucial in life-threatening situations. The researched midwives stress the importance of "the feeling of connectedness", while the "disconnectedness", in turn, leads to relying solely on intellectual knowledge and losing the ability to hear the inner voice of intuition. In those rare labour situations when the mother and the midwife are having contradictory intuitions, they are clearly not connected. Without this feeling of connectedness, the midwives are impeded in providing good, empathic and connected care. (Davis-Floyd & Davis, 1997, p. 164)

The researchers illuminate this process through the personal story of a midwife:

> "...no amount of [taught information] is ever going to compensate for a lack of self-confidence or an ability to blend critical thinking with personal responsibility. What makes a really good midwife, I think, are those inner-based qualities of analysis and discernment, the emotions that she stays in touch with because she does not divorce her self from the process of learning so that the feelings of self-respect, and self-love, and self-trust blend to make her humane and to keep her connected." **(Davis-Floyd & Davis, 1997, p. 156)**

Empathy can therefore be seen as a form of acquiring information, where, through the perception and feelings of oneness, a person can perceive sensations that come from outside of personal experiences. Parviainen (2006) refers to ideas originally presented by the philosopher Edith Stein, and states that the more experienced a person is in the process of perceiving and reflecting – for example related to a kinaesthetic sensation – the easier it is for them to recognize the sensations that do not originate in their own body (Parviainen, 2006).

Sensitivity

It is evident from case studies that some designers and artists seem to be more sensitive – and more intuitive – than others (Uusikylä, 2008). It is not clear whether there is a correlation between these traits, but several highly intuitive practitioners mention sensitivity as a prerequisite for successful intuiting (Guiley, 2001; Myss, 2005; Peirce, 2009, 2013; Thibodeau, 2005; Vaughan, 1979). Some highly intuitive individuals mention that, through *conscious sensitivity,* a person can hear, see or sense signals that are invisible or partly hidden to others (Myss, 2004; Peirce, 2009). In general, some individuals seem to be more sensitive than others with regard to sensory processing due to neurological differences (Aron & Aron, 1997).

Already in 1913, Carl Jung described some persons as "sensitive" and "in most cases these patients were extremely bright, sensitive in-

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dividuals who had suffered on account of this very sensitivity some acute or cumulative trauma in early life" (Jung, 1915; Kalsched, 1996, pp. 11–12). The term Jung chose to describe these persons could alternatively have been "vulnerable", "introverted" or "intuitive" (Aron, 2006).

Michael M. Piechowski, a psychologist specialized in the study of emotional and spiritual giftedness, sees this special type of sensitivity as a developmental potential (Piechowski, 1986). He stresses that gifted and talented persons have important personality traits that the usual intelligence tests do not tap. Among these traits is a variety of heightened activity, for example an enlarged and intensified manner of sensing, feeling, thinking, imagining, or even tasting. Piechowski stresses that the increased sensitiveness of different experiential channels is often found in creative individuals. The characteristics he mentions are usually found across different creative talents – from writers and composers to scientists and inventors, including spiritual leaders. (Daniels & Piechowski, 2008; Piechowski, 2006)

Piechowski's (1986) model of developmental potential defines five dimensions of enhanced mental functioning, which provide a wider hypothesis as to what lies behind giftedness or talent. He mentions psychomotor components, which may present, for example, as restlessness, and sensual components, such as enhanced differentiation of experiences. He continues with the intellectual dimension, which may be the avidity of knowledge, discovery, questioning, or love of ideas and theoretical analysis. From the imaginational dimension, he gives an example of richness of association, the facility for dreams, fantasies and inventions, and a liking for the unusual. The emotional aspects include the great depth and intensity of emotional life expressed in a wide range of feelings, compassion, a heightened sense of responsibility, or self-examination. Piechowski stresses that without some degree of intensity in these areas, a talent is a bare technical facility lacking heart and fire. These five dimensions may be thought of as the channels of information flow and as modes of experiencing, and they can be wide open, narrow or barely present (Piechowski, 1979). The combination of a searching intellect combined with intense emotionality gives persons possessing such attributes the potential for eminence (Piechowski, 1986).

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The psychotherapist Elaine N. Aron (1996) has researched persons she refers to as highly sensitive persons (HSPs). Heightened sensitivity is a personality trait, but it is rooted in neurological difference. Due to the very sensitive nervous system of HSPs, these individuals have greater awareness of subtle signals, which makes them also more intuitive. According to Aron, this means that they pick up and work through information in a simultaneous and nonconscious way. They "just know" without realizing how. HSPs pick up on many of the subtleties other persons miss. What seems ordinary to others, such as loud music or crowds, can be highly stimulating and thus stressful for HSPs. According to Aron (1996), about 15 to 20 per cent of the population is highly sensitive and, hence, since 80 per cent of the population is not highly sensitive, sensitiveness is considered weird, and a HSP is often considered too different. Sometimes HSPs learn to disguise their difference, occasionally they find refuge in fantasy worlds, sometimes they manage to "normalize" themselves but suffer from not fulfilling their own potential (Aron, 1996).

As designers often are very talented visually, it is interesting that, according to Jagiellowich and his co-workers (2010), HSPs seem to be particularly more visually sensitive. When researching HSPs' brain activity by observing the minor changes that occurred when HSP subjects were presented with an image of a landscape, the results showed significantly more brain activation in the areas of visual attention when compared with non-HSPs. This shows that typically HSPs experience greater brain activation in an additional network of functional brain areas that appear to be involved in visual attention and oculomotor processes (Aron & Aron, 1997). It took longer for the HSPs to answer questions pertaining to the landscape, because they paid greater attention to the detail and the subtleties. Such "more elaborate processing" means that in HSPs' visual processing there is neurologically a greater degree of integration of the various components (Jagiellowich et al., 2010).

The stronger the emotional sensations and experiences experienced by HSPs, the less welcome they usually are among peers and teachers, hence potentially causing valuable information to be ignored or even lost. When the unique and special sensitiveness is un-

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derstood and legitimized, there is usually instant recognition and relief. (Aron, 2006)

Extraordinary knowing

One form of knowing that is not often referred to suggests that information can come from outside a person's professional expertise. This kind of knowing is often described as *direct knowing* intuition and the persons possessing this attribute are termed *expert intuitives* or *highly intuitive persons*. This ability to receive or intentionally access intuitive information has been labelled differently in various sources. The psychologist Charles T. Tart (2009) calls it *direct knowing*, the physicist Russel Targ (2004) *remote viewing* and in Dzogchen literature it is called "*naked-awareness*" or "*intrinsic awareness*" (Targ, 2004). Many individuals, including artists and researchers, describe having experiences of information coming "out of the blue" (Davis-Floyd & Davis, 1997; Larsson, 2001; Uusikylä, 2008). With this type of knowing, it is typical that a person can read information, which may be partly based on professional expertise, but all of it cannot be explained through expertise. Sometimes a person is able to access information that exceeds the boundaries of expertise and surpasses even the limits of time and place (Radin, 2008; Targ, 2004; Tart, 2009).

Typically, this type of knowing includes large quantities of information coming from outside of one's experience and learning. However, often expertise is needed in order to understand the nature of the information and the skill to transform it into an understandable form, language or representation. This may often be a challenge since these experiences are not always easy to transform into verbal or even visual representations. (Davis-Floyd & Davis, 1997; Kautz, 2005; Peirce, 2013; Targ, 2004, 2012)

There are numerous references to this type of knowing, for example Kautz has widely researched expert intuitives and he states that an expert intuitive is able to access almost any information since all information is available to be read (Kautz 2003). In other words, the expert intuitives are able to intentionally attune to specific information and acquire the specific parts of the required information. The persons who are able to access this type of information describe the

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experience as being akin to "*united*" or "*round and complete*", instead of the information being scattered and split into pieces (Keller, 1983; Mayer, 2007; Peirce, 2013). Several scholars state that "human beings occasionally have experiences and show certain behaviours that cannot be reduced to materialistic explanations and that look like fundamental aspects of a spiritual nature" (Beauregard et al., 2014; Tart, 2009, p. 36). Even if the truthfulness of these experiences can be questioned, the personal value and utility of them cannot be denied.

Larsson (2001) describes in his book on Nobel laureate cases an example concerning Rabindranath Tagore, who received the Nobel Prize in Literature in 1913. His inspiration was very spiritual, close to a religious experience, resembling a feeling of salvation. One morning Tagore stood in front of his house and watched the sun rising when the inspiration came bubbling forth:

> *"As I gazed, all of a sudden a lid seemed to fall from my eyes, and I found the world bathed in a wonderful radiance, with waves of beauty and joy swelling on every side. The radiance pierced the folds of sadness and despondency which has accumulated over my heart, and flooded it with universal light."* .... *That day the poem "Nirjharer Swapnabhanga" (The Fountain's Awakening) gushed forth and coursed in like a cascade. The poem ended, but the curtain did not fall upon my joy."* **(Larsson, 2001, p. 107).**

A laser physicist Russel Targ states that humans have skills and experiences that originate from extraordinary sensing. In fact, all individuals have a gift of expanded awareness, or extrasensory perception (ESP) (Targ, 2004). We may use it or not, or be aware of it or not, but usually we do not speak about these experiences. An intuitive practitioner, Penney Peirce, differentiates between outer and inner sensing. Outer senses are physical, while the inner senses include ESP experiences (Peirce, 2013). For example, an ability to have premonitions is among these. Larry Dossey, a physician researching premonitions, states that any organism would greatly benefit from the ability to foresee in the game of survival (Dossey, 2009). All humans have extrasensory perception, some of which has developed through evolution (Dossey, 2009; Sheldrake, 2011). However, the

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question remains as to how to designate these experiences. For example, a person may sense if another person is staring at their back. Merleau-Ponty (1968), from the perspective of phenomenology, defines this type of telepathy as an effective perception, while Sheldrake (2013), from the perspective of biology, labels this as a sense of being stared at (Merleau-Ponty, 1968; Sheldrake, 2012).

Varela & al. (1991) state that even the sensible qualities of matter can be known *in themselves* through perception. He argues:

> *"in pure perception we are actually placed outside ourselves; we touch the reality of the object in an immediate intuition. Here also an experimental verification is possible since the practical results are absolutely the same whether the reality of the object is intuitively perceived or whether rationally constructed"*

and continues,

> *"the difference between perception and recollection is not merely in degree, but is a radical difference in kind, the presumption will be in favor of the hypothesis which finds in perception something which is entirely absent from memory, a reality intuitively grasped."* **(Varela et al., 1991, pp. 75–76)**.

Juho Hotanen (2003), inspired by the ideas of Mearleau-Ponty, mentions another kind of experience in the area of extraordinary knowing. He describes how we can try to get closer to the original experience of perceiving and immerse ourselves in the experience. He gives an example of looking at a blue sky: "*I abandon myself to it, submerge this mystery and it 'thinks about itself' in me, I am the sky itself, which unites, accumulates and starts to exist for itself*" (Hotanen, 2003, p. 62; Merleau-Ponty, 1962).

This sensation of being immersed is mentioned in several references (Kautz, 2005; Mayer, 2007; Peirce, 2009, 2013). When an individual is familiar with their personal unique core existence – of which highly intuitive persons sometimes use expressions such as energetic vibration, inner essence or home frequency – the person may access and read the quality of other objects and persons. If a person

stares intently at a flower, and remains watching it over a long period they may start to merge with the flower and reach its core essence, becoming one with it, meaning energetically entangled (Peirce, 2013).

To sum up, highly personal and extraordinary experiences of intuition should be seen as matters of experience and forms of knowing rather than items of belief (Targ, 2004). Further, these experiences can be researched and evaluated if they are helpful, or ignored if they are of no use.

3.4 CONCEPTUAL AND METHODOLOGICAL CHALLENGES OF WORKING WITH INTUITION

There are several challenges when dealing with issues related to intuition, many of which are closely related to the chosen world view. The socio-cultural stigma attached to the concept of intuition is not the only one, though it is one of the most severe. The stigma may often lead to excessive scepticism and denial of intuitive experiences. On a grass-roots level, this may lead to individual suffering when the personal experiences of intuition are denied or not spoken about. Intuitive information brings challenges, such as a lack of scientific models explaining intuitive experiences, missing vocabulary and confusing terminology, as well as a difficulty in verbalizing intuitive experiences. Intuition is a form of personal and inner sensing that takes place mostly in the mental or embodied dimensions and in the non-conscious parts of the human mind. Therefore, the experiences are ambiguous in general; hence, it is challenging to build an understanding and knowledge of them. Further, intuition is often entangled with highly personal experiences or even extraordinary experiences that challenge the traditional and materialistic scientific world view.

Stigma attached to intuition
Elizabeth Lloyd-Mayer, a psychoanalyst and clinical professor researching extraordinary knowing, states that even though intuition forms the majority of human thinking, it is treated like a taboo and

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our culture has a common tendency of shutting if out, as with other anomalies (Mayer, 2007). In public discussion, intuition is often seen as a type of knowing that mostly women – or emotionally driven men – use when making conclusions or decisions (Kautz, 2005). Even today, to be taken seriously as a person, one needs to have impressive rational argumentations to convince others, whereas intuitive information – if it exists – has to be kept hidden and only rational explanations are accepted. This is paradoxical, since intuition, emotion, feeling and imagination are always automatically intertwined in the design process (Nelson & Stolterman, 2003). In particular, the extraordinary experiences are not talked about and sometimes they are even denied due to a fear of appearing unprofessional (Goldschmidt, 2001). In such cases where intuition is used, one needs to mask it since the justifications have to be based on reasoning.

Intuition is considered more an unreliable and questionable form of knowledge than a form of reliable knowledge such as rational arguments. Further, intuition, superstition or magical and supernatural beliefs are sometimes seen as a monolithic phenomenon, which are all biases of cognitive thinking (Svedholm, 2013). However, this is neither a correct nor a fruitful approach. The cognitive scientist Guy Claxton (2000), a well-respected expert on young people's learning and creative capacity in the UK, states that the distrust in intuition reflects the 300-year-long history of European culture and is manifested in the maxim: Cogito ergo sum. The objective is to reduce the human mind to its rational and conscious parts and exercise the solely explicit and analytical form of intelligence (Claxton, 2000). The tradition of positivist science demands explanations of the world to be shared through natural language and to be tied to verifiable observations (Laughlin, 1997). However, the problem cannot be solved "by rationalizing the essential intuitive source of creative knowledge, but rather by studying the way science proceeds when it is successful at being creative" (Laughlin, 1997, p. 22).

Scepticism, pseudo-scepticism and scientism

Scepticism is an obligatory tool for all research and it serves as an important and valuable one for testing information. In general, it

is also wise to reflect on and evaluate new ideas, and to test them with an open mind. This can help a person to validate new ideas and, hence, provide reliability and confidence in further actions. However, it is important that scepticism is not confused with pseudo-scepticism or pathological scepticism. (Tart 2009)

Charles T. Tart, a professor of psychology, who for more than 50 years has researched the nature of human consciousness, especially altered states of consciousness, claims that a pseudo-sceptic pretends to be a real sceptic but is in fact a believer in another belief system, for example scientism. These persons usually believe they are interested in getting at the truth, but, without looking at the data and the evidence, have already decided on and locked into their position. A pathological sceptic needs neither formal education nor evidence from literature or experiments, since they already *know* that what the researchers are doing or concluding is in any case impossible. Even though such a person tries to appear open-minded and scientific they actually are a *believer* in another belief system. (Tart, 2009)

However, there is something very human in the attitude of pseudo-scepticism, a requirement for belief and a resistance to change. Such attitudes and emotions can reveal that a person may be mentally challenged or overwhelmed. They may be facing a pressure to transform or feel that the steps are too demanding and uncomfortable.

It is crucial to discern essential science from scientism. Science itself is a method and a formal system of collecting and refining knowledge, while scientism is a belief system. Scientism is a degeneration of essential science that harms many people by dismissing and "explaining away" the spiritual, rather than examining it and trying to understand or even apply it. "Scientism never recognizes itself as a limited belief system but always thinks of itself as true science, or the noble search for truth, the confusion is pernicious". (Tart, 2009, p. 192)

Some designers have spiritual experiences related to intuition. According to current psychological research, spirituality is often seen to be a transcendent dimension within the human experience and it is usually discovered in moments in which the individual questions the meaning of personal existence and attempts to place the self within a broader ontological context (Saucier & Skrzypinska,

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2006). Sometimes when searching for the inner self, the approach of mixing alternative traditions may be useful. Houtman and Aupers, sociology researchers, mention that in such situations it may be beneficial to use psychological, mystical and esoteric traditions, or eastern religions blended together with free expression and meditation (Houtman & Aupers, 2007). However, it is important to remember that the terms religious and spiritual are not identical and numerous scholars make a clear distinction between them (Saucier & Skrzypinska, 2006; Tart, 2009).

Some experiences cannot be explained away without doing major harm to authentic perception and original experience. With these spiritual – excluding religious – experiences it is possible to remain in a position of observation and neutrality. Instead of taking the common position of belief or non-belief when extraordinary intuitive experiences are concerned, a person can linger in a realm of uncertainty and ambiguity, perceive new sensations and information with an open mind and make personal empirical observations (Hotanen, 2003; Peirce, 2013; Tart, 2009; Varela et al., 1991).

Missing vocabulary – hidden phenomena
One of the major challenges when working in the field of intuition research is limited and missing vocabulary, as well as the poor and confusing use of terms. There is neither a coherent vocabulary nor even proper terminology to describe intuitive experiences, and, partly due to this, it is difficult to recognize and share intuitive experiences. Further, without proper and shared terminology and concepts, it is extremely hard to research the phenomena in depth.

In order to understand intuition, we need an existing conceptual or categorical structure that guides our attention in experience (Järvilehto, forthcoming). Even though the metaphors may help, they may also be misleading (Lakoff, 1980). The lack of proper vocabulary and terminology is also a matter of credibility and plausibility. On the experiential level, a proper naming of a phenomenon validates its existence, and enables a person to get to grips with the issue and therefore become empowered (Lakoff, 1980).

As presented in the previous chapters and in the glossary, there

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are some good words and terms describing intuitive experiences, and even concepts and models to facilitate understanding of the phenomena and experiences of intuition, but most of these are found in "alternative" literature, such as yoga, eastern tradition or esoteric literature (Nadel, 2006). When using the terminology and references outside of the prevailing scientific paradigm, there most likely will be problems pertaining to academic reliability. The use of these kinds of non-scientific concepts and terms tends to give the reader an unofficial permit to disqualify the whole work and to consider the research invalid.

The scientific credibility or effectiveness of an argument needs and depends on a realm of common experiences, as well as on the prevailing practice in communicating those experiences in a shared language. However, these are hard to identify precisely, because such commonalities are often taken for granted. Only when a person steps out of such a "consensual domain" do they begin to become aware of the unarticulated premises, mutual understandings, and the assumed practices of a group. (Keller, 1983; Lakoff, 1980)

Challenges in communicating intuitive information
In many cases, people are prone to conferring a dominant role on the reasoning faculties. The rational mind is well trained and it easily dominates all thinking. Human consciousness aims at constant coherence, therefore even trivial and everyday situations are screened to fit the customary expectations. As stated by the biologist and Nobel laureate Gerald Edelman, the human consciousness can bend, shrink or even split, but it cannot tolerate a break in coherence (Hayles, 2014). This leads to a situation where consciousness easily edits and modifies reality to fit personal expectations, with a cost to reality, by misinterpreting anomalous or strange situations (Hayles, 2014). The situation is like a double-edged sword: on the one hand intuition is prone to biases in situations where an immediate pattern recognition process matches the current situation to previous ones stored in memory (WYSIATI what-you-see-is-all-there-is), resulting in a misinterpretation of the current situation (Kahneman, 2011). On the other hand, the conscious mind may edit the reality by ignoring

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some essential perceptions. All this highlights the importance of authentic perceiving, which can be developed with practice. Usually, when starting to develop intuitive faculties, the dominance of rational faculties will be threatened and the rational mind starts to resist the change (Surel, 2012).

the conscious mind may edit the reality by ignoring some essential perceptions. All this highlights the importance of authentic perceiving

The creative process is mentally and emotionally challenging. Sometimes a person has the capacity to support creativity, flow or intuition, but in most cases they take place more or less randomly. Usually, there is a period of incubation or a state of "being not ready yet" (Lawson 1997). The bigger the challenge, the longer this incubation period usually takes. If a designer does not understand the role of incubation, they may, for example, feel despondent, embarrassed, or feel that they are wasting time. Intuitions do not usually come on demand. The person may feel weird or even frightened. Designers with long professional expertise tend to know that this is just a phase in their creative process and, despite the severe uncertainty of getting any results at all, they trust that the chaos will lead to a solution (Lawson, 1997; Uusikylä, 2008).

For many individuals, it may be challenging and distressing if intuitions cannot be freely talked about or shared without fear of being stigmatized. Lloyd–Mayer (Mayer, 2007) gives an example in her book of a world famous neurosurgeon who had an amazing track record, but who had to quit his university teaching since he was unable to talk about his most important tool, which he used when about to operate on a patient. That is, he always saw a particular light appear above the patient's head when the patient was ready to be operated upon. Without the light, he knew the patient would not survive. So he sat beside the bed of the patient and waited until the light appeared and then operated. He was unable to talk about his method to anyone even though this was his most important working method to ensure a successful result.

Sometimes a person has enough courage to face intuitive experiences but lacks the words and terms to describe them. The intuitive practitioner, Penney Peirce, states that the more complicated or extraordinary sensations are, the harder they become to describe

with words (Peirce, 2013). Occasionally, a metaphor can help a person to widen their sensing and understanding of intuitive issues that were earlier unreachable. A metaphor enables understanding and facilitates the experiencing of one type of thing in terms of another (Lakoff, 1980, p. 5). New metaphors can help a person to broaden their understanding, for example increasing awareness of what might otherwise have been disregarded sensations or extraordinary intuitive experiences. This can begin to happen when a person starts to notice and comprehend their experience in terms of a metaphor, thus forming a deeper understanding of the issue. A person may have a block preventing them from intuiting, but listening to metaphorical expressions of intuitive moments experienced by others may give the person enough courage to open up to personal sensations. (Lakoff, 1980)

Some scholars state that an experience may be so ambiguous that it is difficult to describe even with a metaphor. Further, the use of a poor or misleading metaphor usually limits the actual experience (Arvidson, 1997; Lakoff, 1980). The need to use metaphors when describing intuitive experiences reflects also the profound lack of conceptual structures behind these intuitive experiences.

Many scholars mention the need for self-understanding in order to create a shared understanding of intuitive experiences (Kautz, 2005; Mayer, 2007). Often individuals tend to think that they have direct access to their personal feelings, ideas and mental sceneries but not to anybody else's. Any really deep understanding of oneself takes one beyond oneself (Peirce, 2009, 2013). Understanding and cognition about oneself is like any shared knowledge building, it comes from interaction with the environment (Hayles, 2014; Parviainen, 2006, p. 37). The skills required for *mutual* understanding are necessary to even approach *self*-understanding (Lakoff, 1980, p. 232). Regarding intuitive experiences, self-understanding is essential.

New metaphors are capable of creating new understanding and give a form to intuitive experiences, hence leading to the creation of wider understanding or new realities (Lakoff, 1980). When talking about intuitive experiences and looking for shared understanding, one needs to delicately inquire and slowly figure out what there is in common and what is safe to talk about, how to communicate

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an extraordinary or unshared experience or create a shared vision. With patience and the flexibility to bend their world view, people may achieve some shared mutual understanding (Lakoff, 1980).

Challenges in knowledge building

The processes of intuiting are extremely ambiguous and difficult to understand even partially; therefore, there is a great risk of ignoring or misunderstanding something that is essential. Arvidson (1997) calls for intuition research that is not necessarily tied to *measurable* results, even though it would be compatible with these. He wonders "how could interesting phenomena such as intuition possibly fit into a paradigm that considers microseconds of eye movement standard phenomena for research?" (Arvidson, 1997, p. 52). Therefore, he considers that a radical change in the theoretical foundation is essential in order for a meaningful discussion on intuition to take place.

There is a difficulty in sharing opinions on intuition which needs to be overcome so that knowledge can be shared and built upon through collaboration – especially within design teams as well as within academia. This difficulty may partly be due to the challenges encountered when researching non-conscious processes (Glöckner & Witteman, 2010). There may also be problems in finding a constructive attitude to such an ambiguous phenomenon, thus dividing attitudes and causing emotional reactions. Since designing is an iterative and collaborative process, it requires constant verbal explanations while constructing knowledge and reformulating or testing solutions (Enkenberg, 2001). To tolerate the emotional burden of learning, the role of collaborative action is essential (Enkenberg et al., 2009). Therefore, it is vital to be able to both verbalize and share intuitive experiences.

Even though intuition may sometimes come with such certainty, some part of it remains unknown since it hides behind conscious thoughts. A person will always find excuses to "explain intuition away" if they wish to. According to Mayer (2007), in the area of science it is not beyond belief to hear: *"I have to prove it so I can prove I am not crazy."* But equally dangerous is dogmatic science: *"This doesn't fit with what I already know, so it can't possibly be true."* (Mayer, 2007, p.

104) Also, a need for certainty may easily lead to denial, ignorance or an inability to admit that *"I don't know"* and *"I was wrong"* – which I have heard mentioned by Brenda Dunne, a developmental psychologist in Princeton, as being the most important words for a researcher.

The need for certainty may lead to premature generalization or an ignoring of information that contradicts the beliefs that a person is attached to. Intuition usually challenges many current beliefs. In the academic world, one needs to be convincing, and any thoughts or ideas that are not in keeping with the materialistic scientific paradigm are best kept hidden. Peer-reviewed papers are evaluated by individuals whose thinking tends to be aligned with and support the prevailing materialistic scientific paradigm (Sheldrake, 2012). This rationalization may sometimes be masqueraded as reason. Since nowadays there are almost endless amounts of information emanating from various sources, it is not hard to find proofs and arguments that argue in line with a person's own beliefs and points of view. Consideration has to be given to both the writer's and the evaluator's credibility. Behind the fear of losing credibility may be a justifiable concern about not only one's own reputation but also the reputation of one's research group and, hence, concern about the continuity of funding. (Sheldrake, 2012)

Scientific language is seldom precise. New theories are rarely, if ever, constructed by way of straightforward, clear-cut steps of induction, deduction and verification – or falsification. Neither are they defended, rejected, or accepted in so straightforward a manner. (Keller, 1983; Sheldrake, 2012) In practice, scientists often form the rules of scientific methodology by combining intuition, aesthetics and philosophical commitment. The importance of extra-rational or extra-logical components of thought in the *discovery* of a new premise or principle is generally acknowledged while the role of intuition is kept hidden. We may recall the often quoted words of Einstein: *"To these elementary laws there leads no logical path, but only intuition, supported by being sympathetically in touch with experience"* (Holton, 1973, p. 357).

Intuition includes a great number of areas that are hard or impossible to rationally explain. This may raise prejudices, and may even appear frightening. How to use and develop intuition and, at the same time, stay mentally stable may arouse fears. This can be il-

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lustrated with an example recounted by Lloyd–Mayer who describes a comment made by a peer reviewer while reviewing a journal article on remote perception by the physicists Puthoff and Targ. The reviewer had found the article to be methodologically impeccable and, hence, could not find any substantive basis for its rejection. However, the reviewer recommended rejecting it for publication with the following declaration: "*This is the kind of thing that I would not believe in even if it existed.*" (Mayer, 2007, p. 133) Although this may be amusing, it reveals something that is very close to each person concerning issues of rejection that do not fit our inner mental models.

Summing up, science and scientists should be searching for the best knowledge available, they must love and yearn for the truth and research, in particular, the outliers, where revolutionary new inventions can often be found. Brenda Dunne, who has carried out remarkable research in the Princeton Engineering Anomalies Research (PEAR) laboratory in the area of integration of multiple scholarly vectors, states that this kind of research includes being humble enough to face new frontiers – especially if the new information does not fit the existing models or previous hypotheses (Dunne, 1997). She stresses that through subjectivity, a researcher can reach some meaningful empirical evidence which can be raised into conscious awareness for further consideration. However, this requires complete immersion while being aware of the subjective reactions and admitting failure or lack of information (Dunne, 1997).

4

INTUITION DEVELOPMENT

In current scientific literature, there are numerous research references to intuition in general; however, there are only a few that refer specifically to the area of intuition development or that ponder its pedagogical aspects. Some mentions can be found scattered throughout various sources and the following pages introduce these as well as reflect on their relationship with current design education. In non-scientific literature, for example reports relating to highly intuitive individuals or hands-on books presenting practical exercises associated with intuition or spiritual development, the number of exemplars and the variation are extensive but these are not within the scope of this study. At the end of this chapter, I present some aspects of and practical methods related to intuiting that are frequently mentioned by several highly intuitive individuals and which I have found to be related to the practical methods used by some designers.

4.1 INTUITION AND CREATIVITY DEVELOPMENT IN EDUCATION

Intuition is seen as a personal trait as well as a skill or ability, but the amount of use, the area of excellence and the level of competence vary between individuals (Atkinson & Claxton, 2000; Bastick, 2003; Hogarth, 2001). Intuition as a skill appears to have a developmental potential that changes according to practice and experience (Baylor, 2001). Several researchers, highly intuitive practitioners and references underline that intuitive skills can be developed with practice or enhanced with supportive conditions (Bastick, 2003; Hogarth, 2001; Kautz, 2005; Monsay, 1997; Myss, 2005; Orloff, 2001; Seligman & Kahana, 2009; Shefy & Sadler-Smith, 2004; Vrugtman, 2009). There are even some methods for increasing innovative thinking through the use of intuitive tools (R. Root-Bernstein & Root-Bernstein, 2003; R. S. Root-Bernstein, 2002). However, some scholars argue that emotions and affects are an important part of intuition and, hence, they express doubt as to whether intuition can be taught (Hogarth, 2001).

Intuitive and reasoning faculties can be thought of as a cognitive continuum, not just as a dichotomy. In fact, the whole decision-making process is suggested as being a continuum based on varying amounts of intuition and conscious reasoning (Hammond, 2007; Simon, 1987). Kenneth Hammond (2007) suggests that intuition and analysis can be considered as the end points of a cognitive continuum, where various conditions select various forms of cognition. Even though this continuum is an abstraction, it is a useful reminder that there is variation in cognitive activities that range from intuition to analysis (Claxton, 2000; Hogarth, 2001).

> Intuitive and reasoning faculties can be thought of as a cognitive continuum, not just as a dichotomy.

In the current literature, there are several books specifically dealing with intuition related to creative expertise either through case examples or stories of famous scientists, artists, inventors or business executives (Gladwell, 2007; Keller, 1983; Larsson, 2001; Uusikylä, 2008). Further, there are numerous practical hands-on books related to the development of intuition written by intuitive practitioners. Most of these present a selection of exercises readers may use while

searching for a better connection to their intuition or process of intuiting (Brennan, 1987; Cartwright, 2004; Guiley, 2001; Myss, 2004; Orloff, 2007; Rosanoff, 1991; Thibodeau, 2005). However, there are no books tailored to the needs of designers.

It is probable that intuitive processing cannot be based on rote learning or on the traditional and narrow sense of teaching, but it can be learned, or an individual can also actually unlearn routines and habits that hinder intuition (Kautz, 2005). Kautz states that all individuals have the skill of intentional intuition and that they are able to learn it, given a few prerequisites: believing that it is possible, having a certain amount of self-esteem and the courage to take steps forward.

In the following sections, I present some of the most common methods and supporting activities that are mentioned as enhancing intuitive thinking and creativity. Often these are divided into internal and environment-related factors, or "inner" and "outer" aspects (Bastick, 2003; Kautz, 2005; Mayer, 2007; Monsay, 1997).

Environment-related support

The environment-related issues can include issues of the physical environment, such as physical freedom, safety and nutrition, but usually they are considered psychological, such as supporting an emotional atmosphere or psychological freedom (Monsay, 1997). To encourage intuitive ideas, creative people often try to recreate environments where they have previously experienced such intuition. Sometimes these may involve certain patterns or even rituals, such as props to act as stimuli (cigarettes, drinks), an idiosyncratic ritual (bath, careful preparations), or physical activity (jogging, executing routine tasks). Some of these may even become habitual substitute activities. Sometimes these rituals work but the outcome is not guaranteed. (Bastick, 2003)

The classic external facilitators for creative insights are the three Bs – bath, bed and bus – typical places supporting physical and mental relaxation and the free flow of ideas (Bastick, 2003). These environments may enhance the brain to adjust to a different mode, activate intuitive faculties or assist a person to notice new connections

or serendipity, just as Louis Pasteur assures with his famous quotation: *"Chance favours only the prepared mind."* (Pasteur, 1939)

Many Nobel laureates have emphasized the role of circumstances in the emergence of insights. Hideki Yukawa, who received the Nobel Prize in Physics in 1949, often lay awake at night thinking about the problem of the forces holding together the nucleus of the atom.

> *"He had a notebook at the side of his bed, so that he could record the thoughts that he might have. Sometimes he believed that he was close to a solution, but when he thought through his ideas in the morning, they proved to be worthless. One night, however, an insight came to him – there must be a relationship between the intensity of the force and the mass of the binding particle. On the basis of this idea, Yukawa calculated that this binding particle would have a mass 200 times that of an electron. He called this particle a "meson"."*
> **(Larsson, 2001, p. 77)**

Linus Pauling, a Nobel laureate in chemistry, spent several years working on the mystery of alpha keratin molecules. Then, in 1948, he got a heavy cold, which forced him to remain in bed for some time. After getting bored with books, he started to sketch images of the molecule on a page, which he folded at the points where the molecular structure would allow it. After several attempts, he succeeded in folding the paper to form a pipe-like structure that allowed the spiral form. He described: *"Hunches or inspirations, come to me often when I have thought about a problem for years and then I have suddenly found an answer. This is because I train my unconscious mind to retain and ponder problems..."* (Larsson, 2001, p. 115)

Yasunari Kawabata, who received the Nobel Prize in Literature in 1968, mentioned the Japanese tea ceremony as a special moment – it involved a meditative quietness that was also important to his writing. He viewed artistic creation as a form of meditation in which the mind is emptied: *"the emphasis is less upon reason and argument than upon intuition, immediate feeling"."* (Larsson, 2001, p. 71)

There are some general characteristics that parallel the fruitful experiences described above. Most typically mentioned are rest and relaxation, periods characterized with mental dissociation. Also, a

robust expertise gained through years of orientation is an integral component. Sometimes simultaneous light physical activity of a repetitive and automatic character has been reported to assist such experiences (Bastick, 2003). One practical method to support this is to keep the conscious mind busy, for example with a simple routine task, in order to increase the function of accessing intuition and non-local information (Surel, 2012).

Traditional design process models
In the area of design literature, most design models presented illustrate the design process as a set of phases, with an emphasis on guiding, organizing, or avoiding chaos. Especially in the 1990s it was very common to present a design process as predefined steps and to provide guidelines to enhance the design process with ready-made exercises and a rational way of working (Claxton, 2000; Jones, 1992; Lawson, 1997). Rationally thinking, it would be nice and convenient to model the creative design process into a package of understandable steps, and to exclude troublesome areas that are hard to explain, such as intuition and serendipity.

The traditional design models tend to support those phases of the design process that are somehow manageable – either individual or shared ones. Often they are based on analysis-synthesis-evaluation where the analysed problem is divided into sub-problems to be solved (Claxton, 2000). Many of the design models are targeted to enhance the process of designing or information sharing by illustrating the different visible phases of the process (Jones, 1992; Lawson, 1997). The best of the models are iterative and cyclic, supporting the intangible aspects of designing, such as distributed cognition, building of knowledge structures and sharing of expertise (Bereiter, 1993; Goel & Pirolli, 1992; Lahti, Seitamaa-Hakkarainen, & Hakkarainen, 2004; Seitamaa-Hakkarainen, 2008; Vartiainen, Liljeström, & Enkenberg, 2012).

There are also several separate methods and tools targeted to help certain phases of the design process, including generating new ideas. Typically, these are thinking methods, which help to structure the problem and generate new ideas (Jones, 1992; Lawson, 1997). Of-

ten these are classified into different categories and they help, for example, to choose design strategies, explore boundaries or problem structure, search for ideas or evaluate the outcomes (Jones, 1992).

All such design models and methods may be important and support creative processes, especially when working in teams. My purpose is not to underestimate the value of these, since they can be truly beneficial. However, if someone's personal and natural method of designing is very different it may result in underuse of the personal creative potential or in a poor working atmosphere. In particular, novice designers, who do not have enough practical professional expertise to rely on while designing, are very reliant on external models and support (Lawson, 1997). Further, it seems that students are more attached to methods for idea generation and are more reliant on them compared with professional designers (Gonçalves, Cardoso, & Badke-Schaub, 2014).

Most of the design models I am familiar with do not offer enough – if any – support for the intuitive faculties. This easily leads to loss and ignorance of the most precious part of creating. The methods may offer good practices in knowledge construction and can help in many ways with controlling and structuring the environment and, hence, support the production of outcomes. However, these process models may be limiting since those unconventional ideas that do not fit the model happen to come a little bit too late, are too ambiguous, too troublesome, hard to put into practice, or restructure all the previous plans, and cannot usually be taken into account.

Internal support

In the current intuition development literature, certain psychological and mental circumstances are seen as important factors in allowing intuitive insights to occur. Some scholars mention the development of mental awareness and use of versatile thinking as a corner stone in supporting intuiting (Bohm, 1987; Csikszentmihalyi & Csikszentmihalyi, 1988). Monsay (1997) and Bastick (2003) state that intuitive insights are supported by some specific "inner" conditions such as openness in experience and tolerance to ambiguity. Further, they are supported by emotions, playfulness, game-like at-

titudes and fun (Larsson, 2002). The ability to indulge in spontaneous play requires a feeling of safety and an interest in the world – the same properties that enhance intuitive leaps (Laughlin, 1997). On the other hand, some turbulent, high anxiety or stressful situations may cause a situation where intuition dominates (Bastick, 2003; Dayan & Di Benedetto, 2011).

In the area of creativity research, when a person orients themselves towards a problem, the phase of mental and physical preparation is followed by or overlaps an incubation phase, which is seen as being aligned with the process of intuiting. The incubation phases usually include mental preparations, such as a well-prepared mind including robust domain expertise and immersion, as predisposing factors. Often, the proper definition of a problem or the nature of the solution also assists intuition. (Bastick, 2003; Lawson, 1997; Monsay, 1997)

If intuition is considered as a form of heuristics, feedback plays a major role, since the accuracy of intuition can be increased over time with proper feedback (Piatelli-Palmarini, 1994; Shefy & Sadler-Smith, 2004). Hogart (2011) states that by being aware of our intuitive experience we can manage its development. A concrete example of this might be observing and learning from intuitive moments, i.e. not mixing the three Is – insight, incubation and instinct (Shefy & Sadler-Smith, 2004).

As mentioned earlier through case examples, numerous Nobel laureates emphasize mental states to enhance intuitive insights, for example taking advantage of relaxation and meditation. Nobel laureate Dag Hammarskjöld even created a meditation room in the UN Headquarters. Some mention altered states of mind such as a change of perspective or even extraordinary experiences (Larsson, 2002).

Since intuitive information processing is a natural and innate operation mode for humans, in many cases a person can increase their utilization of intuition just by being open to it and letting it unfold (Mayer, 2007; Peirce, 2009, 2013). However, it is not always easy. There can be many kinds of disturbances blocking intuition. Kautz (2005) talks about "residues" and obstacles

disturbing the access to the superconscious and biasing intuition. Tart (2009) mentions limitations caused by the narrow consciousness when a person is living within a material simulation. Yoga literature presents theories aligned with the layers of consciousness and domination of the ego (Acarya, 1982; Tart, 2009).

Humans tend to think intuitively at first, which is an inbuilt, natural and easy way of thinking (Laughlin, 1997). It is effortless, quick and ordinary. Elizabeth Lloyd-Mayer, who consulted numerous intuitive persons when working as a psychiatrist, describes intuition like this:

> *"Ordinary? Oh yes, it's surprisingly ordinary. In fact most people use aspects of this state of mind in their daily lives without realizing it. For instance, an important key to this state of mind is 'no effort'. And that's quite ordinary, because if you think of a time when you tried hard to remember something, you know the more you **tried** to remember it, the more you pushed it down within you. However, when you **allowed** it to emerge, it bubbled right up. You accomplished that with no effort. That's how intuition works."* **(Mayer, 2007, p. 52)**

Unlike a common belief, many times the problem is not to hear the voice of intuition; indeed, it may be very natural as described above, but the challenge is to have enough courage to act on its advice (Surel, 2012). Individuals tend to explain away intuition with rational arguments. In order to look behind those personal denials – even trivial ones – a person must examine with an open mind the data that are deeply personal, highly subjective and insistently private; this is the way in which intuitive knowing manifests itself (Mayer, 2007, p. 36).

4.2 METHODS USED BY HIGHLY INTUITIVE INDIVIDUALS

Highly intuitive individuals often use methods that are very intimate. Also, their experiences of intuition may be highly personal and extraordinary. Some of their ways of intuiting may be more or

less an innate skill, while others result from a long period of practice. The methods used vary and often they have been either developed spontaneously or intuitively.

Self-knowing and self-esteem

Many highly intuitive practitioners highlight the importance of self-knowing. Caroline Myss (2004), an intuition practitioner and medical intuitive, stresses the fundamental role of self-esteem and Peirce (2013) underlines self-experience, which is based on personal and unique so-called frequency. According to Myss (2004, 2005), self-knowing means that a person cannot afford to stop listening to the voice that others don't and admitting that they have data that others cannot read. According to her, a real, intuitive hit involves biological as well as sensory perception. An individual can feel something in their body but often rationalize as to why it can't be true (Myss, 2004).

Kautz points out that intuition itself is maybe the best communication channel to the inner self. He claims that intuition is everyone's main access to self-identity and their primary source for new knowledge, guidance, strength and inspiration (Kautz, 2005, p. xxi). Given this, intuition exercises may enhance learning to know the inner self better – and vice versa, knowing oneself is a step towards better working intuition. Intuiting usually happens between a person and the non-conscious parts of their mind, simultaneously when they are communicating with other persons or other outer sources of information (Kautz, 2005). At this point, the exterior data become interior data (Myss, 2004).

In order to attune to the delicate signals of intuition, a person needs courage to feel comfortable in an ambiguous and unfamiliar situation. They need to linger in sensations that are vague, diffuse and hard to define and to observe the limits of their conscious "moulding" of thoughts and possible subjective interpretations such as imagination and storytelling. "*Imagination organizes, manipulates, analyzes, and edits these intentionally selected objects of thought and their relational structures until a good fit is obtained between the information, intention, and situation or subject that motivated the intention*" (Burnette, n.d.-c). Therefore, it differs significantly from intuition. If

a person wishes to develop their intuition further, they need to recognize these different faculties and to expand their thinking beyond those limits that previously have been the constructions of their world view or the cornerstones of their understanding (Kautz, 2005). This all requires courage, and reasonably good self-esteem as well as openness to new perspectives, including willingness to change (Kautz, 2005; Myss, 2004; Surel, 2012). The great intuitive leaps of insight, where subtle signals start to form a new meaningful pattern, are possible only through spiritual detachment that comes from self-examination (Dunne, 1997, p. 126).

Evaluating the reliability of intuition

Several sources point out that intuition may be incorrect (Bastick, 2003; Glöckner & Witteman, 2010; Kahneman, 2011; Kahneman & Tversky, 1982). However, some sources underline that if the voice of "real" intuition can be heard, intuition is always correct (Kautz, 2005; Myss, 2005; Peirce, 2013). A few sources mention how a person is able to know if intuition is trustworthy or how to measure the reliability of intuition in general.

According to Monsay (1997), the type of intuition is directly related to its reliability. Physical intuition is most likely reliable while sensible intuition rooted in sensing and common sense usually creates errors based on naïve experiences. In general, practice and trust appear to be crucial steps when interpreting intuitive signals and the reliability of intuition (Nadel, 2006). Remarkably, an individual can trust in intuition even if it turns out that not all their intuitions are correct (Hardman, 2009). This may enhance intuitive processing and, hence, create a positive loop. Davis-Floyd and Davis (1997), who researched the intuition of midwives, stress their need to test the reliability of intuition since wrong decisions may lead to dangerous situations. *"Many of them told us that the trick, each time the inner voice speaks, is how to know whether or not it is 'real' intuition, and the struggle is to learn the difference between the inner doubt and debate that accompanies ratiocinative thinking, and the true voice of intuition."* They continue: *"The voice of reason is loud and aggressive; the harder task, as the midwives see it, is to identify and heed the truths spoken by the still,*

small, and culturally devalued inner voice." (Davis-Floyd & Davis, 1997, p. 159). The most essential components for testing reliability seem to be the personal and inner feeling of connectedness as an embodied and spiritual aspect. This also includes the physical and instinctive connections to the mother and the child. The reliability is related to the matrix of physical, emotional and spiritual connectedness (Davis-Floyd & Davis, 1997).

Several highly intuitive persons describe some inner and personal methods of evaluating the reliability of intuition. The physicist Russel Targ (2004), who uses remote viewing to access co-called non-local information, describes that: *"I have learned that if I see a colour clearly and brightly, or something silver and shiny, that is the aspect of the target that I am most likely to describe correctly."* (Targ, 2004, p. 40). Remote viewing is a process where a person intentionally contacts a given target through their intuitive faculties. The target – usually an object or a location – is unknown to the reviewer, but is labelled with a set of random numbers with no significance. Remote viewing is a good example of acquiring and utilizing direct knowing information, which provably comes from outside of the self (Targ, 2012; Targ & Puthoff, 1974).

In remote viewing sessions, when a person intentionally tunes into a special target through intuition, they may smell, taste, hear, see or sense the target – or expand this sensing as the skills of perceiving information develop (Targ, 2004). However, these sensations are not always available or present. People are different, hence they sense targets differently. There is an abundance of research in this area that shows that a person is able to access information they did not know or get results far beyond what can be expected by chance. One of the most important aspects is that there is verifiable evidence of the viewer's accurate impressions. (Persinger, Roll, Tiller, Koren, & Cook, 2002; Radin, 2006a; Targ, 2004, 2012; Targ & Puthoff, 1974; Utts, 1995)

The act of perceiving
Many highly intuitive persons report the ability to read subtle signals as forming the basis of successful intuiting. This includes, for

example, embodied signals, mental processes and forms of noetic knowing. Developing sensing and the quality of these signals improves the process of intuiting. (Kautz, 2005; Peirce, 2009, 2013)

For highly intuitive persons sensing is usually about attunement and a leap of perception, which can be utilized through intentional intuition since the information is always present and available. The process of perceiving is adjustable, including focusing on micro or macroscopic levels of information when required. (Keller, 1083; Peirce, 2013)

This process can be illustrated with the example presented in Figure 5 (Mayer, 2007). The black dots in the figure at first seem to be random, but actually form a pattern and, hence, a picture. This can be altered through the process of intuiting. Once a person starts to notice the hidden patterns, the whole process starts to unfold. This parallels a researcher's ability to distinguish a *"sudden emergence of coherent information from a background of random noise"*, which creates a meaningful and integrated pattern of meaning (Dunne, 1997, p. 126).

Some people have learned how to go back and forth between these different faculties of perception. They have learned to discern *"that the contours establishing an ordinary state of mind can be released into contours that delineate a different state"* (Mayer, 2007, p. 147). And from that alternate state, the extraordinary ways of knowing may happen intentionally or inadvertently (Mayer, 2007).

Many highly intuitive persons describe intuition as a sensation of being immersed, a feeling of connectedness, not separateness (Keller, 1983; Mayer, 2007; Peirce, 2013). Mayer (2007, p. 147) describes that *"in that different state, the ordinary thinking that results from adding things up appears to stop. What takes place is a primary sensation of oneness"*. This sensation of wholeness results from connectedness and uniting all experiences rather than from breaking things up. Once a person has crossed that conceptual divide, and stepped into a state of connectedness, the experience of the state itself might come unexpectedly. Mayer states that increasing the likelihood that a person will at least open up to getting to that point may be enhanced if they know that going back and forth between these experiences is already innate. A person needs to know that getting there does not mean they have to relinquish the profound grounding in conscious reasoning.

Figure 5.
The picture and
the background
by Mayer 2007,
p. 144.

When looking at Figure 5 above, it may take some time before a person recognizes the patterns and sees the Dalmatian. Once seen, however, it can no longer be ignored. When practising perception skills, a person develops the ability to consciously recognize different signals, when practising discernment a person develops the ability to recognize the importance of signals.

With intuitive information, referring to William H. Kautz, usually *"the difficulty arises less from incorrectness than from uncertainty – that is, not because the information is wrong (which is quite possible) but because he [a person] is not sure that it is right."* (Kautz, 2005, p. 319). Its accuracy is not always the most important aspect of intuition but most individuals are especially concerned about its reliability. Of course there has to be a certain level of reliability in order to take a piece of information seriously – or at least accept the probability of false or misleading information.

Some intuition experts mention that all humans have their own specific radiation, whether it is labelled as core existence, home frequency, personal vibration or inner essence. It is also described as being the source of being within each of us and within the universe itself, as well as the origin of intuitive guidance and self-esteem (Mishlove, 1997). Recognizing this quality in oneself enables a person to get more connected both to their inner self and to their personal intuition (Peirce 2009).

> *"If you use will to try to have or be something, it means underneath, you feel you don't already have it or aren't naturally that way, that there's a gap to cross or an obstacle blocking the experience. The more you "try" the more shrill and brittle your vibration becomes, and it takes you further from your naturally high home frequency. You don't have to generate your home frequency; it always radiates you freely. Just relax into it."* **(Peirce, 2009, p. 113)**

According to Peirce (2009), when a person's ability to sense is accurate enough and they are familiar with their "home frequency", it is easier to distinguish all the frequencies that differ from this personal frequency. That is, it becomes easier to differentiate between the inner frequency and the frequencies coming from outside of self. For her, frequency is information. Through intuition, a person can distinguish between the frequencies and also know the origin of intuitive information (Peirce, 2013).

Attention, intention and non-attachment

Several highly intuitive practitioners mention the use of intentional focus of attention (Guiley, 2001; Myss, 2004; Peirce, 2013). In its intensity, it is similar to flow experiences that are highly focused states of consciousness with the sensation of effortless performance and learning of new (Csikszentmihalyi, 1996). Intentional focus is not just a question of discerning the difference between a signal and a background, or something being elucidated while something else is not. It is also a question of the angle of attention, how broadly or narrowly something is observed (Arvidson, 1997).

According to Peirce (2009) attention is akin to an adjustable lens of perception and focusing it is like deciding between a microscope and telescope, choosing which perspective to use. A person can regard their body as a central focusing lens of the universe, using the desired scale. Whatever is happening on a larger or a smaller scale filters down through a person's personal sensory system and is focused on by their body lens, allowing it to be consciously recognized.

When a person learns how to use attention skilfully, they intentionally make a connection with things. They begin to look differently and start to see. Such experiences are reported by several Nobel laureates (Keller, 1983; Larsson, 2001). Attention is a person's live connection to the world and wherever a person focuses their attention that connection comes alive. When a person merges with something, it merges with them – the subject and the object become one and there is no separation. Mayer (2007) reports that every 'professional intuitive' to whom she has spoken characterizes their mental state thus. (Hotanen, 2003; Keller, 1983; Mayer, 2007)

Peirce (2009) uses the term "*inner perceiver*", which may help a person to recognize what to notice. Usually, if a person notices something, it is there for a reason. However, when using attention, a person should not "*push*" their way out. They should simply remain open, accepting, curious, and expansive, receiving and observing – in a state of inner perceiving. Mayer (2007) emphasizes the importance of getting the sense of oneself out of the way, just as Nobel laureate McClintock stressed the importance of forgetting oneself (Keller, 1983). Nevertheless, this does not mean that a person should not know themselves – on the contrary, it is essential to be familiar with the personal inner self (Peirce 2009, 2013).

An ethnographic researcher, Marja-Liisa Honkasalo, has been researching so-called small action, which as a form of being or acting comes close to the acts of perceiving described above. Small action is a state of waiting while being alert, a way of being much more intense than any kind of search. It is like letting go in such a way that one can be immersed in something. The receiving dimension of an action, the passive dimension, is action that is so "small" that it is actually a territory of experience where experience and action can be thought of as if flowing into each other, so that the boundary be-

tween them disappears. (Honkasalo, 2013, pp. 52–52, 58)

There is a difference between attention and intention. Attention is soft and gentle, focusing on the present moment. It reveals the essence of the target. With attention, a person can tune themselves to a certain target, an object or frequency – however it is labelled (Courteney, 2010; Targ, 2004; Varela et al., 1991). Attention keeps intuition open, it enables unity and flow.

Intention is about using willpower and it targets the future. It may intensify and accelerate the use of attention. (Peirce 2009, 2013) While becoming more and more aware of the non-conscious parts of the mind and personal habits, a person can use intention to widen their perceiving and to open themselves to the new dimensions of intuition. When a person focuses their mind on a task, not only the conscious but also the non-conscious faculties start processing the information or acting in line with the intention (Lipton, 2005).

Several sources mention non-attachment as a way to acquire information (Mayer, 2007; Peirce, 2009, 2013). These same sources stress the importance of emptying the mind, getting the person's own projections out of the way and using perception as a method for reading radiant waves in the surroundings and objects. It is extremely difficult to reach new sources of information by just '*tuning in*', since it is equally difficult to '*tune out*' of the ordinary information that continuously overwhelms the sensory system (Mayer, 2007, pp. 9, 66).

> It is extremely difficult to reach new sources of information by just '*tuning in*', since it is equally difficult to '*tune out*' of the ordinary information

A person may get emotionally entangled with something, sometimes also non-consciously. Often, the thoughts are driven by emotions (Burnette, n.d.-a). An example derived from the everyday life of ordinary people may be a case where a person is searching for a lost object. They try hard to remember the object's location. They may widen the search area, then get irritated and start searching again in those places that they have already searched. Then, within a short time of abandoning the search and moving to another task, they suddenly remember where the object is. When a person is entangled with the subject, they usually direct their own intentions, expectations or imagination towards it (Peirce

2009, Mayer 2007). However, when reasoning faculties are occupied, for example with a simple routine, the intuitive faculties can usually work better on a given task. As in the example above, the conscious mind starts easily to illustrate and create false memories, such as "*I remember putting it here*". But when disconnecting, and allowing the answer to emerge, it bubbles right up (Mayer, 2007).

Davis-Floyd and Davis (1997, p. 161) found that midwives whom they had interviewed credited a similar state of non-attachment, and that state was elemental when utilizing intuitive information. The researched midwifes are excellent examples to reflect the process of intuiting – even if from a totally different domain – since the accuracy and correctness of their intuitive decision making can be reflected simultaneously in a real-life situation. The midwives stressed the importance of a certain mental openness, an attitude of letting go, instead of maintaining a desire to control. A midwife describes: "*...But then I had this intuition that the baby could go head down, but that I was blocking the process... and she [the mother] laid down on the slant-board again, and the baby just went around. So again, it was the intuition about knowing that the baby wanted to turn around, and looking at what everybody had been doing that was stopping that from happening.*".

Summing up, all the different methods of developing and testing intuition, as described by intuitive individuals, seem to interconnect. Therefore, it is hard to analyse the difference or construction between the modalities involved in paying attention – whether it is a question of perceiving, discernment, using attention, staying non-attached, or evaluating the reliability of intuition. What seems to be essential in all these stories is the ability to master the personal mental dimensions and the awareness of the present moment.

4.3 SUMMING UP THE PROCESS OF INTUITING

As a conclusion to the theories presented in the previous chapters, I now outline a draft aligned with my experience in intuition coaching. Even though the current understanding on intuition, and especially intuition development, is incomplete, lacks coherence and is mostly

unmapped, as well as presenting more questions than answers, there are some known aspects that can be combined and linked.

The area of intuition research is highly interdisciplinary, intertwining studies from various fields, for example from psychology, cognitive science, contemplative studies, philosophy, literature, physics, biology, medicine and the educational sciences. All of these domains use concepts and terminology of their own, which are not always compatible with those of other domains. Currently, the term "intuition" is used unsystematically to label different phenomena, varying processes and diverse outcomes. At the same time, there is a lack of proper, accurate and scientifically accepted terminology describing intuitive experiences and the process of intuiting.

In this study, I have defined intuition as a *mode of knowing*, since my objective is not to research a specific type of intuition, but rather to focus on the application and development of intuition in the creative process. In general, the difference between conscious reasoning and intuition can be illustrated as follows: when reasoning consciously, a person consciously knows they are thinking the thought, and when intuiting a person knows without knowing how they know (Evans & Frankish, 2009).

Even though the process of intuiting is still mostly unknown, it can be researched through intuitive experiences, as well as before and after intuitive moments (Klein, 1998; Petitmengin-Peugeot, 1999; Plessner, 2008; Policastro, 1999). The current cutting-edge research outcomes related to intuition and the studies conducted with highly intuitive individuals reveal new perspectives and dimensions in understanding even extraordinary experiences of intuition and the processes behind them. These outcomes strongly suggest that intuition can be developed, even though this is challenging, since there are various types of intuition and the whole process of intuiting is embedded in complex and unknown processes. (Claxton, 2000; Hammond, 2007; Hogarth, 2001, 2008)

In Figure 6, I have roughly summed up the theoretical background presented earlier and outlined a draft that aims at clarifying the complex area of intuiting. The theoretical background of this thesis aims at building an understanding of how the act of intuiting can be supported throughout the process. To maximize the potential and utili-

ty of intuition – at any time during the process – means keeping the window of opportunity open to various types of intuiting. In the figure, this means staying above the black area. To enable this, it is important to understand that the whole process is already rooted in the foundation of background theories and world view, since these tend to determine what is considered plausible. The choices can either open a bigger window for intuition or alternatively restrict or even block the view. For example, if an individual assumes that there cannot be the direct knowing type of intuition, such perceptions are easily ignored and experiences bypassed or denied.

Foundation

The foundation for unseen solutions and radical breakthroughs is usually rooted in mental openness, where the window of opportunity is, from the very beginning, open to something yet unformed. Exceeding the limits of the known or nurturing unforeseen ideas requires encouraging atmosphere. Human biology, physiology and physics, in general, typically constrain what can be considered possible in the first place. However, recently many of the prevailing common beliefs embedded in the materialistic world view have been challenged by cutting-edge research. Following ongoing research outside one's own area of expertise, updating information or revising incorrect and outdated beliefs is not an easy task since it is time consuming and challenging. If the aim is to exceed the limits of the known or to seek radical innovations through intuiting, it is beneficial to adopt a hypothetical "what if" attitude. For example, when considering the human body, it has only recently been discovered that the human heart has neural cells that may store short-term and long-term information independently of the brain (McCraty et al., 2004a, 2004b). However, regarding scientific information, when developing intuition a position of believing or unbelieving is not the core question, rather it is the using and testing of intuition.

Each domain approaches the area of intuition from a different perspective. None of them has a complete overview of the intuitive process; instead, they build a disorderly view of it. The fields of knowledge mentioned in Figure 6 represent the areas handled in this

research, which is not an inclusive representation of intuition-related research. Further, even though these domains are placed in a specific position in the figure, the research in those domains covers a wider area.

Biology, medicine and neuroscience form a foundation based on the natural sciences, but even within these domains the world views conflict. However, it is commonly agreed that intuition is a natural and integral part of human thinking and the nature of the human brain is inherently intuitive (Laughlin, 1997). Cognitive neuroscience confirms that all humans need intuition in everyday living and decision making, without it everyday life is impossible (Damasio, 1994). The human nervous system comprises a complex, multi-layered and distributed network of billions of cells acting in myriads of ways and most of this processing is non-conscious (Laughlin, 1997). If compared with reasoning, intuition handles enormous amounts of information at any given time (Lipton, 2005; Zimmermann, 1989). Further, in some situations, intuition is superior to reasoning and, in complex cognitive tasks, the role of intuition is indispensable (Gigerenzer, 2007; Klein, 1998).

In the area of physics as well as in anomalies research, some experiments challenge the prevailing scientific paradigm. For example, the outcomes confirm that sometimes a person is able to access information that exceeds the boundaries of expertise and surpasses even the limits of time and place (Radin, 2008; Radin & Sheehan, 2011; Targ, 2012; Targ & Puthoff, 1974). Due to the recent increasing number of such unconventional research outcomes, some hundreds of accredited scholars from various fields of science have been calling for an open study on all aspects of consciousness, including the inexplicable subjective dimensions of human experience (Beauregard et al., 2014; Cardeña, 2014).

Philosophy and language studies have an important role in opening up an understanding towards internal dimensions and experiences that are hard to verbalize. Indeed, the lack of proper concepts and terminology is a severe challenge in the area of intuition research.

PROCESS OF INTUITING

Foundation	Prerequisities	Moment	Right after	Outcomes

+ maximizing the potential of intuiting

Foundation	Prerequisities	Moment	Right after	Outcomes
"what if?" world view, possibilities, physical limits, beliefs	attuning, open mind, sensitivity, support, inspiration, intention	intuiting, data acquisition, info retrieval, acceptance, oneness	new perspectives, insights, conjunction, evaluation, judgement	solution, product, decision, action
	blocks, restraint, denial	biases, fears, emotional attachments, imagination shutting off	dissonance, doubts, dissociation, narrow-mindedness	errors, failure, starting over, learning

— limiting the potential of intuiting

FIELDS OF KNOWLEDGE RESEARCHING THE AREA

philosophy biology language studies anomalies research physics	cognitive neuroscience consciousness research intuition research psychology	creativity research design studies educational studies contemplative studies	business studies innovation studies decision-making studies

**Figure 6.
The process of intuiting aiming at maximizing intuitive potential and a selection of domains offering information related to intuiting.**

Prerequisites

Psychological research has an important role to play in the area of intuition even though there are many contradicting views. In particular, creativity research reveals that creative individuals have some characteristics in common. Often these individuals have developed abilities that allow the intuitive process to take place. These may include empathy towards the problem or ownership over the issue, free mental processing such as preverbal drafting, or open-ended association. Mood and a rational state of mind seem to create favourable circumstances for successful intuiting (Jung-Beeman, 2008; McCraty et al., 2004a), as well as the use of intention (Burnette, n.d.-b). The classic external facilitators for creative insights are the three Bs – bath, bed and bus – typical places supporting physical and mental relaxation and the free flow of ideas. These environments may enhance the brain to adjust to a different mode, activate intuitive faculties and assist a person to perceive or notice new connections or serendipity (Bastick, 2003).

Typically, a 'Eureka!' experience is preceded by a long period of incubation, where a person has involved themself in the problem without being able to solve it – until a coincidence in the physical world acts as a fuse and the person becomes suddenly aware of the solution (Bastick, 2003). Even the smaller 'Aha!' experiences are preceded by a switch to internal attention and non-conscious activation (Jung-Beeman, 2008).

Some design case studies suggest that talented senior design students use more intuitive faculties while working compared with novice students. The creative ones also have more cognitive resilience and self-confidence, which allows them to take risks and explore new directions and unusual goals. (Burnette, n.d.-b; Cross, 2004; Cross et al., 1994)

Important research areas are those involving highly sensitive and highly intuitive individuals, since these open up interesting aspects to the prerequisites of intuiting. In many cases, an exceptional ability to intuit – and especially an ability to perceive subtle signals – relates to some kind of heightened sensitivity, which may appear in various forms of perceiving.

Highly *sensitive* individuals receive an excessive amount of stimuli due to neurological differences. This can generate qualitative-

ly or quantitatively different amounts of information. This feature is characteristic of creative individuals across different creative domains, from composers to scientists and inventors. (Daniels & Piechowski, 2008; Piechowski, 2006)

Numerous studies involving highly *intuitive* individuals have a fundamental role in revealing the potential of the human mind by unfolding and demystifying the process of intuiting. Highly intuitive individuals have marked out the way to intuition development, especially by exceeding the limitations of accessible information as well as by exposing the methodology of intuiting (Kautz, 2005). These studies suggest that the mind is not limited to an individual or to boundaries such as time, space or linearity, but is shared by everyone (Dossey, 2013; Sheldrake, 2012). Further, they suggest that almost any information can be accessible through intuition (Kautz, 2005).

The reasoning faculties constantly communicate with non-conscious cognition and are dependent on its support, since otherwise they would be overwhelmed. Essentially, humans are not capable of reasoning without intuition – reason requires non-conscious cognition in order to be free to execute complex cognitive tasks (Hayles, n.d.). However, it is important to note that many references suggest that this process can be overturned: the conscious mind can acquire specific information from intuitive faculties through intentional intuiting (Kautz, 2005; Targ, 2012). When a person considers a task, not only the conscious but also the non-conscious faculties of the mind start acquiring and processing the perceptions and information in line with the intention (Lipton, 2005). This is the core of intentional intuiting and the area I have been researching in my work.

For many highly intuitive individuals, non-attachment and emptying the mind are essential prerequisites, which means that not just "tuning in" but also "tuning out" of the ordinary information becomes important (Mayer, 2007). While using intention and attuning intuition, it is necessary to be aware of the biasing effects of intuition. Wishes or expectations can start biasing, restricting or blocking the free flow of intuition, so it is beneficial to learn how these can be set aside. The reasoning faculties may hinder the process or even block some perceptions even before they reach consciousness, therefore educating the mind is important (Surel, 2012).

The moment

The very moment of intuiting is unique since there are various types of intuition and the process of intuiting evolves. For example, all humans constantly use hunches, gut reactions and everyday intuition, as well as problem-solving intuition for complex cognitive tasks (Gladwell, 2007; Kahneman, 2011). All these different types of intuition involve varying mental and non-conscious activities that are based on slightly different information integration processes, for example association, learning, pattern recognition, pattern matching, information retrieval or recall (Glöckner & Witteman, 2010). However, Figure 6 does not represent any varying types of intuition or underlying processes but deals with intuiting as a monolithic phenomenon at a general level.

Many scholars state that there is a fundamental difference between intuition and imagination, insight, instinct or memory. Typically, imagination manipulates, edits and analyses, whereas instincts are inbuilt evolutionary reactions related to surviving. Insights, in turn, already suggest a solution, while intuition may remain as hazy unvalidated hunches, point to a promising direction, or, in some cases, even appear as an illuminated new realm of information. (Burnette, n.d.-c; Kautz, 2005; Shefy & Sadler-Smith, 2004) Several sources from neuroscience to intuition research stress the importance of discerning between those useful hunches and perceptions that can lead to beneficial intuiting and attaining valuable information (E. Bowden et al., 2005; Davis-Floyd & Davis, 1997; Kautz, 2005).

Through expertise a person is able to utilize a huge subconscious database of information, including tacit and embodied knowledge. Several Nobel laureates report the feeling of immersion or a state of total confidence, with a complete understanding and a feeling of integration (Keller, 1983; Larsson, 2001). Some of these may be similar to flow experiences with highly focused states of consciousness, including a sensation of effortless performance (Csikszentmihalyi, 1996).

Studies on Nobel laureates reveal that when facing a truly difficult problem, instead of working excessively on the problem these individuals start to work with themselves. In other words, instead of collecting additional information and analysing it, they turn inwards. Further, many of them report having exceptional ways of

working, including, for example, feeling *"united"* with the research target, or an exceptional capacity to mentally visualize and handle multiple dimensions. (Keller, 1983; Larsson, 2001)

Many intuitive practitioners use personal and untypical expressions, such as a *"deep inner voice"* or the *"heart knows"*, when describing their intuition. Highly intuitive individuals often report a *"feeling of connectedness"*, while the *"disconnectedness"*, in turn, leads to relying solely on intellectual knowledge and losing the ability to hear the inner voice of intuition (Davis-Floyd & Davis, 1997). These individuals also mention the use of intention and attention as being the core of intuiting. While intention attunes, attention is soft, gentle and focuses on the present moment and reveals the essence of the object, as well as keeping intuition open, and revealing unity and flow (Courteney, 2010; Peirce, 2013; Varela et al., 1991).

In an optimal situation, the actual moment is a state of perception, acceptance, and openness, which is not always easy. If not alert, biases can be easily introduced. The process of intuiting, including its prerequisites, the actual moment and the subsequent moment are often so instant that they appear as one. Sometimes the judgement of a hunch, intuition or an idea is so rapid and intertwined with perception that it hardly reaches consciousness. In such cases, denial, belittling, imagining or shutting off can occur before it is noticed. Therefore, to attain valuable, exceptional and especially inexplicable perceptions, intuiting needs to be practised. (Kautz, 2005; Peirce, 2013; Shefy & Sadler-Smith, 2004; Surel, 2012)

Right after

After information retrieval, the intuitive information can be evaluated, tested, analyzed, compared or integrated with reasoning. Usually, it is beneficial to collect all intuitive information before turning to reason, partly because over-analysing intuition rationally has been shown to reduce the accuracy of intuitive judgements (Nordgren & Dijksterhuis, 2009). Often intuitive information appears in ambiguous, multidimensional or non-verbal form and needs formatting and verbalization before it can be understood or shared. This may take a while.

In an optimal situation, intuitive and reasoning faculties can be integrated as intuitive intelligence. The question is not just to develop and listen to intuition, but rather to combine intuition with reasoning faculties – it is not a question of intuition *versus* rational thinking but rather of intuition *and* rationality. (Shefy & Sadler-Smith, 2004; Surel, 2007, 2012)

If intuitive information contradicts reason it may cause dissonance, denial or emotional reactions. This is plausible especially if the information is inexplicable or if intuiting involves extraordinary experiences. The human consciousness can bend, shrink or even split, but it cannot tolerate a break in coherence (Hayles, 2014). This leads to a situation where consciousness easily edits and modifies reality to fit personal expectations, at the cost of reality, by misinterpreting anomalous or strange situations (Hayles, 2014). This may result in ignoring or shutting out anomalies even before they reach the conscious level of the mind. The situation is like a double-edged sword: on the one hand, intuition is prone to biases in situations where an immediate pattern recognition process matches the current situation to the previous ones stored in memory (WYSIATI what-you-see-is-ALL-there-is), resulting in misinterpreting the current situation (Kahneman, 2011); on the other hand, the conscious mind may edit the reality by ignoring some essential perceptions. All this highlights the importance of authentic perceiving, which can be developed with practice (Shefy & Sadler-Smith, 2004).

Outcomes

From the intuition development perspective, failures and mistakes are important. Without making mistakes, it is hard to develop intuition to its full potential. Only if a person experiences biases can they be assimilated and learning begin. In the case of failure, the process can be just restarted– the practice situations are endless. In optimal cases, intuitions and insights lead to new knowledge, new practices and breakthrough innovations. And, in all cases, they lead to learning. How this whole process of intuiting can be enhanced, supported, evaluated and developed is the focus of my research and the following pages delve into these aspects.

5

METHODOLOGY: DATA SETTING, DATA COLLECTION AND DATA ANALYSIS

My aim is to study intuition from my own perspective, namely that of a designer. In this research, I emphasize the role of personal experiences of intuition and the subjective perspective of designers, while searching for wider perspectives to understand designers' different intuitions. This includes being aware of my own subjectivity, as well as utilizing its potential. I believe that without my personal experience as a practising designer, I would have been unable to understand many of those highly personal experiences described by designers.

This approach has led me to value the descriptions of highly personal and varying intuitive experiences as described by designers. Through these, I searched for ways to support the personal and unique processes of designers' intuitions, as well as researched new methods to further develop such intuition.

The methods used in the research are qualitative. The research data consist of in-depth semi-structured interviews, informal group discussions, intuition learning diaries and questionnaires collected from intuition coaching courses. My personal observations and written notes over the past years have also played an important role throughout the research.

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It is important to remember that in the research the objective is to focus on the *utility* of intuition and designers' experiences of it, and not on its validity or on specific types of intuition. Therefore, the emphasis is on designers' descriptions of their experiences of intuition. Equally important are the process of intuiting itself and the pedagogy related to intuitive skills, and especially designers' personal reflections on this area. My interest is not to ascertain whether the actual experiences of these intuitive moments are absolute truths as long as the experience is meaningful and important to the person. Neither have I researched the actual increasing *amount* of intuition development, as long as the increase is evident from either detailed descriptions reported by a designer, or from the progress seen by others when observing a designer.

I have found that intuition is difficult to grasp and research – when targeting the actual pre-conscious experience and not just a preset hypothesis or mental model of the phenomenon. It is challenging to build knowledge and not to fall into the trap of rationalizing or oversimplifying the phenomenon. Comparing and classifying the experiences of intuition are challenging. Group discussions in a trusting environment seemed to be the best approach to get closer to actual experiences and to verify and scale them against each other.

The material started to accumulate little by little over the past number of years. The foundation of the research was formed through the observation of my personal design process and continued with material collected from coaching creativity courses. These observations and written notes evolved into documentation and led to more structured research. The timeline of this intuition study is illustrated in Figure 7. The actual intuition research took place in 2008–2013.

**Figure 7.
The timeline of
the research.**

Global   Different Journey   The research funded by   Aalto University
Dignity   2008   The Academy of Finland   funding
                                      2009–2012

Creativity and intuition coaching in 2003–2014

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The research produced five peer-reviewed articles and a case study that looked at one personal design experience. Each of the articles forms a specifically targeted view of the area of designers' intuitions.

I *"Experiences on Developing Intuitive Thinking among University-level Teachers"* provides the results of a survey focusing on the impact on teachers of a single course on intuition development. (2013)

II *"Experiences from Intuition Coaching – From Implicit Teaching towards Conscious Development of Intuition"* examines if a single course on intuition development can help design students to develop their intuition. (2011)

III *"Designers' Experiences of Intuition: Coaching Intuitive Skills as part of Creative Design Process"* reveals designers' varying ways of intuiting and presents some methods of intuition coaching. (2010)

IV *"Designer's Highly Personal Experiences of Intuition Modelling for Developing Intuition"* illuminates and models the inner very personal and extraordinary experiences of a designer. (2009)

V *"A case study of intuition and design: Building a tool for parents of premature babies and the nursing staff who care for them"* deals with the use of group intuition and challenging problem solving, as examined through a study project. (2008)

A case story, *"Global Dignity"* illustrates the use of intentional intuition in symbol design through a personal experience.

The objectives of the study and data setting
The research is based on the data collected from intuition coaching courses and interviews with designers. I researched how designers describe their intuition and how they verbalize their personal intuitive experiences. I collected accounts of personal experiences of designers' intuitions, including highly personal and extraordinary experiences that are seldom talked about. I also interviewed some highly intuitive individuals in order to build a more coherent understanding of the processes of intuiting.

My main interest is to build an understanding of how designers can better connect with their intuition in order to utilize and develop its potential. On a practical level, this means researching whether

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intuition can be used as an intentional tool, which implies that intuition is not just a random emotional-based coincidence but instead an intentional process whereby a person can attune to intuitive information. Given my personal interest in intuition development, I researched those natural, inbuilt and personal ways of intuiting that are used by designers. Based on this experience, I developed a working model of intuition, which presents as a continuum. Further, I studied whether a single course on intuition development can help a person to better connect with their intuition, as well as whether intuitive skills can be developed with coaching. The objectives and the specific objectives researched in each article are summed up in the methodology section.

As described in the very beginning of this thesis, the research objectives are: 1) to research designers' intuitive experiences and their intuitive processing as a mode of knowing, and 2) to research if intuition can be developed with coaching.

The first objective includes building an understanding of designers' varying intuitions and, through these experiences, building a wider understanding of intuition as part of the creative process. The emphasis is on highly personal and even extraordinary experiences that are seldom talked about. These experiences often form the core of a designer's creative process and therefore demand acceptance. This includes collecting descriptions of personal ways of utilizing intuition, and, hence, building an understanding of how designers use their intuition.

The second objective is to research how designers could better connect with their intuition in order to utilize and develop its potential. On a practical level, I researched whether intuition can be used as an intentional tool, thus implying that intuition is not just a random emotional-based coincidence, but, instead, a conscious process whereby a person can attune to intuitive information. This includes researching the pedagogy related to intuitive processing, specifically whether a single course on intuition development can enhance intuitive processing.

The work also aims at making intuition more acceptable and legitimate, while increasing its accuracy and reliability. This includes making intuition more visible, including highly personal and ex-

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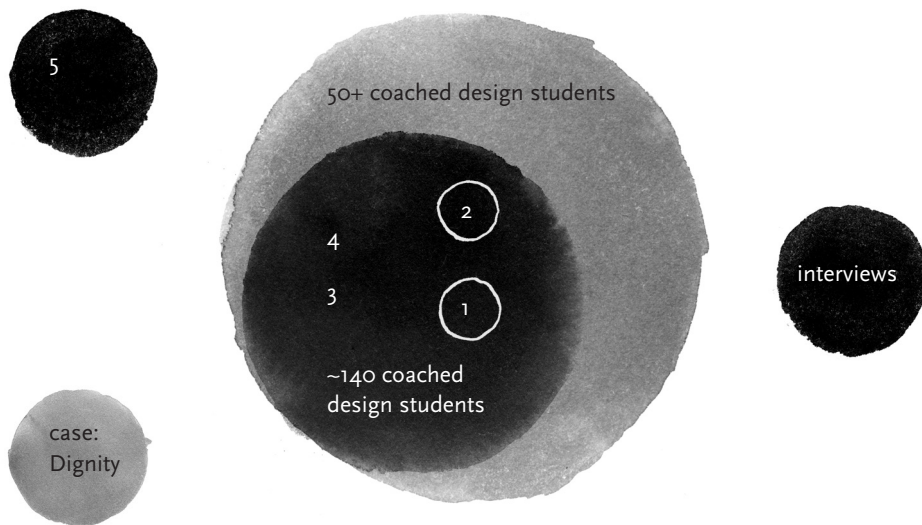
Figure 8.
The research
data related
to the articles
are presented
in black. Each
number refers to
one of the articles
referred to above.
Grey areas refer
to the additional
material used in
the research.

traordinary experiences, as well as bringing the issues concerning the reliability and accuracy of intuition into the discussion. These are important aspects when building an understanding of the process of intuiting, intuition development and intentional intuitive processing. As a result, this may help designers, design students, educators and other individuals to build an understanding of intuition and its potential. In an optimal situation, this work should support and build an understanding of designers' creative design process and help to develop design education in general. All the articles deal with intuition from varying perspectives and have slightly different objectives, as illustrated in Table 2.

Since the data setting was different in each of the article-based studies, the overall data setting for the research is illustrated in Figure 8. The areas in black illustrate the research data used in the articles. The big grey circle represents the total number of coached design students, approximately 200. These data were part of the additional research data, as well as the small grey circle, which represents the case study, *The Global Dignity*. Articles 3 and 4 are based on a sample of approximately 140 students. Articles 1 and 2 used a smaller sample – 43 design students and university teachers. Article 5 is not connected to intuition coaching courses even though the students received coaching during the study project, *A Different Journey*. Also,

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	NAME OF THE ARTICLE	OBJECTIVES OF THE STUDY	**Table 2.**
			The articles and their objectives presented through the themes.
I	*Experiences on Developing Intuitive Thinking among University-level Teachers*	How a single course affects teachers' opinions on intuitive thinking, their intuitive processing and the utility of the methods used to develop intuition. The follow-up questionnaire given 6–10 months later aimed at measuring the actual impact of the course: the change in frequency in utilizing intuitive thinking and in supporting students' intuitive faculties	
II	*Experiences from Intuition Coaching – From Implicit Teaching Towards Conscious Development of Intuition*	How a single course affects the use and understanding of intuition; whether intuition can be developed with exercises; and whether a single course can help in developing intuitive skills.	
III	*Designers' Experiences of Intuition: Coaching Intuitive Skills as part of Creative Design Process*	Examine the experiences of intuition described by designers and creative artists, and to research how to handle intuitive experiences and how to develop intuition towards an intentional skill.	
IV	*Designer's Highly Personal Experiences of Intuition Modelling for Developing Intuition*	Collecting and reflecting on the experiences of intuition described by designers; observing the diversity of the highly personal experiences of intuition; and modelling intuitive experiences.	
V	*A case study of intuition and design: Building a tool for parents of premature babies and the nursing staff who care for them*	Utilization of intuition related to innovations, complex problem solving and project management, as well as the use of group intuition in a challenging design assignment.	
Case	*Global Dignity*	Use of intentional intuition in the design of a symbol through personal experience.	

the interviews are separate from the intuition coaching courses yet are used in the articles.

Data collecting

Since 2003, I have coached more than 200 university-level design students who undertook courses on creativity coaching and intuition development. The discussions during coaching creativity courses and intuition coaching courses took place between 2003 and 2013. I have also coached some dozen practising designers and other professionals to deepen their understanding of intuition. In 2011-2012, I coached 20 university-level teachers in intuition development. The background of the teachers varied from architecture to engineering, business and design.

The research data include several documented informal discussions which took place during these sessions, including written notes containing descriptions of intuitive experiences, ways to utilize intuition and processes of intuiting. The additional research data obtained from student coaching courses include learning diaries and feedback forms.

During the research period funded by the Academy of Finland in 2009-2012, I conducted, together with my colleague Samu Mielonen, 12 in-depth semi-structured interviews with design students, design professionals and some highly intuitive persons. The interviewees were individuals who use a lot of intuition in their creative work and in their life in general. They were recognized as being very intuitive not only by themselves but also by their peers. A few of these individuals had been intentionally practising intuition for several decades, but the rest of them used intuition actively, yet not so systematically, in their work and life. All of them, however, typically used their intuition in a very personal and self-guided way. The interviewees represent different areas of design and can be divided into a number of categories. Four were highly intuitive in various fields, eight were designers who used a lot of intuition, one was a composer, four worked in the field of digital media design, while three were practising designers and teachers.

Each interview took 1–2 hours. The questions related to inter-

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viewees' personal intuition, their understanding of intuition, their use of intuition and their personal development of intuition. The interviews were used as a basis when coming to an overall understanding of designers' intuition at the beginning of this Academy-funded project. Further, they helped when developing methods and exercises for testing in the intuition coaching courses. I continued the semi-structured interviews in 2012-2013 with four more highly intuitive persons, three of whom were designers.

In 2009-2011, I surveyed, together with Samu Mielonen, 23 Aalto University design students who participated in a course on intuition development. The data were collected through questionnaires. In 2011-2012, I collected similar material from 20 Aalto University teachers who had joined another course on intuition development. The questionnaire used in both cases was the same and was administered at the start and end of each course. Given that the questions in both inquiries were the same, this enabled me to detect possible changes in the understanding of intuition and intuitive processing. The inquiry forms contained questions related to understanding of personal intuition, the personal way of intuiting, the concept of intuition and its development.

The objective was to get answers that were as authentic as possible; therefore, the subjects were asked to carefully describe their experiences and understanding from various perspectives. Twenty-one of the student questionnaires were classified and used in one peer-reviewed publication. From the teachers' course, I additionally collected a follow-up questionnaire, since one teacher suggested that the course might initiate a mental process that would continue long after the course. The list of questions used in the questionnaires can be found in the Appendix. One coaching group, consisting of eight design students, kept a learning diary on intuitive insights.

Data analysis
The semi-structured interviews were recorded and the most important issues written down. The thoughts, opinions and intuitive experiences of the interviewees were compared. This formed a basis to build an understanding of the area of intuition and designers' intu-

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itive experiences.

As already mentioned, the data were collected from two questionnaires, one administered to design students and university teachers at the beginning of a course and the other at the end. The answers given in both questionnaires were compared. Both design students and teachers answered anonymously. They were asked to use pseudonyms when answering, since this enabled privacy but allowed comparison between answers given by the same person. The answers were classified and divided into categories, based on the actual answers.

The majority of the data came from discussions and notes made during coaching sessions over a 10-year period. The discussions were only partly documented, such that only the most important aspects were written down, and emphasis was placed on descriptive experiences of intuition and pedagogy related to creativity. However, this material was not classified into categories but handled as raw material, giving additional information related to the objectives studied through the inquiries. Even though the research data in this area may seem vague, they are very significant since some observations were constantly being made and clear patterns were formed over the years. Table 3 below sums up the data collecting and analysis used in the study.

Even though the questionnaires gave concrete and comparable results, the informal discussions were an essential and valuable way to reflect on and further evaluate the questionnaire results. Intuitive experiences are challenging and sometimes even impossible to verbalize and there are risks of simplifying or misunderstanding the results obtained from the questionnaires.

Table 3.
The focus of the study, the data collecting and data analysis.

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ARTICLE / MATERIAL	FOCUS OF STUDY	PERSONS RESEARCHED	DATA COLLECTING	DATA ANALYSIS
A Case Study of Intuition and Design	Group intuition	9 design students joining the project	Discussions ● Observation + notes ● Course feedback	Qualitative analysis of the experiences and the outcomes
Designer's Highly Personal Experiences on Intuition	Personal experiences of intuition ● Modelling the experiences	Approximately 140 design students ● 12 design professionals	Discussions ● Observation + notes ● Course feedback ● Learning diaries ● Interviews	Qualitative analysis ● Patterns of the experiences
Designers' Experiences on Intuition	Ways of intuiting ● Implication of intuition coaching	Approximately 140 design students	Discussions ● Observation + notes ● Course feedback	Qualitative analysis ● Patterns of the experiences
Kokemuksia intuitio-valmennuksesta (Experiences on intuition coaching)	Intuition development	23 (21) design students & design professionals	Questionnaires ● Discussions ● Observation + notes ● Course feedback ● Learning diaries	Qualitative analysis ● Classification
Developing Intuition among University-level Teachers	Intuition development	20 University-level teachers	Questionnaires ● Discussions ● Observation + notes ● Course feedback	Qualitative analysis ● Classification ● Comparison with the students' data
Material collected outside of the articles	Intuition development Functionality of the exercises	Approximately 40 design students ● 12 design students ● 4 highly intuitive persons	Discussions ● Observation + notes ● Course feedback ● Questionnaires ● Learning diaries ● Interviews	Qualitative analysis ● Patterns of the experiences
Case: Global Dignity	Intentional intuition	1 professional	Self-reflection	Documentation of the sketches

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Research composition

My research did not exclude subjectivity, instead I tried to be aware of it, to make it as visible as possible and to utilize it through combining it with the methods of external reflection or validation. During the whole research process, I valued greatly the importance of all personal experiences – including those of the students, as well as my own – and their meaningfulness in creativity and intuition coaching. Therefore, I feel I can justifiably include and reflect on some of my personal experiences of intuiting, since through them I try to open new perspectives. My own intuitive experiences and the inner research of intuiting have played an important role when developing the preliminary hypothesis on intuition development.

An ethnographic researcher, Marja-Liisa Honkasalo, states that a researcher is part of a network consisting of professional colleagues and the research field, which is embedded with specific meanings. Within this context, a researcher aims to understand and interpret all they see, hear and experience. They use the self as an instrument. The essence of such research is to take time with the informants. (Honkasalo, 2008, p. 40)

Since intuition is a complex and hidden phenomenon, it is a very challenging topic to research. A developer of phenomenography as an educational research methodology, Ference Marton, states that it is impossible to measure without a measurement unit (Marton, 2014). In the area of intuition development, the measurement units are clearly insufficient since there is hardly any previous research related to intuition development. Often, *what* the students understand is not measured; therefore, the perspective of the research becomes important (Gibbs, Morgan, & Taylor, 1982). Hence, I chose to adopt a phenomenographical approach to my research. Approaching the immediate and authentic aspects of experiences is recognized by many scholars (J. Bowden & Marton, 2004; J. Bowden & Walsh, 2000; Varela et al., 1991). Brenda Dunne, a researcher working on the integration of multiple scholarly vectors, states that in order to reach some meaningful empirical evidence through conscious awareness and consideration, complete immersion is required, while being aware of subjective reactions and admitting to failure or lack of information (Dunne, 1997).

I have been researching my own intuition for more than 15 years.

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Initially, my research focused on the area of educational science, then on my internal creativity as a graphic designer, and continued as I became a teacher of creative process development and an intuition researcher. While the perspectives have changed, my understanding has widened and deepened. Most of the time, I have found the area of intuition research to be extremely fascinating, but also challenging. Actually, I have always been a little bit terrified of its broad and unknown aspects. They have forced me to face my personal limitations, the boundaries of my own mental thinking, mental boxes and blockages, as well as to face inner fears and outer contempt. The humility imposed by having to face a bigger issue than my mind was able to handle, combined with the fear of being mentally too limited, formed the basis of my decision to include so many original quotations from designers. Constantly, during the research I have been forced to broaden my personal mental thinking when being exposed to new and even more extraordinary experiences of intuiting. Most of the time, I felt that I was being taken too far from my comfort zone, and that I was not wise or talented enough to take responsibility for researching or developing the area of creativity and intuition development. However, I also feel that being aware of these personal limitations and ambiguities is of great importance when including subjectivity as part of the study.

An important part of the research structure was the integration between different domains related to intuition. Bowden and Marton argue that learning in the sense of knowledge formation *"can be considerably facilitated by paying attention to how knowledge is formed within different fields, how new ways of seeing different phenomena are brought about, how critical aspects are discerned and focused simultaneously"* (J. Bowden & Marton, 2004, p. xi). Therefore, it was essential to adopt an interdisciplinary approach to the phenomenon and to include models and hypotheses from various scientific domains, as well as experiences of highly individual practitioners.

The core of the phenomenographic research relies on one's experience of a particular event and the objective is to research the variation in other people's experiences of the same event (Marton, 1997). Aligned with this, my research focus is on designers' personal experiences of intuition and the variation becomes evident through

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their personal descriptions and stories. In order to observe and open up to these original experiences and to reach authentic perceptions – which can be difficult – it became necessary to avoid a restrictive classification of the experiences, especially given that the phenomenon of intuition is still partly unmapped and ambiguous. Therefore, the research includes original quotations, while searching for common denominators to approach the experiences. The phenomenographical approach suggests that *"the researcher has to step back consciously from her own experience of the phenomenon and use it only to illuminate the ways in which others are talking of it, handling it, experiencing it and understanding it"* (Marton, 2997, p. 121).

The phenomenographical approach states that the way of experiencing forms the relationship between the experiencer and the experienced and that this process is internal in nature. This is the basis of a phenomenographical approach to research. *"In phenomenography we try to describe how the world around us might be seen or experienced. We try to capture ways of seeing and ways of experiencing in terms of dimensions and variation, value and instances"* (Marton, 2014, p. 113). The describer cannot be separated from the description – the world is real yet described and experienced by individuals. In this process, discerning something from and relating it to a context are the essence of how knowledge about the world can be gained (Marton, 1997). The process of discerning intuition from other perceptions, as well as relating it to a context of understanding, seemed to form one of the core issues when learning to understand intuitive insights. Often this process included a mental expansion that had happened in personal understanding during the intuition coaching course.

The way descriptions of intuition changed during the intuition coaching course, as well as the variation between different individuals, became meaningful and significant. Further, the kind of explanations and meanings individuals gave to their personal experiences became significant. A phenomenographical approach asks the question: how we can gain knowledge about the world from the particular experience (Marton, 1997, 2014). The experience is contextualized and relates to the awareness of a person. This issue is also dealt with at the beginning of the text while referring to the research carried out by Charles T. Tart (2009).

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Phenomenography points out that awareness has two important qualities. First of all, people cannot be aware of everything in the same way. Secondly, awareness is layered. This means that it plays a significant role in a process where the core can be extracted from the periphery to make the experience relevant. (Marton, 1997, p. 123) Through the varying descriptions of intuitive experiences recounted by designers, my aim is to reach the essential core of designers' intuition. My objective is to reveal the variation and to capture the core of the intuition, regardless of whether the difference is between individuals or within an individual. Indeed, the research material states that difference does not refer just to that between individuals but also to to variations in intuition experienced by a single individual.

In phenomenography, the variation enables the discernment of some critical aspects related to the situations or phenomena a researcher has to handle. Finally, this leads to the formation of a pattern. The process is rooted in perception since all individuals see things differently and without variation there is no discernment. Therefore, learning changes and expands the way individuals see the world. *"Thanks to the variation, we experience and discern critical aspects of the situations or phenomena we have to handle and, to the extent that these critical aspects are focused on simultaneously, a pattern emerges"* (J. Bowden & Marton, 2004, pp. 6–7).

I consider my work as a way into a phenomenon that has often been hidden, bypassed and ignored. Therefore, the intuitive experiences form the core of the research and this is reflected also through their own descriptions and evaluations. Marton argues that a change in a person's way of understanding reality or some part of it is *"the most extensive way of understanding"* (Marton, 1982; 1997, p. 38). In this process, the awareness of the individual plays a significant role and affecting the awareness changes the aspect of the whole, hence the understanding (Marton, 1997). According to phenomenography, the variation in the ways of experiencing things and the process of depicting this variation is a significant research focus (Marton, 1997). The change in design students' attitudes was seen as being qualitative. Even after several years, some of the students came to me commenting that they had frequently pondered the ideas dealt with in the coaching course and this had had a significant impact on their lives.

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Limitations of the study

I am aware that qualitative research has some common problems, which may be relevant in this study too. The objective of this study may have been too vague or too wide, including parts of the creative process, which are here labelled as intuitive experiences, although being something creative beyond labels. There is a risk that I see intuitive experiences in places where somebody else might just talk about the creative process. This subjectivity may bias the research although I have tried to open it up and to make it as transparent as possible.

The analysis of the intuitive experiences in the questionnaires may lack depth or may have been incorrectly classified, since it is not easy to verbalize intuitive experiences in the first place. The coding in the classification may include mistakes since the coding decisions are not always clear and easy. However, the results of the questionnaires were recognized as being tentative but providing some direction. They are not even considered to represent ultimate proofs of anything. Also, the informal discussions were always used as additional material to further evaluate the data collected from the questionnaires.

The research sample may be considered insufficient since the amount of in-depth interviews and questionnaire material is small. Also, the overall number of coached design students is not huge either. This being true, the area of intuition would benefit from further research. However, the results obtained from the interviews seem to be quite in line with all the other research data, including the observations and discussions that took place during the coaching sessions.

Additionally, observing the phenomenon of intuition was ongoing over many years. The orientation period was very long and the pace of writing the articles slow. This may give rise to a somewhat excessive attachment to my personal perspectives and favourite ideas. On the other hand, the slow pace was imperative while researching this hidden phenomenon. It allowed a continuous and renewing observation, facilitating the formation of new ideas in collaboration with students as well as reshaping existing ideas and methods connected with intuition development.

Another limitation may have been caused by the difficulty in collecting the research data concerning non-verbal pre-conscious processes. It is extremely difficult to turn intuitive experiences into

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words or images. The intuition learning diaries were used by a few groups, but they were not able to detect the ambiguity that occurs in intuiting. Describing the process of intuiting with the limited vocabulary available may instead affect this vulnerable and ambiguous process and may lead to a situation where some aspects of intuition are not detected at all.

Utility vs validity

When coaching intuition, I always focus on the personal experiences of intuition and its inner aspects. For me, it is essential to highlight the meaningfulness of intuitive experiences and its *utility* to a person, not its *validity*. This means that, if the experience, method or theory is *usable* and helps a person's creative process, it doesn't matter if it is objectively considered *true* or not. For example, in Aesop's Fables, the story of the tortoise and the hare can be used even though everybody knows that animals *do not really speak*. Despite this, the story may have an important role, for example, in widening a person's understanding.

It appears that intuitive thinking cannot be fully understood, since at least some areas of intuition are hiding conscious thoughts. This makes research in this field challenging, though without preventing it. Even though an insight in itself cannot be fully understood, the intuitive process can be reflected on and researched before and after the insight. Also, a researcher can rely on their experiences and research them, which is my approach in this research. These intuitive experiences are usually unique, very personal and hard to verbalize. For the person experiencing them, they are true, meaningful and valid. However, these stories and experiences have to be considered as personal and not as general or objective truths. When making conclusions, this has to be taken into careful consideration in order to avoid premature generalization or other biases. Therefore, I have tried to use, as far as possible, the recounted stories as original quotations. Summing up these, I have an understanding that despite all the challenges and limitations, the data strongly suggest that the results found in this study are relevant and meaningful.

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THE RESULTS:
OPENING DOORS AND
UNLEASHING INTUITION

This chapter addresses the findings and outcomes of my research on designers' intuition. These include the intuitive experiences described by designers, the varying ways of using intuition and experiences of developing intuition further through coaching. The material referred to in this chapter is based on the research data collected from questionnaires, interviews with designers and highly intuitive individuals, as well as from the discussions during intuition coaching sessions, including learning diaries and feedback. The group researched consisted of approximately 200 design students, 12 professional designers, four highly intuitive individuals and 20 university-level teachers. What becomes apparent through the analysis of the research data is that an intuition coaching course can expand students' understanding – not just of the process of intuiting but can also have a wider impact on their lives and unveil some of their earlier, previously hidden beliefs. Sometimes, even everyday experiences begin to unfold and are seen in a new light or perspective. At times, this process seems to create a change in the person too. Since intuition is a matter of personal perception and personal understanding, this change is one of my main interests in the research.

6.1 DESIGNERS' WAYS OF HANDLING THE CHALLENGE OF CREATION

The difficulty in handling the creative process and intuitive faculties has been revealed to me through years of observation when teaching the coaching creativity courses. Lack of discussion on and understanding of intuitive experiences hampers the education of novice designers who have limited experience of their creative process (Mielonen, Raami, et al., 2009; Raami, Mielonen, & Keinänen, 2010). Usually, design students have to face the inner mental process of creating without external support (Raami et al., 2010). This may be partly good, since there is not always enough understanding of how to support the inner intuitive processes and spurious methods may indeed do more harm than good. Therefore, this ignorance may turn out to be very unsupportive and even destructive.

Professional designers often experience a slightly different situation. They can rely on their solid professional expertise as well as on their familiarity with their personal way of doing things, which all help them to advance even if the optimal creative feeling eludes them. In contrast, novice designers have none of these skills. Their professional expertise is very limited and their trust in their personal creative process is usually vague. In order to handle this chaotic phase of creating, despite these inner constraints, many people have developed their own practical methods of survival. However, some of these may cause a huge amount of anxiety and therefore make the creative process emotionally overwhelming and unbalanced.

Many students have described that studying and working in a creative domain is mentally so ponderous that they frequently consider quitting their studies or changing career. Some students state that such thoughts may even occur daily. Several students report their regret at not having chosen a profession whose study involved easy, rational steps in the development of professional expertise, without having a constant feeling of being on the edge of their comfort zone. Yet there is something that makes them continue.

Typically, in each coaching course there are a few students who give feedback stating that the course has given them a lot of hope and encouragement to continue in their studies. According to this

feedback, the discussions handling the area of intuition and the challenges of the creative process have been the most important reflection areas for these students (Raami & Mielonen, 2011).

One student described it thus:

> *"At the moment I feel this course can be the one that is saving me and pulling me out from my "professional distress". Finally, there is light at the end of the tunnel. I have been going to therapy for years but it was not until this course that the issues started to unfold."* **– design student**

My hypothesis is that this kind of feedback reflects the importance of handling the difficult challenges of creating. The course does not provide therapy, nor does it deal with therapeutic issues. However, I help students to appreciate and become connected with their inner self, to find their personal, valuable, sensitive and unique strengths of creating and to resolve issues that block their intuition and creativity.

Creativity requires a certain amount of sensitivity. Those who are sensitive may face the greatest challenges when trying to fit their personal uniqueness to external requirements (Mielonen, Raami, et al., 2009). Yet, according to my experience, sensitivity is an essential component for creativity and therefore a very valuable human trait. It is a key to the kind of information that others do not have access to.

It is not easy to be creative and attain flow experiences without any knowledge of how to support the intuitive faculties, or how to build a bridge between the rational and intuitive modes of thinking or other forms of knowing. Nevertheless, many expert designers and teachers report their constant beliefs concerning their own insignificance, of not being good enough, of having very limited skills and of being anxious about what they perceive to be their chaotic design process (Raami, 2013). To handle this incongruous and harrowing situation, many individuals have intuitively developed their personal methods and routines to survive and to support their creative process despite these limitations. In the following sections, I will present some of these routines. However, some of these naturally developed routines and operations may trigger a huge emotion-

al obstacle to the creative process by engendering guilt or fostering feelings of inferiority. These negative emotions require a lot of mental energy, which in an optimal situation could be channelled into the creative process itself. (Mielonen, Raami, et al., 2009)

It is not easy to admit that there is something frightening in the creative process. Typically, it may be a feeling of being on the edge of one's own competence, a fear of one's creative limitations or a lack of courage to surpass oneself. Often these feelings are activated when struggling with a difficult assignment, not being able to connect with one's inner source of creative energy or to reach the flow experience. Some of these fears are at least partially non-conscious. One very intuitive teacher of design who promised to write down some personal experiences mailed me:

> *"After a long period of distress I have been able to write something down. You will get them by Sunday. It is not easy to describe things that have been a source of great mystery or fear to the self."*

Typically, some of these fears may be extraordinary in nature. A few designers described, for example, that they *"feel that someone is putting thoughts into my head", that "this is not my thought" or, that "something is preventing me from seeing"*. As these experiences are difficult to observe, articulate and, in particular, to understand, it may be frightening even to admit their existence.

> *"Sometimes I feel that my thoughts are not my own thoughts. I wonder how come I am thinking like this – the thought does not feel mine. Sometimes this may be frightening since I do not know where they're coming from."* **– designer**

Some students believe that if they pay attention to and try to develop their creative process, they may somehow damage it or lose the connection to creativity. My experience as both a designer and a teacher strongly contradicts this opinion, given that none of the course participants reported these experiences. On the contrary, usually once a person becomes more conscious of their mistaken be-

liefs, the obstacles become clearer, thus giving the person more free-dom to choose. However, there may be a seed of truth in such a be-lief. According to my experience, if a design method is linked to a person's own creative process, there is a possibility that it will lead to a situation where the personal way of creating is modified to con-form to a given model or method. This may indeed be harmful since inner originality and one's personal way of doing are seen as subsid-iary or secondary and, hence, can be interrupted.

Many design students report having a fear of their intuition be-ing wrong or that it might lead to poor decisions. At the beginning of the coaching courses, many students have some qualms about the accuracy and reliability of intuitive information. These doubts may be relevant since in formal education intuitive faculties are neither developed nor are any methods provided for the evaluation of the ac-curacy and reliability of intuitive information. My experience is that once one starts to develop intuition, after a while these concerns are either eased or totally allayed.

All the designers I have interviewed and coached report on vary-ing survival strategies they have developed to handle the challeng-es encountered in the creative process when things become difficult, for example due to deadlines, lack of ideas or other constraints. How-ever, some of these survival strategies may trigger a huge amount of anxiety and therefore make the creative process emotionally over-whelming and unbalanced (Mielonen, Raami, et al., 2009).

In the following pages, I will present some of the most common methods for handling the battle between the intuitive and reason-ing faculties. Most of these came up constantly in discussions dur-ing the coaching courses.

Substitute activities
Intuitive thoughts and insights usually need a calm mental state to develop. If a person is neither able to support their intuitive facul-ties nor activate a flow experience, they are usually forced to wait for a random intuitive insight or to rely on routines or conscious reasoning. The latter may cause a "survival mode" of creating, thus avoiding the most creative phases when ideas need to be processed

at non-conscious levels of mind and matured in thoughts. Avoiding these intuitive phases may reduce the creative input to perfunctory and simplified tasks, such as element-combining and copy-paste solutions (Mielonen, Raami, et al., 2009).

In order to make room for intuition so that it can take the leading role and generate fresh unique ideas and solutions, a person needs to turn the dominance of their reasoning faculties "off", or at least know how to use a fader. Luckily, many designers know naturally how to do this. The most common way is to give the rational mind a simple routine task to do, and thus keep it busy in one way or another.

Sometimes students use an activity for this, which I have labelled as a substitute activity. However, many students as well as designers report the distressing nature of these substitute activities (Mielonen, Raami, Keinänen, & Rouhiainen, 2009). Since many of the students are neither aware of the important role that the substitute activity is playing nor of other ways to support their intuitive faculties, they often find the situation embarrassing, and so oppressive that they would rather not talk about it. Often an individual feels guilty for the fruitless use of their time. When in the group discussions during a coaching session a brave participant confesses their substitute activity, the others then admit to doing something similar. It is a relief to understand the mechanisms behind these actions and not to feel ashamed of them, or alternatively, to be able to replace the activity with a more fruitful one.

> It is a relief to understand the mechanisms behind these actions

There are as many substitute activities as there are individuals, varying from aimless activities, such as just hanging around, to triviality. Typically, the activity is a simple task that does not require much brainpower for its accomplishment. Often, a person is able to continue the task for the desired period of time or repeat it over and over again. It may be a monotonous routine, such as playing cards, or something that gives a feeling of satisfaction, such as washing dishes, or it may be something that is physically exhausting, such as jogging. In particular, people with constraints, such as families or children, are under a lot of pressure to be accountable for the efficient use of their time. One student described:

"I asked my parents to take care of my child while I am writing my thesis. I felt so ashamed and embarrassed when they came to the room where I was supposed to be writing and they saw me playing that stupid computer game. I wondered myself why I had such an obsession to play it every time before starting to write, but at some phase when I got my writing rolling fluently the obsession just vanished." **– design student**

Despite the fact that most of the designers describe these substitute activities as being very distressing, they have a task to do: to give more space to the intuitive faculties to operate. Luckily, most students have also those precious, inspiring flow experiences, which provide them with the life blood and courage to continue.

False routines and superstitions

Many design students report a need for certain specific routines while designing. A person may need a particular pen, environment or time of day, or some specific music or other routine in order to allow the creative process to happen (Mielonen, Raami, et al., 2009).

"To be able to reach the essential mode for designing, I always need a nice cup of tea beside me. But, you know, I hardly ever drink it! After the course [coaching creativity] I am not dependent on it any more. I can reach the mental state without it.' **– design student**

Often this routine may seem to be almost like a superstition – without it a person is not able to start or continue designing. Many times these are harmless habits through which a person tries to guarantee that the creative process will happen. It is great if that helps to create, but sometimes these may become limiting or burdening self-cheating excuses that cause creativity to happen only if that certain routine is fulfilled.

"I stopped designing when I became a mother. I always explained that it was due to the fact that my workspace had been turned into a childcare space and I had lost my desk. Later

we moved to a bigger house where I had a study. But I did not design. I had been lying to myself without noticing it. I got caught. I realized there had actually been a block but when this whole issue was unfolded I started to design again. Now I am drawing even at the kitchen table." – **design teacher**

Individuals are very talented at creating excuses and even lie to themselves. It requires courage to face personal limitations and to look at the truth without bias.

Process belief and standard solutions

Early in 2000, I used to help designers to develop their design process using the common standards based on the design tradition of the 1990s. This meant providing guidelines to enhance the design process, in addition to more or less ready-made exercises, and to support the process in general. Typically, these are methods, which can be attached to the personal process and team processes, for example help to structure the problem and invent new ideas (Raami, 2004).

The use of such methods happens also on a wider scale, for example, in many audio-visual and film productions, the entire process is divided up into certain predefined phases and fixed processes. This is sometimes inevitable since without it there might just be chaos. However, I encourage designers to experiment in their own field of design and to break boundaries in order to maximize utilization of their intuitive faculties. I encourage a search for new tools to exploit creative chaos, synchronicity and serendipity – not to eliminate the unpredictability from the process but to benefit from it. The outcome may be of exceptional quality such as one unconventional audio-visual study project, *A Different Journey* (Raami, Celen, & Puntila, 2008).

In coaching sessions, I use a great number of stories told by various famous designers, which reveal that there is no single optimal way of being creative, or of running a project. Instead, there are varying ways of creating, some of them being contradictory. There are no authorities to reveal the optimal solution or the correct answer concerning the creative design process. Instead, all designers need to find the

> there are varying ways of creating, some of them being contradictory

courage to seek the answers from within. One teacher describes the current situation in the area of arts and design education where the teaching must be increasingly cost-conscious:

> *"A certain model, a certain way to think wilts, meaning when information is given or poured into a head. To do in a certain way, that is not creative work, it is executed work. Earlier there was a possibility for growth. Now we have a product."*

I posit that where there is cultural distrust towards intuition and prominence afforded to the role of reason, there is a tendency to lean more towards technology and process belief. I also claim that while the process models create order, easy routines and avoid chaos, they have a tendency to support relatively traditional or already known solutions, while the potential of boundary-breaking creativity becomes more difficult to realize. Teachers need more tools to support student's intuitive processes.

> *"Teaching is a profession of serving others, so that students can handle issues by themselves, being strong. To help them so they can emotionally go under their skin and into furs, to handle even unpleasant issues. If these things are not handled they always follow to the next situation, like a tail, it is like a bugbear."* **– arts teacher**

Supporting activities
Many designers have found routines and practices that greatly support intuition. Many of these are aligned with the environmental-related and internal issues mentioned earlier in this text. The majority of the supporting methods referred to by designers are routines or habits to help a person to create a certain mental state for supporting creativity and intuitive thoughts. Often, they are arrangements that help a person to create an enhancing and safe environment, with a minimum amount of disturbance. Alternatively, some people decide to do their creative work in one place, and carry out their routines in another.

Some designers have found supportive methods in the use of mental tools. A few describe that calming down, quieting the mind or listening to music is an effective way to get new fresh ideas.

One designer described:

> *"Often before I start to write or to do some other things that involve some kind of stress, requirements or negative feelings, I put on inspiring spiritual music till I somehow lose myself. Then after a while when I no longer think about the task at hand, an inspiration or peace hits me and writing flows out easily."*

Another designer described:

> *"I had been asked to do a website design within a very small time frame. When I was about to start looking at the [example] sites on which the new website should be based, it felt as if I should put on some Christian music instead. I didn't know how I would finish the site in time but the inner desire was so strong that instead I did put the music on. Soon I forgot all about the job. All of a sudden, a design flashed in front of my eyes. I knew exactly what to do. It took me about 20 minutes to draw it in a burst of inspiration. That evening when I met the boss he was astounded and complimented me greatly. I, of course, didn't know what to say because he was a firm atheist and I could barely myself believe what had happened. The next day I had the chance to look at the examples. Had I designed the site based on them, it would have been at least as clumsy as most of the examples."* **– a designer**

A few of the designers and other interviewees mentioned meditation as a way of quieting the mind, two reported practising meditation for decades. They stressed the importance of meditation as a way of calming the mind. In general, it seems that the varying personal ways people have found to naturally enhance their design process work well.

6.2. DESIGNERS' INTUITIVE EXPERIENCES

All the research data underline the importance of intuition as a valuable part of the creative process. Most designers highlight that intuition is the most important tool while designing (Mielonen, Keinänen, Raami, & Rouhiainen, 2009; Raami et al., 2008, 2010; Raami & Mielonen, 2011).

The designers I have interviewed and coached report having intuitive experiences varying from small hunches, flashes or feelings of promisingness to more profound sensations such as visions, experiences of serendipity, or large quantities of inspirational material taking on a life of its own – to mention just a few. Some designers describe even highly personal, extraordinary experiences, which may challenge their personal world view and way of thinking (Mielonen, Raami, et al., 2009).

To describe the intuitive experiences, designers use expressions varying from verbal and illustrative to metaphorical and poetical (Raami & Mielonen, 2011). Many embodied intuitive sensations and experiences can be illustrated with descriptive analogies or comparisons. The idea may feel good, a direction may feel promising or a solution may cause a feeling of unease. There may be a sensation of "*correctness*" or that something "*does not match*". Many designers describe a sensation where their "*hair stands on end*" or that something is not at all "*resonating*". There are a lot of expressions describing different emotional states and many times these expressions are able to describe quite accurately the emotional states of human experiences.

Designers use expressions such as "*cold shivers*" ("kylmät väreet"), "*goosebumps*" ("kananlihalla") and "*gut feelings*" ("perstuntuma, vibat") to describe similar embodied sensations. Not all of these specifically refer to intuition but more to a specific signal, a feeling or a sensation that a person gets about an issue. Some designers report getting goosebumps also when listening to music or watching a film; however, these are seldom labelled as intuition.

Some of the interviewees describe that they have "*a special kind*" of vibe or cold shivers, or that these exist in a particular location in their body when intuition is concerned. Usually, a person may feel very confident in relying on these signals and experiences in their

everyday life. Designers have used common expressions such as being on the same *"wavelength"*, *"tuned"* into the same *"frequency"* or having matching *"vibes"* to understand each other. The "heart" may know, or one can see with the *"mind's eye"*.

When a person gets intuitive information, they may illustrate it with a picture of *"a light bulb"*, describe that an idea is *"bright"*, *"brilliant"* or that something *"flashed"* into their mind. It is interesting to note that all of these illuminating expressions are usually depicted in drawings as happening above the person's head.

Thoughts may be *"aligned"* or *"entangled"* with somebody else's. The ideas may start to *"fly"* or *"flow"*. A thought may have *"wings"*, or the ideas may just float in *"the air"* of come from *"thin air"* or *"out of the blue"*. A person may have a writing *"block"*, or a *"storm"* in their mind or *"butterflies"* in their stomach, but finally the *"pieces"* start to *"find their place"*.

In coaching sessions, I use metaphors when wishing to widen students' perspectives and increase their understanding. Being *"inside a box"* or *"getting out of the box"*, *"attune"* to intuition, or establishing a *"connection"* with intuition have all been used. The issue is, *how* well the metaphor matches with the person's own experience and how well they are even able to turn their own experiences into metaphorical descriptions. Many design students report that intuitive experiences are much easier to describe in their mother tongue than in a foreign language.

Intuitive experiences are extremely meaningful to the person experiencing them (Mielonen, Raami, et al., 2009; Raami, 2013; Raami et al., 2008, 2010; Raami & Mielonen, 2011). Often, they are unique, very personal, and hard to verbalize even with metaphors. These experiences may be beyond the traditional norms and, therefore, difficult to define. They also tend to lose their meaning if a person tries to fit them to traditional design models or generally acknowledged ways of designing. However, the intuitive experiences cannot be given credence before they are shared with others. (Raami & Mielonen, 2011) This can be illustrated with the following example of a composer describing his creative process:

> Intuitive experiences are extremely meaningful to the person experiencing them

"When I compose I contact my deepest feelings. Then I just express what I feel and write it down. It is very easy when I am relaxed. Something hidden in me starts to express. I am not in the world that is surrounding me – I am travelling somewhere else. It is hard to describe with words."

There is a lot of variation in the expressions that designers use to illustrate their personal intuitive experiences. The interviewees described their personal experiences for example as follows (Raami & Mielonen, 2011):

"It [intuition] is like walking with your head like a cone." (*"Kulkea pää tötteröllä"*) **– design student**

"It is like turning the lights on in a dark room. All the connections and perspectives are revealed simultaneously." **– arts teacher**

"When I get a good intuition I feel certain kind of goosebumps, either in my whole body or in certain parts of it, like in the top of my head." **– designer**

"A very strong intuition feels like there are thin needles piercing my skull, except I do not feel pain." **– designer**

It is important to observe intuition even though it is not always easy to step out of one's comfort zone or to face something that cannot be fully understood or verbalized (Mielonen, Raami, et al., 2009; Raami, 2013; Raami & Mielonen, 2011). It requires courage to linger in sensations that are hard to understand and define. Sometimes this can be easier with support from others. Most of the students as well as the teachers stressed the importance of group discussions when sharing intuition experiences (Mielonen, Raami, et al., 2009; Raami, 2013; Raami & Mielonen, 2011; Raami et al., 2010). It is easier to accept and credit personal experiences when a person also hears stories recounted by others. Through these, one can find similarities, as well as contradictions that can help to understand both the self and the varying processes of others.

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Process of intuiting

All designers included in the research have their personal ways of intuiting. Often intuitive experiences – or decisions based on intuition – are not credited as being a serious part of the process to be shared and accepted. A designer often also feels that they need to find rational arguments to justify decisions. Since intuition is mostly kept hidden, observing the ways to intuit requires careful attention. There are a number of challenges when approaching the process of intuiting. First, it is not easy to observe how the intuitive process is taking place inside of oneself. Secondly, it is hard to verbalize these experiences. Third, it requires an environment of trust and acceptance to share these experiences. (Mielonen, Raami, et al., 2009; Raami & Mielonen, 2011) However, when a person is able to bring these experiences into conscious levels of the mind and they are shared with and accepted by others, the person usually feels empowerment. Many students report that talking about these experiences is contrary to the usual practice of hiding their intuition and, therefore, they are not always eager to talk about them. The following examples illustrate this.

> *"Rhythmic decisions I make intuitively. (Now,) at this stage of my studies I need to be able to analyse HOW I make those rhythmic decisions. All my decisions must have a rational justification."* **– film student**

Many design teachers have extraordinary experiences of intuition, even though the area of design is probably more open to extraordinary and personal experiences.

> *"I cannot describe [intuition] either. But when I look into the distance I can see it... When I started to talk about the structures, I thought everyone could see those, but they cannot. I see them as colours, forms, I could mould them, draw as a full score – I see my life like that as well. It approaches beforehand – I wonder if a piece of art can have an aura – but it's like that. I know where all should be, in their places, and start searching for those things. ...But the structure, it is awful if you are not able to see it. There may be a work project with a huge conflict and then I am not able to see it."* **– arts teacher**

According to the interviews with designers and discussions during coaching sessions, many designers seem to be very sensitive visually, emotionally or through other types of sensing (Mielonen, Raami, et al., 2009). Trying to stay as long as possible in the world of impressions, without drawing or writing down the experience, is mentioned by several interviewees and therefore seems to be important. Some prefer to write down simple words, descriptors or impressions, keeping the vista of the visual imagination open for as long as possible.

How do the design students experience intuition and how do they describe the process of intuiting? Even if it is hard to find words to describe these experiences, some students describe recognizing an intuitive moment as a *"form of energy"*, *"colour"* or *"pressure"*. Often it is also described as an embodied sensation, such as *"a lump in my upper stomach"*, *" a lump in my throat"* or *"like applying pressure right below my chest"*. The bond between intuition and flow experience is also often predominant.

> *"There is a short distance between the first intuitive observation and the flow experience. Time and place disappear."*
> **– film student**

How can these experiences of intuition then help while designing? The following discussion between film students illustrates how they recognize and pick out the important scenes when editing.

> *"A sensation that evokes different thoughts than any other event."*

> *"It's like sitting on a bus and watching the scenery flash by. And even though the bus is not stopping, you yourself stop at a certain scene or image."*

> *"Even though everything flows there is a place where I stop, that catches my attention."*

> *"Yes, on an emotional level you pause somewhere."*

Many students have described recognizing intuition based on the emotional reactions it evokes.

> *"An emotion that evokes different thoughts than other events."*

> *"I may suddenly start to laugh. Then after doing something else for a while I again recognize the 'crying emotion'."*

The importance of emotional reactions is common. A film student described:

> *"I always cry when editing. And even though I accept it I have to admit it looks weird. Especially sitting by a computer it is funny."*

> *"It feels a bit silly being somewhere by myself editing and then suddenly starting to cry all alone."*

The students quoted above – just like many other designers – report that personal intuitive experiences are usually kept hidden and are not talked about. Sometimes the person may even feel ashamed or annoyed at having these emotions. All of these students thought that they were the only ones sensing these experiences and emotions but, on hearing of similar experiences from others, they felt relief. For me, this sensitivity, which seems to be often emotional but may take other forms as well, indicates an ability to operate on an immersive intuitive level while designing. This makes these sensitive persons' capacity to acquire new information extremely valuable.

Designers' highly personal experiences of intuition
There are many ways to perceive, experience, understand and utilize intuitive information and there are most likely as many varying words to describe intuitive experiences. In many cases, these descriptions are connected with embodied knowledge – though the *origin* of the information does not necessarily come *from* the body. When we lack a shared terminology, it is difficult to share and compare intuitive experiences. (Raami & Rouhiainen, 2006)

The highly intuitive experiences may be multi-sensory, visual, kinaesthetic, symbolic or even extrasensory – a type of preverbal activity that is hard or impossible to describe verbally. Some designers even report that turning these experiences into words may hamper reaching the core of the experience, or bias the original experience. A better method is to linger in the original perception and sensation for as long as possible without a need to label the experience, just letting the authentic quality of it be revealed. When turning the experience into words, our reasoning faculties may narrow and manipulate the original information by illustrating, decoding and analysing it. (Mielonen, Raami, et al., 2009; Raami & Rouhiainen, 2006)

Several designers report having intuitive experiences that are either highly personal or extraordinary in nature. There is considerable variation between different individuals as well as between single situations experienced by an individual. It is not easy to talk about highly personal experiences, partly due to the limited vocabulary available to adequately describe the moments that are experienced as a person goes through the creative process. A novice designer tends to bestow upon themselves the public perception of a designer – which usually excludes such an experience, partly due to a fear of looking unprofessional. Therefore, the students find it demanding to admit the existence of such experiences or to talk about them to their peers. Further, many teachers have found it challenging to talk about these experiences since they do not fit the materialistic scientific world view and the experience may have implications for the person's public image. (Mielonen, Raami, et al., 2009) One teacher described the importance of intuition coaching and discussions as follows:

> *"When I knew that I was not silly and alone with my thoughts it gave me strength."*

Depending on the person's own world view, attitudes towards the extraordinary experiences of intuition vary from acceptance to de-

nial or explaining away (Mielonen, Raami, et al., 2009). These types of intuition usually exclude expertise-based, learned and memorized forms of thinking, and at the same time include the possibility of insights emerging from thin air – a situation described by several designers (Mielonen, Keinänen, et al., 2009; Mielonen, Raami, et al., 2009; Raami, 2013; Raami et al., 2010). Some of these experiences may happen on a once-off basis, while others may be recurring, so that a designer may use them as a "form of guidance". Perhaps the most common sensations connected to these experiences are bodily sensations: shivers, vibes or a feeling of energy. When these sensations are explained with common terms, such as "*goosebumps*", "*good vibes*" or "*gut feelings*", they are often commonly accepted. However, if they are of a different nature, such as outer body sensations, they appear as peculiar.

> *"The goosebumps are sometimes all around the body, sometimes in certain places in the skull."* **– designer**

> *"Every time I get a good idea, I feel as if my body is pricked with very thin needles all over. It doesn't hurt at all. They are not like cold shivers, but different. If I get a particularly great idea, I feel these pricks on my scalp too. Using these sensations I can recognize particularly good ideas."* **– designer**

Some designers describe that their personal intuitive experience either appears or is supported by this kind of extraordinary experience such as "*an inner voice*", "*a certain specific feeling*" or "*feeling extrasensory or outer body sensations*". A student described their experience designing with a computer:

> *"It's like an energy field forming between myself and the screen".*

In the current literature, there are various working theories and hypotheses, explaining extraordinary intuitive experiences, as well as instances of individuals having their own personal hypothesis. Regardless of the explanations chosen, it is important to legitimize these unusual personal experiences of intuition: to accept them,

to enable the sharing of them, and to help bring out their personal meaning. This actively manages the process of intuitive experiences, which in turn fosters the transformative learning experience of intuition and can lead to significant leaps in intuitive processing while creating. (Mielonen, Raami, et al., 2009)

When the unique and special sensitivity of a person is understood and legitimized, there is usually instant recognition and relief. Often it is difficult to fully open up to these sensations and it requires a vast amount of courage to trust the sensations that others ignore and/or question (Raami, 2013; Raami et al., 2008). Denying these experiences may create individual suffering and feelings of isolation and inequality. Further, when these experiences are denied, it usually hampers opening up to intuition and, hence, prevents the development of intuitive capacities (Raami et al., 2010).

Sources and origins of intuition

Sometimes a person is able to recognize different "sources" or "origins" of intuition. During these moments, they typically feel that they are at their most creative. There is a strong feeling of "receiving" ideas, being energized or "carried" and being empowered. Many of these persons report a qualitatively different experience between "receiving ideas" and the experience of ideas arising from the subconscious mind. (Mielonen, Raami, et al., 2009)

>'Sometimes when designing, I use a method where I lift my consciousness above my head. Once I had to invent a good name in a very limited time and my head was totally empty. I used this method and instantly the name popped into my head. After that, all the other name choices felt lame. I strongly felt the name was given to me. I could never have invented such a good name myself.' **– arts teacher**

>"When composing, I feel the music is coming somewhere outside of me. It kind of has a life of its own, I just follow it and write it down." **– design student**

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unleashing intuition   Intuition Unleashed

A composer described his process of composing:

"It's like the emotion has two different power supplies. When intuition originates from within oneself it can be felt in the heart but this feels as if it's radiating from outside."

"I have a couple of external sources, classical music might be playing by itself. The songs might already exist but I still don't recognize them. One can use modification and begin to work on them. But I seldom save them anywhere else but my mind. I just lack the skill of writing notes, I need a computer and an instrument – like a piano – and software to save it with."

"Sometimes it feels like holding on to a string and following it. There's a strong feeling of presence, goosebumps all over my body and a sensation that something is going to happen."

"It is multileveled, an issue which is not from self. I am feeling thoroughly light and uplifted – like when meditating on a higher level. Something in the inner resonance changes and you are part of the flow."

"Sometimes I experience music as originating from a three-dimensional place from where the sound is coming. With electronic music I can place the sounds in a three-dimensional place, forming "sound portraits" of a sort in which the voices are sliding and, when I have the chance to use my sight, forms and colours also start to appear."

The origin of these experiences can be considered as a thought arising from the non-conscious parts of the mind and not as an insight coming from 'outside'. However, this does not seem to help those students who feel that intuitions arising from 'an external source' feel qualitatively different from those arising from inside one's non-conscious mind. Another possibility to explain these experiences is a field model. Field models accept that intuition may come from outside of one's physical body and may also be sensed differently. In fact, they imply that the non-conscious intuitions and so-called 'external intuitions' are different – both experientially and in the type of knowledge gained. As such, students may consider developing them differently. (Mielonen, Raami, et al., 2009)

Naturally, it is possible to be creative and intuitive without having experiences of extraordinary intuition or accessing "an external source of intuition". External sources seem to exist, based on many experiences described by designers. They are qualitatively different and most likely require different methods of access. For some designers, it seems to be important to recognize the source of intuition to some extent at least. These persons mention that they try to pay attention in order to differentiate between different sources of intuition.

Some designers report experiences of interpersonal intuition. Transferring pictures 'telepathically' is not among the common methods taught in design – yet many visual designers tell how they are able to "visualize ideas from others' minds". Others puzzle at the simultaneous emergence of almost identical ideas. (Mielonen, Raami, et al., 2009)

> *"Sometimes I wonder how is it possible that in the same design competition somebody has submitted the same idea as mine, even executed it similarly, but from another side of the planet. I thought this was odd, because I had not seen or heard of a similar kind of idea anywhere before, and I was convinced I had surely developed it myself from the beginning to the finish."*
> **–design student**

A composer described a moment when composing with a friend:

> *"Two minds become one. We both hear the melody in our heads forming the same way."*

Also, such experiences can make sense if explained as thought fields. The normal approach might be to dismiss them as random coincidences due to cultural trends or the use of imagination. In the field model, thoughts extend beyond the physical body and can be sensed by other people on a crude level. According to the model, it is also possible to become more attuned to these fields and thus develop an intuitive sense in designing, something which the novice designers most strongly express a yearning for. (Mielonen, Raami, et al., 2009)

Some persons describe occasions where an intuitive insight brings new unbelievable information and the rational mind tries

to resist, causing an extremely strong emotional conflict. A person may lean on rational explanations and question the inner vague and intuitive sensations. This may be emotionally extremely burdening.

"A strong contradiction with the rational mind which causes a conflicting feeling" – **a composer**

"During one quarrel I wanted to believe what the other person was saying. However, I was confused by the amount of rage, conflict and nerve-racking emotions I was feeling. I wondered where does all this anger come from! When it turned out that the other person had been lying, all those frantic feelings disappeared immediately and I was overcome by the feeling of relief and inner peace. Of course it was a shock that the other person had been lying but the feeling of relief was even greater, since the reason behind my inner conflict was unravelled and I understood there was nothing wrong in me." – **a designer**

In summing up all these extraordinary experiences of intuition, there is a multitude of perceptions and experiences described with disjointed and inadequate terminology. However, the most important point is that the original perception is recognized and acknowledged by the person themselves.

Group intuition

Group intuition is included in my study only through one case study (Raami et al., 2008). The *A Different Journey* study project was conducted in 2007-2008 together with the Helsinki Media Lab and the Neonatal Intensive Care Unit (NICU) in Helsinki University Children's Hospital (HUCH). Nine MA-level New Media design students participated in the project, working in a network of shared expertise together with nurses, doctors and various specialists from the NICU. There were several parents of preemies as well as other persons included in the background team.

The assignment was to design a short audio-visual presentation to help parents and nursing staff to understand the special nature of premature babies' communication. Preemies' communication differs significantly from that of full-term babies due to their undevel-

oped nervous system. When the carers better understand the specific communication of the tiny baby, they can more efficiently help them in their struggle for life.

The students felt the assignment to be very challenging since they knew nothing about preemies or their medical care. The theme was also emotionally challenging, videotaping preemies while they were being taken care of and facing the struggle for life. There were a lot of ethical issues to be considered and several events that could not be filmed or included in the public version. Yet the students were supposed to design professional material that would give information and support and, hence, help the parents to support their preemies in their survival. The hospital personnel had great trust in the student team and gave them a lot of freedom in their approach to the issue.

The project was going well, following the production plans based on the agreed visions of the hospital team and students. Most of the material had already been filmed. Yet the director got an uncomfortable intuition, feeling that something not quite right, something not matching up or missing. The director, described:

> "Even though all the rest of the team seemed to be sure about the concept, I could not rid myself off the odd feeling that kept bugging me like a small pebble in my shoe. There was something so elusive about our mission that even at the risk of appearing thick-headed, I could not to let go of this strange, undefined concern. I weighed the excuse of being rather new in the team or just not understanding the complex field but still listened to the inner urge to start questioning. It was this intuitive warning of something missing that actually would turn the entire project around in a couple of months, to take us to quite a surprising route.

> I kept asking, and somehow instead of finding clarity, I just found more confusion. This was a good sign – I wasn't the only simple-minded one in the team, the one who couldn't grasp it. There really was something still to be uncovered. From being the only one lost, I had stumbled upon a tower with a good view of the entire project and was witnessing how there had been shutdowns of information between the many participants of the convoluted project geography. Nobody knew they actually did not know; they were just assuming.

After that I was completely sure about the fact we still did not actually have the full idea, just a ghost of it. Even without knowing it, I had known this. Somewhere within, the marrow and the juice were hiding, and I was the one to let intuition take us there." **(Celen, 2008; Raami et al., 2008)**

At that time, the director did not talk about this feeling of unease to the others in the team but continued asking and questioning while going with the original plan. However, soon the whole team started to share this intuitive feeling: something was not right. The team started to film more material, interviewing parents and nurses in order to find a reason for the uncomfortable feeling. The director described the click-in moment when she got the most important intuitive hunch:

"I had been going around and around, and it seemed like different people knew different sides of the whole thing but no one could point me in one direction. One conversation of significance I had was with one of our most experienced HUCH nurse specialized in premature babies' communication. She confirmed that the main target audience would be the parents. This group was even more important than the health-care personnel in terms of from whose perspective we should tell the story. As I heard this, there was almost an audible click in my head. This was significant information, the next clue I needed in getting to the bottom of this all. Then, of course, I asked the nurses how they thought the parents would like to see this information, how they would best grasp it. It turned out that the nurses did not really have this first-hand information from the parents even though they worked with them everyday. I was astonished. How was it possible that no one in the team actually knew, no one had thought about asking the parents before, and all we had was actually just a non-factual assumption? And on top of this all, we had built an entire project plan." **(Celen, 2008; Raami et al., 2008)**

At that point, the team had a serious discussion as to whether to proceed with the original production plan or to rely on intuition and step into the unknown, which meant enormous uncertainty and jettisoning all the previous plans. As in every film production, there was a limited time schedule and a tight budget to be followed, which made

even small changes challenging. Yet the group intuition and feeling of unease was so strong, as well as the desire to design the best outcome that they possibly could, that I let the student team decide and, in case they wanted to choose to follow their intuition, to support them in every possible way. The team chose the route of intuition.

The students were supported through mental support, unconditional encouragement and maximum freedom – both from the hospital staff and from my side. From that point, the project developed in an evolutionary manner, allowing decisions to be made at the last minute, giving room to ambiguous hunches, allowing the possibility to utilize serendipity and coincidence, including the possibility to make mistakes. Of course this was challenging, requiring everyone to go beyond their comfort zone and tolerate ambiguous situations, but on the other hand the team was also partly forced to this since the situations in the NICU unit were unpredictable.

After some more research, it turned out that the parents had such huge fears of losing their preemie that they could not assimilate any of the given information without first getting some relief from their fears. Until then, some of the nurses who had been working for more than 10 years in the NICU unit had never heard parents talking about their fears like they did in the material the students had filmed.

During that time, the team had revealed three extremely important design goals instead of the one that was stated at the beginning of the project. This has all happened through intuitive processing. Further, at the end of the production there emerged a further three outcomes of which nobody had even had the faintest idea previously, but which the produced material fulfilled. Later, when the DVDs were already in distribution, the feedback revealed a further three outcomes which the material answered even though no one was aware of these goals (Raami et al. 2008).

Feedback from parents and medical staff underlined the excellence of the intuitive decisions used during production. For instance, the parents' emotional world was revealed to the nursing staff for the first time ever.

In an anonymous feedback form one parent described:

"It felt tremendously good to hear others describe their own feelings so clearly. Partly I understood things just now (after 5 years) when I heard others clothe their thoughts in words. When watching the DVD I cried a lot, but somehow that purified me. I am wondering if there will ever be a day when I do not cry anymore when telling about his prematurity? Can one ever recover from this or will this shock follow our whole life?"

And another parent reported:

"Very touching, personal – opened connection to those feelings and events of the premature birth over eight years ago. I was astonished how powerful the watching experience was, because I thought I had got over it (having a preemie) while participating in peer support, and after delivering two full-term babies after him, but the way of handling the subject through such a personal grasp – not fact-based or drama-like – it was different from all the others I have seen or read about the subject before!" **(Raami et al., 2008)**

Furthermore, the project empowered students and resulted in a transformative learning experience. The students were able to surpass themselves and reach far beyond their expertise. They had all been able to create something truly meaningful and complete, listen to and follow their intuition and access knowledge that had been hidden from everybody before the project. None of the designers would have dared to take on such a challenge if those design goals had been mentioned at the outset of the project. Instead of a 20-minute film, they produced a 1-hour-long production – all in the same schedule and for the same budget.

According to my understanding, intuitive processing guided students to reach those significant design results. Without listening to intuition and being brave enough to follow it, the result would never have been so good. The team had created something that delved deeper into the subject matter than anyone could have imagined. Even though this study project is just one case, the result strongly suggests that intuition should be included as part of the decision-making process when working with challenging design tasks. (Raami et al., 2008)

6.3 CASE: GLOBAL DIGNITY – USE OF INTENTIONAL INTUITION

I believe that it would not have been possible for me to understand the highly intuitive experiences described by designers if I had not had any of my own. A remarkable thing happened to me in 2007 while guiding MA design students together with Pekka Himanen in his Global Dignity workshop. The students had done great work designing the new website and visualizing the world of *The Global Dignity* project in in its early stages. The project had already started but it needed an easily identifiable symbol or logo. Despite much encouragement from Pekka and me, none of the students had presented any ideas. The deadline for the symbol came closer and finally passed without any sketches from the students. At that time, I had been designing symbols for a number of companies. The symbols had just "dropped" into my head in a ready, finalized form. I had wondered where had they come from, but got no answer.

Logo and symbol design had been one of my favourite areas while studying graphic design. So I decided that I would "order" a symbol for *The Global Dignity* project. I started to wait. Nothing happened. I waited further. An expert designer would call this wishful thinking. I was disappointed. I pondered what to do and finally contacted an old art teacher of mine who had become a friend over the past few years. I knew she had been meditating since her youth and maybe she could help me to see something. The next evening I sat down on her couch, she sat next to me. We asked for a symbol for the project and closed our eyes in silent mediation. Neither of us spoke.

It has always been easy for me to visualize. I have a vivid imagination, but I can clearly differentiate between a perception of images through intuition and an active visualizing of images. When I am visualizing, I can control and freely mould all my visions. I can visualize a certain kind of chair with arms, upholstery and fancy legs and with my imagination I can change the setting, change the colour, shape, form, everything. The image is totally flexible and it retains the given form. When I perceive images and visions through intuition, I cannot order desired results. I can ask to see something specific, but it may be totally different from what I had expected or ever imagined. I can ask the vision to change, and it may indeed change

for a while – until it soon returns to its original form. The best I can do is to remain open to perceptions.

So there we sat quietly, with our eyes closed. Immediately, I was taken to a place that I recognized from an earlier meditation session. A clear vision was presented to me like an animation in front of my closed eyes. Behind my closed eyes appeared two hearts, one coming from above, the other from below, getting closer to each other until they intertwined, forming a symbol of two hearts. I was amazed. Was it this easy to see and attune to intuition? I opened my eyes and drew the symbols on paper, which can be seen in Figure 9. I noticed that my friend had opened her eyes and was also drawing something. Neither of us spoke a word. Then I asked whether she had seen something and she said she had been presented with a vision. Our amazement was great when we compared our drawings. They were similar. Unfortunately, the sketches drawn by my friend disappeared sometime in the past few years. After the meditation, I started to question: How can this process be explained? How come this can happen in the first place?

I ended up with a sketch of a symbol that perfectly matched the idea of global dignity. To be frank, I have to admit that with my own skills alone I had never been able to come up with such a good idea.

Figure 9. Sketches of The Global Dignity symbol and the finished symbol.
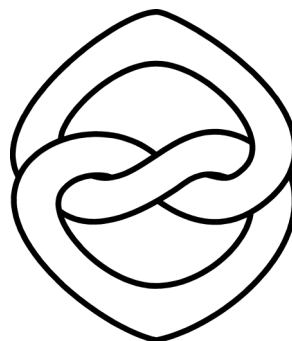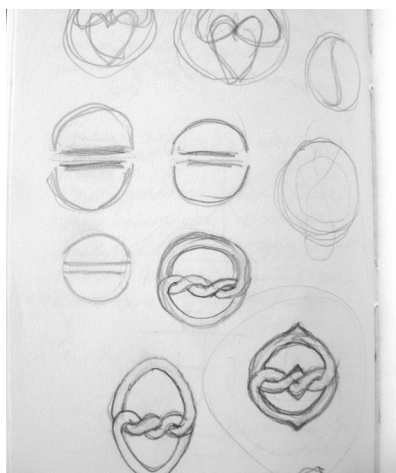
The result was beyond my imaginative skills, something I could just stare at without being bored. When I looked at it, several new aspects were revealed: unity, two becoming one, a globe inside hearts, northern and southern hemispheres coming together, a hug, stability, eternity, intertwining of two worlds or dimensions, etc.

It took just a few more sketches to finish the symbol design. Those who are familiar with logo or symbol design know that usually the process takes at least several weeks, including hundreds of sketches, dozens of working hours to get a good idea, to sketch different variations of the idea and, finally, to design the final version. I had spent around 15-20 minutes meditating and a few minutes sketching, plus a few hours finalizing the symbol, first manually and then digitally. This experience revealed to me the potential and power of using intentional intuition and the exceptional outcomes that may result.

6.4. DEVELOPING DESIGNERS' INTUITIONS

All the intuition development related issues presented in this final part of the work are based on the research data. They are derived from feedback and discussions with designers and design students during intuition development courses, and include my personal experience based on 10 years of creativity coaching. One of the articles focuses on intuition coaching in general and two focus on researching the impact of a single course on intuition development (Raami, 2013; Raami & Mielonen, 2011; Raami et al., 2010).

Developing intuitive faculties differs greatly from developing reasoning faculties, since every individual has a unique internal system to intuit and to process information.

Developing intuitive faculties differs greatly from developing reasoning faculties, since every individual has a unique internal system to intuit and to process information. According to my understanding, there are no quick-to-apply methods to become a master of intuiting. Rather, it needs courage to open oneself inwards to personal intuiting and patience to practice. (Raami,

2013; Raami & Mielonen, 2011)

Over the years, the contents of my coaching have developed, mainly from general creativity coaching to more focused development of intuition. In the early 2000s, the emphasis in coaching relied more on environmental-related support but, since then, the amount of time spent on internal and personal-tailored support has been growing steadily.

My approach to intuition development is "from inside out", therefore the issues handled in the coaching courses always arise from the specific needs of the group. There is never a prepared set of issues or exercises. Some of the exercises always come from my own intuition, and others are derived from the literature, where a great variety of exercises can be found.

The following pages present the intuition supportive methods used in coaching, which I found while researching intuition development in those cases on which the articles for this thesis are based. I will not present any specific methods and detailed instructions, since I have never used a fixed set of exercises, and neither is that the objective of this research. Rather, it is to research what kind of intuitive experiences designers have, how they use their intuition, whether designers' intuitions can be developed and whether the exercises help in general, and not if a certain set of methods works best.

The cornerstones of intuition coaching

The basis of my intuition coaching lies in removing blocks as well as supporting the perception and recognition of intuition. Intuition coaching is built upon the following four main components (Raami, 2013; Raami & Mielonen, 2011; Raami et al., 2010).

The background theories of intuition

Intuition cannot operate in a narrow box of conscious reasoning. Therefore, it is very useful to present a lot of cutting-edge research data to open up a person's rational mind towards intuition. There are numerous studies on various domains related to intuition, con-

Intuition cannot operate in a narrow box of conscious reasoning.

} firming that intuition exists, that it is useful, sometimes even superior to conscious reasoning and that it is smart to explore, use and develop intuition. At some point, when presenting somewhat more challenging material, a person will be driven to the edge of their comfort zone. Observing the personal emotional and mental reactions and confrontation is usually very illuminating and an important eye-opening experience for an individual. When breaking down these mental boundaries, a person can usually better access completely new perceptions.

The background theories used include varying models of intuition, in addition to alternative explanatory models of intuition. These models have a significant role in supporting the personal experiences of intuition. Presenting even contradicting models of intuition has been useful since the goal is to provide tools for personal observation, reflection and knowledge building. This allows a person to find an appropriate model fitting their personal experiences and not vice versa.

Use of stories

In coaching sessions, I read aloud numerous stories told by famous designers and artists in which they talk about their personal intuitive experiences. Some of these stories are surprising and extraordinary, while others may just describe the design practices and routines. For many participants, it is mind expanding to hear that even great artists struggle with feelings of not being good enough, use

There are as many ways to create and design as there are individuals.

} substitute activities and suffer from severe limitations. There are as many ways to create and design as there are individuals. Opening these issues up is important, especially for design students. For teachers and professional designers, the stories are more like interesting anecdotes and refreshing points of view. The use of stories is greatly valued by all the coaching groups. The perspective of a single individual is narrow and since intuitive experiences are not usually talked about, one can widen one's perspective through stories. Usually, a

person feels more relaxed and confident about their personal process after hearing the varying and extraordinary experiences told by famous designers.

Intuition exercises

The purpose of the exercises is to develop the skills of perception and discernment. These include the observation of embodied knowledge, emotions, non-bodily feelings, mental layers, states of consciousness and, some-times, extrasensory perception. I use a lot of different exercises and methods so that a person can find a method supporting their own personal way to intuit. The goal is to find a path leading to the internal dimensions of a person. Another person's path will not lead there.

> The goal is to find a path leading to the internal dimensions of a person.

The exercises enhancing this process include, for example, mental imaging, mindfulness, meditation, relaxation, reflection as well as breathing and concentration exercises. Also, observing the use of personal attention (where the attention goes), personal reactions related to sensations (feelings, emotions) and the how reactions are handled (validation, rationalizing, controlling) have been very useful. The individual exercises are not elaborated here since there is a great variety of them and most of the time I have customized the exercises to the specific needs of the participants.

Group discussions

In many feedback forms, group discussions are mentioned as the most valuable form of thought processing. Most of the students and teachers describe that it is easier to accept and credit personal experiences when one can compare personal experiences with those of others. Through these, one can find similarities and contradictions, which may greatly help in the understanding of both one's personal inner process as well as the varying processes of others.

Supporting trust and acceptance

One of the prerequisites for successful coaching is to build an atmosphere of trust, support and acceptance. Since intuition is often seen as an inferior way of thinking, it requires courage to widen one's thinking towards acceptance of intuitive faculties and to openly observe and share very personal experiences with others. The importance of a trustworthy environment and a supportive atmosphere is confirmed through constant, coherent feedback derived from several courses (Mielonen, Raami, et al., 2009; Raami, 2013; Raami & Mielonen, 2011; Raami et al., 2010).

It is equally important to support students' personal trust in their internal intuition development. This allows a student to feel free and confident in testing different methods and exercises (Raami & Mielonen, 2011). According to the research, intuition development does not require that a person believes in the development, but strong opposing beliefs slow down the process. Once becoming aware of the power of subconscious programming, a useful method is to start to utilize its potential. One can intentionally feed the nonconscious mind with enhancing and positive affirmations towards intuition. It is not important whether the positive affirmations are actually *true* or not, or whether a person *believes* in them or not. A new thought form can be strengthened, and maybe even encoded in the non-conscious mind despite its truthfulness. In coaching, I have found this method powerful, even if it sounds naïve and simple. (Raami & Mielonen, 2011; Raami et al., 2010)

Supporting the personal way of being and doing

The prerequisite for the development of intuition is the observation of the personal intuitive process, the utilization of intuitive information and testing the information in real-life situations. In an optimal situation, this creates a positive loop, where intuitive processing increases the understanding of the intuitive process, which in turn encourages the greater use of intuition. However, there is some variation between students. (Raami & Mielonen, 2011)

The discussions taking place during coaching sessions have revealed a great variety in the personal processes of intuiting, includ-

ing the perceiving and processing of information as well as the expression of intuition-related internal information. Even though these information processes are mostly hidden, there are some fascinating and well-worked exercises on how to make invisible thinking at least partly visible (Raami, 2004). Sometimes these hands-on exercises can help to unveil something that has previously been non-conscious, hence assisting a person to acquire new perspectives on their personal way of thinking, intuiting and designing. Through this unfolding, a person may also be able to widen their perspective to understand the varying processes of others. (Raami & al., 2010; Raami 2013)

Many coaching students describe the development of intuition as a "homecoming". They say that it reminds them of the way of doing things as a child, the original inner and natural way of creating. Several students mention that, over the years, they have somehow lost or forgotten this connection to their inner being and modus operandi, and describe not being aware of this lost connection prior to attending intuition coaching courses. They have been looking for answers outside of the self instead of attuning to and valuing the inner self.

> Many coaching students describe the development of intuition as a "homecoming".

Developing perception skills

The process of perceiving the world may differ profoundly even though individuals think they share the same perceptions and reality. Individuals perceive differently, not just when using the ordinary basic senses, but also through intuitive sensing. They differ in the ways they acquire and process information as well as in how thinking moves from one thought to another. All of these are part of the inner information perception and processing system, which is closely linked with intuitive sensing (Mielonen, Keinänen, et al., 2009; Mielonen, Raami, et al., 2009; Raami & Rouhiainen, 2006).

Through my own experience and through experiences described by designers and students, when starting to develop sensing intuitive signals it is easier to to become aware of intuition through one's most dominant channel. As sensing develops, intuition can actual-

ly be recognized through many senses. It can, for example, be seen, heard and felt in the physical body. Often, intuition passes holistically through the body and senses.

In 2006, through coaching experience and continuous self-observation, I concluded that the skills of perceiving and discerning were the main components when developing intuition. These skills affect each other all the time, and this cooperation is so intertwined that it seems that when developing one the development of the other is also affected. A person needs to recognize an intuitive perception in the first place as well as to be able to discern its meaningfulness and importance. This process creates an interaction between these three components, intuition, perception and discernment, which is illustrated in Figure 10. (Raami et al., 2008; Raami & Rouhiainen, 2006)

In intuition coaching, I use a lot of different exercises to develop and fine-tune the ability to perceive. These include, for example, exercises to observe embodied knowledge, to sharpen the senses, to discover new senses, or to observe emotional reactions, mental patterns or environmental issues. According to the research outcomes and student feedback, the ability to become aware of these signals can be practised. In particular, perceptions with embodied signals increased significantly after a single intuition coaching course (Raami & Mielonen, 2011). The following examples illustrate the typical comments of the students after a couple of intuition exercises (Raami & Mielonen, 2011):

> *"I am astonished at how strong the feelings in my hands were during this exercise"*
>
> *"It is amazing that only after a few exercises I am able to notice such a major difference in my perceptions"*

All designers I have coached seem to have their own way to perceive and sense as well as to use different sensory channels. Through exercises, a person can expand their perceiving and sensing abilities and, hence, develop both recognition of weaker signals and learn new ways of sensing. (Mielonen, Keinänen, et al., 2009; Raami et al., 2010)

Developing discernment skills

Sensitivity is the core ability to perceive and discern physical and emotional feelings and sensations or non-bodily feelings. As it heightens, a person may pick up non-verbal information through their senses and through tiny variations of expansion, contraction, and signals in their body and mind. My coaching experience strongly suggests that those designers who seem to be highly sensitive may have access through their sensitivity to specific and unique intuitive information (Mielonen, Raami, et al., 2009; Raami et al., 2008).

To recognize meaningful intuitive signals, a person needs good discernment skills. These skills need to be developed at least to that point where intuition is not confused with emotions such as fears, emotional attachments or wishful thinking. It seems that differentiating between feelings and emotions is essential but often difficult. A person may cover up things that are emotionally painful. Further, especially in the beginning of practising, there is a lot of noise in the signal, or the mind may colour or bend the original perception or impression.

Inside of one's head there is a huge assortment of information that can be organized and labelled differently. To access these varying mental scenes, I have used a method where a person may label the different sources of information themselves. Many designers describe different mental scenes as being like different *"stages"* or *"discussions"*. These are described also as *"a chatter box"*, *"a voice of conscience"*, *"a voice of reason"* and *"a voice of intuition"*. Through visual metaphors, these have been described as *"a stage of imagination"*, *"a stage of memory"* and *"a stage of intuitive insights"*. The purpose is not to assign certain labels to mental activity but to be able to observe the varying ac-

**Figure 10.
The intercourse
between intuition,
perception and
discernment**

intuition

perception skills   discernment skills
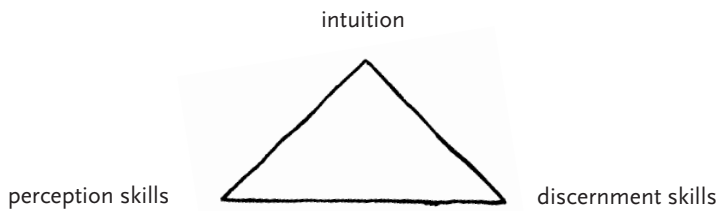
tions taking place inside one's mind. Many designers describe that intuition takes place *"somewhere between conscious thoughts"*, or *"in-between"* the normal senses, or even *"outside"* of them.

I have found it valuable to use some exercises that help a person to realize how information is received and organized inside one's head, and how a person moves from one thought to another (Raami, 2004, 2013). In general, observing the different mental levels can be beneficial, but since intuition mostly hides an individual's conscious thoughts, excessive concentration on mental levels is not beneficial. The most important thing is that intuition can be recognized and utilized.

The impact of a single intuition development course

Between 2009 and 2013, I collected descriptions related to designers' intuitive experiences and intuitive processing. The participants joining the *Developing Intuitive Thinking* course in Aalto University were asked to describe their personal intuition and their ways of using it at the very beginning of the course. The same questions were asked at the end of the course. Both questionnaires were answered anonymously – persons used pseudonyms in order to allow both sets of answers to be matched to the same person. The answers to these questionnaires were then compared. The data were collected from five separate courses attended by a total of 41 participants consisting of design students and university-level teachers. The results concluded with two peer-reviewed articles (Raami & Mielonen, 2011; Raami, 2013).

The answers reveal that most of the descriptions of personal intuition were more specific and personal after the course. However, they also reveal considerable variation in the type and in the quality of intuitive experiences and in the descriptions of intuition (Raami & Mielonen, 2011; Raami, 2013). This may be illustrated with the following examples.

One student described their personal intuition at the beginning of the course:

"Non-conscious, functions in peace, needs time and space."

And at the end of the course:

 "I am now able to discern the flashes of thinking separately from flashes of intuition."

"I am able to acquire information from different sources quickly and I have a feeling I can observe myself why I am getting a certain feeling. So I can better collect information. It helps also in small decisions."

One teacher described their personal intuition at the beginning of the course:

"Intuition is a part of my own inner world, part my real self. I want to be on good terms with my intuition, otherwise 'it doesn't feel good'. Emotion and balance are included as well as an experience of being part of a bigger plan. My intuition is probably quite strong, but often it's also covered under 'noise'."

After the course, they described:

"Earlier emotion and suspicion were mixed with my intuition. Now my intuition is becoming clearer and more lucid. It has become smooth and trustworthy."

Another teacher described:

"There is somehow pressure or anxiety involved. Two simultaneous directions and the contradiction between them, a struggle."

And afterwards:

"Describing it [intuition] is difficult, but I'll try. My intuition is very rational and real, strong. It is hard for me to accept that I argue against it, consider and have doubts. I want to make difference between intuition and imagination."

All the end-of-course descriptions are more detailed and none of them is more hesitant or unspecific than the first one. They describe not just "flashes" or emotions but also versatile expressions and sensations experienced through multiple senses. Further, the general understanding of intuition as a phenomenon is more diverse and multifaceted. The data suggest that even a single course can have an impact on paying attention to personal intuition and on widening understanding of intuition (Raami & Mielonen, 2011; Raami, 2013).

After a single course, the majority of the students felt more open towards their intuition and reported using it more frequently and intentionally. All the students reported that they had acquired new methods to utilize intuition; 86% of them reported that their understanding of personal intuition had increased, while only 40% of the teachers reported this increase. This is understandable, since the teachers already had functional methods for utilizing their personal intuition before joining the course. Moreover, teachers can generally be expected to have more life experience and professional experience than students. However, those teachers who deepened their understanding of the intuitive process during the course reported a major change in quality. (Raami, 2013)

Students joining the course reported increasing openness to test new methods of recognizing and activating intuition. Many of them considered personal development as significant. Further, most of the students wanted to continue developing intuition after the course, even though some exercises were not useful for everybody (Raami & Mielonen, 2011).

An interesting outcome from the teachers' course is that the methods of utilizing intuition increased during the course, but they continued to increase *after* the course. One explanation is that the exercises used and theories presented during the course caused this development, but the results may also suggest that pure *intention* and *paying attention* towards intuition after the course can develop intuition (Raami, 2013). This is plausible, since the students also reported increased confidence towards being an active intuitive operator: after the course they believed

Methods of utilizing intuition increased during the course, but they continued to increase *after* the course.

more in their possibilities to utilize and develop intuition (Raami & Mielonen, 2011). However, one third of the teachers reported that they had not been able to find new methods for utilizing intuition, though some of these persons also reported that they had wished to find new tools for the development of intuition but ended up finding none.

In summary, the results collected from the five intuition development courses suggest that a single course can activate and enhance intuitive processing, increase the acceptance of intuition and even further develop intuitive skills (Raami, 2013; Raami & Mielonen, 2011).

Intuition as a skill continuum

The research data strongly suggest that intuition is a skill continuum and that it can be developed. To build a tentative idea of this continuum, I have ended up using all the research data as a basis. This includes the material from the courses mentioned above, the interviews with 16 professional designers and highly intuitive persons as well as the discussions during the coaching sessions.

Figure 11 illustrates the varying qualities and ways of intuiting reported by the different persons. Many design students reported that emotions and feelings give them valuable guidance (Mielonen, Raami, et al., 2009; Raami & Mielonen, 2011). Some were not very aware of their personal processes of intuiting, for them it was mostly a random and emotion-based process. In these cases, it is typical that, when intuiting, the intuition signal may be full of disturbances or noise, and a person may falsely believe that they are not intuitive at all. This situation is illustrated in the bottom left corner of Figure 11.

At the other end of the line on Figure 11, the intuition signal is clear and the amount of noise is minimal or sometimes even excluded. A few interviewees described intuitive experiences matching this type of intuiting (Mielonen, Raami, et al., 2009; Raami & Mielonen, 2011).

The two ends form the polarities of Figure 11. If a person develops their intuition, it does not automatically mean that they slowly move towards the upper right corner – even though my coaching experience suggests that this often happens. A person may stay at the same spot for a long time and still successfully develop their

CLARITY

ONENESS

DIRECT KNOWING

CLEAR VISIONS

PARTIAL SOLUTIONS

non-attachment

IDEAS

"extraordinary knowing"

DIRECTION

connection to a source

PROMISINGNESS

visioning

"YES-NO"
ANSWERS

"non-bodily feelings"

seeing hearing

emotions   "feeling of significance"

DISTURBANCES   "feeling of unease"
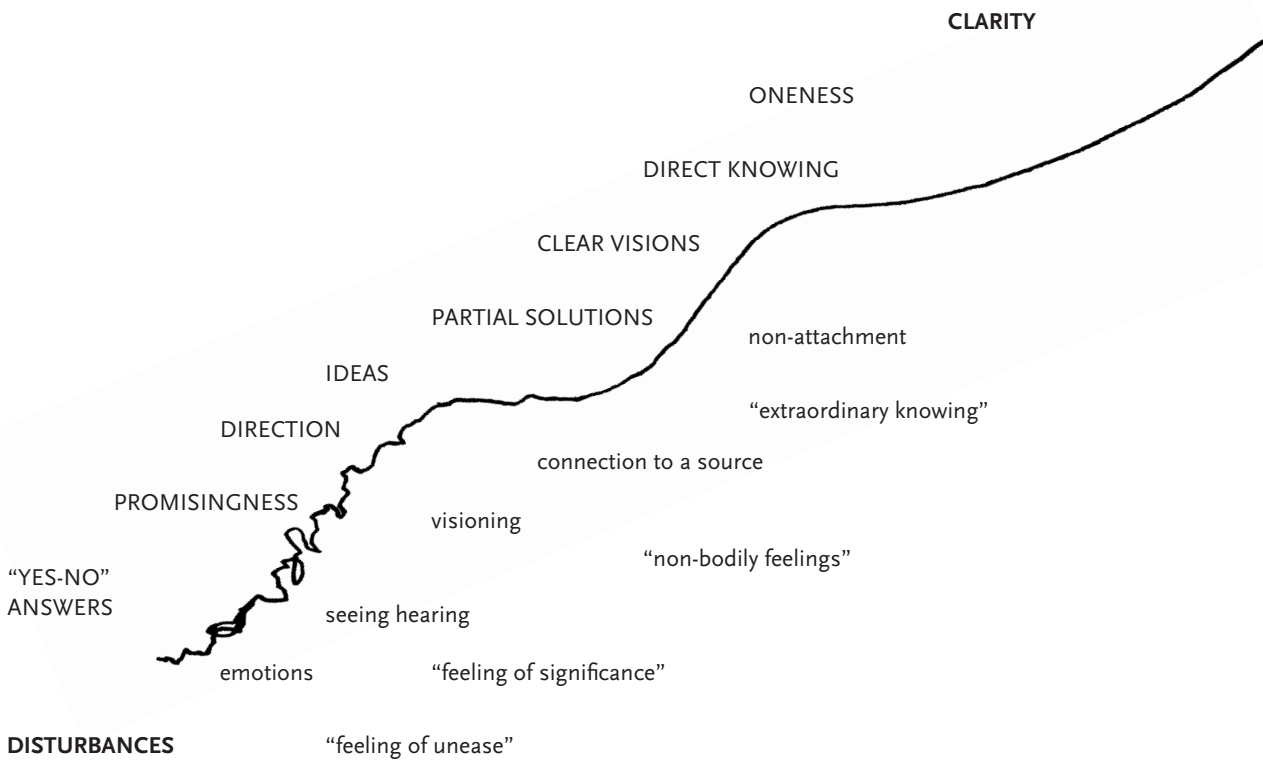
**Figure 11.
A working model
of intuition as a
skill continuum.**

intuitive skills in some specific areas of intuition, for example discerning emotional signals, or developing a specific expertise-based intuition and, hence, become very adept in that area of intuiting.

It is important that the steps or stages illustrated in the figure are not measured or even deemed to be something "superior" to the previous steps or stages. Intuition may be – contrary to that presented here – something that expands, widens or deepens to various or multiple dimensions. Further, the directions illustrated here – up and down, left and right – are figurative and just a way to illustrate the process. However, the figure may give an idea of the multidimensionality of the process of intuiting and reveal different forms and modes of knowing.

In coaching courses, when practising the recognition of intuitive signals, it is a good approach to start with simple yes-no questions

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Opening doors and
unleashing intuition   Intuition Unleashed

targeted at the intuitive faculties. The question has to be formed carefully since, with a loosely formed question, the answer may be varying combinations of "yes-but-no" (for example: yes, but not now). According to the results, even a few exercises targeted at embodied dimensions can help to develop this type of intuiting. A person usually starts to better recognize their inner embodied intuitive signals and, hence, develop the ability to observe and discern personal sensations and information processing.

If reading the figure from left to right, intuition can give other types of guidance after yes-no answers. These can include for example *"a direction"* in which to go, feelings of *"promisingness"* or *"special interest"* or a feeling that *"something is not matching"*. All these expressions were common among the interviewees. Typical sensations are feelings of unease or feelings of significance. Many students said that these sensations included emotions, such as feelings of attraction or dislike, and the decisions made are often based on these. These sensations can also be labelled as forms of tacit knowledge and are often linked with professional expertise, or with a person's own life, which is of course one area of expertise.

When moving further towards the upper right corner, the noise usually reduces and a person may get more specific intuitive information or larger quantities of it. Depending on the domain, they may be, for example, seeds of ideas, fragments of information or clues and hints taking a person forward. The process usually includes some specific sensations of intuition such as goosebumps, gut feelings, and sometimes even extraordinary sensations such as seeing or hearing something special. This type of intuiting usually suggests that a person has developed an ability to read themselves, that is, they know something about their internal information processing system. For example, they are able to differentiate between different inner mental states.

The further one moves towards the upper right corner, the more intuitive information a person is able to receive. They may intuitively arrive at partial or even complete solutions to problems. They may have a feeling of a connection to either some other person or to another external source. They may also have extraordinary experiences or even arrive at complete design solutions. Nevertheless, the area

of intuitive information is usually connected with the area of expertise, although it cannot be reduced to solely expertise-based knowledge. Usually, a person has at least some ability to read the environment, for example they may have a sensation of being mentally at one with another person or with another outer source of inspiration. Visionary type of expert-based intuition is usually combined with this type of knowing. Such individuals are able to intentionally attune to and extract the necessary pieces of information. In the upper right corner, intuitive signals become clear and the disturbance minimal. Those able to access this type of information describe their experiences as *"lights being switched on in a dark room"* (Mielonen, Raami, et al., 2009). People may also get a feeling of "being united" or "connected" with the source of information.

Accuracy and reliability of intuition
With all types of information, the issues of accuracy and reliability are fundamental. Due to the difficulty in evaluating these with intuitive information, intuition is often considered very unreliable. In many cases, one of the problems is that intuitive information comes in a form that is not easy to verbalize. Since there are no common tools to measure the accuracy and reliability of intuition, it often remains a bypassed form of information – at least in everyday discussions or when it contradicts rational arguments. When a person tends to use intuition intentionally, issues of reliability become even more important.

   According to my coaching experience, accuracy of intuition can be improved with proper feedback as well as by asking carefully formed questions. A person can pose very specific questions for their intuition to address but the questions need to be focused on a specific issue at any one time. The more general the question, the greater the chance of obtaining inaccurate information. To simplify, when a person asks a loosely formed question, intuition may give "yes-and-no" answers, since part of the answer may be "yes" and part of it may be "no". (Mielonen, Raami, et al., 2009)

   Evaluating the reliability of intuition is more challenging. Based on the coaching observations, interviews and questionnaire an-

swers collected, some individuals who use a lot of intuition have developed personal ways to evaluate the reliability of their intuitive signals (Mielonen, Raami, et al., 2009). What drew my attention to this several years ago was the use of "confirmations" related to intuition as described repeatedly by several individuals. In these cases, it had taken years of internal observing and accumulation of knowledge to develop these personal methods.

> Some individuals who use a lot of intuition have developed personal ways to evaluate the reliability of their intuitive signals.

The coaching experience suggests that there are methods that can help an individual to observe the internal process of intuiting and, hence, help to develop personal ways to evaluate the reliability of intuition. In the following sections, I will present the material collected from discussions and experiences as recounted by designers in order to build a tentative approach to evaluating the reliability of intuitive information.

Confirmations related to intuition

Individuals using a lot of intuition often report becoming aware of special signals or sensations from the environment. These signals work as a form of guidance, underlining the importance or the correctness of their intuition, and are sometimes labelled "confirmations". There are as many forms of sensing and styles of decoding them as there are individuals, yet they all share similarities of some kind. These signals or sensations are very significant to their owners; the sensitivity to recognize them has developed during many years of observation, and they often "trigger" another level of understanding or experiencing.

One designer described that there is *"a kind of special light"* that appears when the solution or outcome is correct. A few designers mention *"tiny pinpoints of light"* like little twinkling stars appearing in their field of vision when the idea is right or the fact correct (Mielonen, Raami, et al., 2009). These can be illustrated with the following examples:

"I see little twinkling stars, either blue or bright. These work like confirmations that something is true or the direction is right."
– design teacher

"Even as a child I saw bright stars. When thinking of possible answers to a question on a historical date for a history exam a small star would twinkle alongside the correct year. I knew then that was the correct answer. I told nobody of my method – I thought it was cheating. Later I have used this countless of times in various situations when looking for the right answer."
– arts teacher

A few of the teachers, who had been using their intuition for decades, described their intuitive experiences as follows:

"When I know that the outcome is right and correct, there appears a certain kind of vague light around the solution. The work is kind of illuminated." **– arts teacher**

"There are absolutely no emotions connected, if emotions exist, I know it is not a reliable intuition." **– arts teacher**

"There is a certain kind of specific shiver." **– design teacher**

These sensations work as confirmatory signals for the persons experiencing them. A few interviewees described that they hear the sound of a "*click*" or a "*snap*" in their surroundings if the idea or thought is correct or right. A typical explanation for the experiences described above might be some sort of a visual or aural hallucination. However, alternative models of intuition make even these types of odd experiences legitimate: fields can vibrate and information that is valid can be thus sensed. Further, bodily sensations can be implied by layer models, suggesting that informational layers of external intuition can influence a person's physical body layer. (Mielonen, Raami, et al., 2009) Some designers described the confirmations as a religious experience.

"My husband and I were looking for an apartment. We saw one we wanted, it was great, the most beautiful one and then I prayed and felt the 'no' of the Spirit. Well, it didn't make any

sense, especially to my non-Christian husband, so we bought it anyway. In a couple of weeks, the meltdown of the global economy started and the value of apartments started to sink."
– a designer

"It [intuition] is a constantly developing phenomenon. In important, big things like selecting a school for my child or buying an apartment, I often have a strong inner sense that goes against MY feelings or thoughts. It is in me but it's not me. In fact, when it is quite against my ideas, I recognize the Holy Spirit the easiest and often end up taking quite crazy risks, trusting the Spirit more than I trust myself. Each time the end result has ended up being extraordinary, even if logically there is no way one would have thought it would work out. Of course, in big things, I check and recheck many times by finding space and time in things of God and then seeing if the inner desire decreases or increases. I'm also learning to trust the guidance of the Spirit in smaller things. Nowadays it is becoming my everyday life: if I have a desire to do something, even if I wasn't planning on it, I just do that thing and not the one that I was planning on doing. But the key is in recognizing the little desire, not just blindly going by the schedule or the requirements. There is also something new happening nowadays in my life. When I really don't know what is going to happen or which option to choose, I start praying till I feel peace." **– a designer**

Of course a person needs to be able to differentiate between confirmations and superstition or random coincidences. If these signals are picked up without personal customization, they indeed may be a form of magical thinking or imagination. But for some persons, these confirmations seem to work as a significant and reliable tool and their constant use tends to make them even more precise.

Forms of confirmations
Based on the nature of the confirmations used by the interviewees and coaching participants, I have classified them into three main categories: internal, noetic and external. A person can get confirmations through all these forms of perceiving. A few interviewees reported that if intuition is strong it can be sensed through multiple signals and the experience passes through the whole body. My per-

sonal experience is aligned with these descriptions.

Internal confirmations take place inside a person, including physical, emotional and mental confirmations. On the physical level, these are usually sensations such as goosebumps, cold shivers, gut feelings or embodied sensations. A person may see, hear or even smell or taste something special. The physical and emotional confirmations are the most common ones mentioned by designers.

The mental connection between conscious reasoning and intuition was mentioned in the interviews by a small number of designers and artists. Some persons can differentiate between an intuitive insight and a self-generated thought. Likewise, they can recognize an intuitive vision or thought and separate it from imagination. The use of this kind of confirmation needs most likely careful observation and good internal discernment skills since these processes are usually partly non-conscious. One important form of mental confirmation is recurring thoughts. Sometimes there is an idea or a thought that keeps on returning even if intentionally pushed away. This may be one form of a mental confirmation.

The second category of confirmations is extrasensory experiencing, which I have labelled *noetic knowing*. These types of confirmations are described by a few of the interviewees. The confirmation may for example appear in specific sensations, such as *"seeing"* tiny pinpoints of light or coloured impressions. It may also be a form of *"hearing"* music or a *"feeling"* in the heart area or a feeling of energy. It may be a sensation that is hard to describe with words, such as a sense of *"just knowing somehow for sure"* or that something is *"resonating"*. None of these sensations happens as a result of what is perceived to be normal nor through what is considered to be common sense. This category includes the non-bodily feelings such as *"the sense of being stared at"*, *"connecting"* to a source of information, which can be another person, physical location or a field of information. If a person uses noetic knowing as a form of confirmation, they are most likely already very sensitive to intuitive information.

The last category is external confirmations, which come from the surroundings and the environment. Something in the environment attracts special attention even if the signal is not intentionally sought. Such confirmations may be, for example, experiences of ser-

endipity, an exceptional coincidence, or synchronicity, where some-thing happens and simultaneously creates an invisible connection between two separate components. The confirmations may appear as physical sounds or visible symbols in the environment. A person may run into surprising persons or exceptional situations. There may be a remarkably meaningful recurring issue or a similar pat-tern may repeat constantly. In rare cases, there may even be changes in the physical environment such as an exceptional disappearing or materialization of objects.

Sometimes individuals tend to "explain away" these aforemen-tioned experiences. The most trivial ones are often labelled as ran-dom coincidences or superstitious thinking, while the extraordi-nary ones are questioned profoundly or explained away. Indeed, intuitive information may be biased – as all information can be – and there is a risk of misinterpreting these signals and of being mis-taken. However, I need to repeat that not all the interviewees report-ed use of confirmations. One highly intuitive individual described:

> *"I do not analyse my intuition. I just follow my thoughts – they have become calm and clear over 20 years of meditation. Most of my thinking is intuitive. I live on the flow and follow my intuition constantly. I can totally rely on it."*

Evaluating the reliability of intuition through confirmations and biases
When a person is familiar with their process of intuiting, they often may get confirmations of some kind. Even design students who are not very aware of their process of intuiting report these confirma-tions. Usually, a person can sense the signal through one source or sense, for example a gut feeling. When intuition develops, it is usu-ally sensed through other senses too. (Mielonen, Raami, et al., 2009)

Based on personal stories, there may be several overlapping, or a series of, confirmations. Often this indicates that the intuition is more likely correct. Further, some of the confirmations can be "stronger" or have more emphasis than others. However, if they are absent, it is not necessarily proof of an incorrect or false intuition.

Besides the confirmations, a person needs to be aware of the biases connected with each confirmation. Being aware of possible biases when intuiting is always important, but, especially if intuition is used intentionally, it should be integral. Listed below are the most common confirmations and biases mentioned by designers and highly intuitive persons.

INTERNAL CONFIRMATIONS:

Physical, emotional and mental confirmations

Physical sensations: embodied / tacit knowledge, e.g. goosebumps, cold shivers
Biases: misinterpretation of signals

Emotions: feelings, emotions or lack of emotions
Biases: emotional attachments, e.g. fears, or wishful thinking

Mental sensations: insights, visions, voices, thoughts
Biases: analytical overlay, imagination, story telling

NOETIC CONFIRMATIONS:

Extrasensory experiencing, non-bodily feelings

Sensations: "seeing", "hearing", "resonating", "connecting", "oneness"
Biases: "residues", creating by belief, misinterpreting

EXTERNAL CONFIRMATIONS:

Surroundings, environment

Observations: synchronicity, sounds, symbols, other persons, recurring issues, changes in physical environment, serendipity
Biases: force fitting, magical thinking, superstition, wishful thinking, over-confidence

When using confirmations as a tool for evaluating the reliability of intuition, a person needs to be able to interpret the signals instantly and correctly. Sometimes the signal may be biased. Sometimes it is too fast and observation of it too slow. Sometimes there is

noise and the clarity of the signal is not sufficient. Sometimes there is misinterpretation of a signal. With every type of signal there are biases, which should be excluded to get a reliable confirmation.

The usual bias in physical sensations is the misinterpretation of signals, for example confusing the ordinary physical bodily sensations with intuition. When sensing emotions, intuition can be biased, for example by fears, wishful thinking or other emotional attachments such as non-conscious hopes, attractions, disgust, exclusion or ignorance.

The most common bias associated with mental sensations is probably confusion with imagination. It is very natural in humans that the mind starts to create a story or illustrate the reality with attached images. Another bias is analytical overlay, which takes place when conscious reasoning starts to analyse and explain reality. Usually, this takes place when the mind starts to fit new perceptions to already existing memories or models. Often this happens at least partly non-consciously.

In noetic sensing the signal may be misinterpreted, it may be disturbed with obstacles or other "residues". These residues may label, colour or bias intuitive mental images, impressions or sensations. One bias, which can be hard to recognize especially if a person's mind is very strong, is creating by belief.

For sceptics it would be tempting to claim that all noetic confirmations are biased through creating by belief, but according to the experiences reported by designers, highly intuitive persons, as well as according to my coaching experience, this is not the case. With the aid of these confirmations, many persons seem to be able to recognize reliable intuition, with high accuracy and reliability.

External confirmations may be biased with magical thinking when a person is purposely searching for confirmations. Other biases are force fitting, where the signal is wrongly combined with a person's own expectations, superstition, magical or wishful thinking where the reality is seen as a continuum to the person's own imagination. Also, over-confidence affects the reliability of signals. Sometimes when being extremely sure about external signals, there may be non-conscious attachments or expectations included.

Even if this internal observation described above may sound com-

plicated and effortful, it is not. However, it needs practice and an open mind. The intuition exercises, that is practising the skills of perceiving and discernment, used in the coaching sessions target the development of perception and discernment skills in this particular area.

Yet there is one important bias to be taken into account, which is connected with all of these areas mentioned: premature generalization. This common pitfall originates in a belief that the personal intuitive process remains immutable. According to my experience and suggested by the interviews, the intuitive process evolves. It renews and changes – along with the person using it and depending on a situation. Therefore, continuous and detailed observation is fundamental.

I understand that there are certain limitations in this approach. The reality is not divided. Knowledge is emergent and deduction does not result in optimal results. It is artificial to divide senses and observations into separate units instead of integrating them. Many highly intuitive persons describe that an attempt to get closer to undivided experience is more useful. I also understand that with this approach there is a risk of over-fitting experiences to a certain model. Therefore, I consider this approach to be tentative, requiring further research and testing.
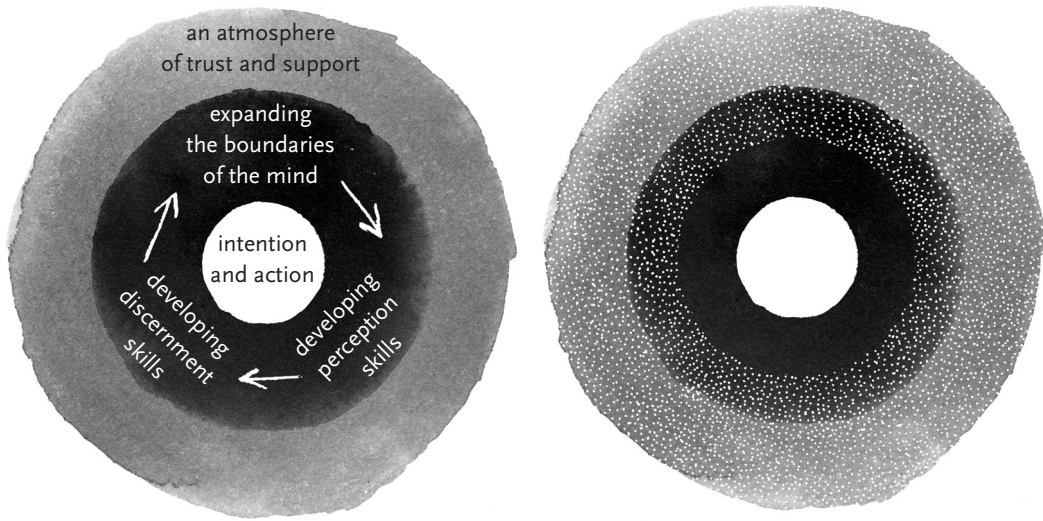
6.5 GUIDELINES FOR INTUITION DEVELOPMENT

To sum up the final part of my work, I outline here the main pedagogical guidelines for intuition coaching and teaching based on my research and personal experience. Teaching intuition often raises the question: how can non-conscious processes be consciously taught in the first place. Indeed, teaching intuition cannot happen in the narrow sense of teaching. Nevertheless, it can be learned, practised, enhanced and coached in the same way as any skill or practice. A student can activate and use their intention. They can bring some parts of the non-conscious mind into the conscious mind and learn new ways of acting. These processes can be supported and enhanced by a teacher or a coach.

I am not including a detailed curriculum or step-by-step process since I have found that teaching settings vary so much that very detailed instructions cannot be given. In every field of teaching there are numerous variants, including backgrounds of the students, area of expertise, availability of time and other resources, personal strengths of the teacher, and so on. In fact, in every course that I have taught, the setting has varied due to the interests of the students and my desire to test alternative ways of teaching. Therefore, it is neither possible nor the purpose of this study to simplify the process into predefined steps. However, I have realized that in all my teaching sessions the main components leading to successful intuition development have stemmed from an identical foundation. In the following pages, I present a working model that illustrates the teaching and learning process of intuition development. The process consists of three continuous and rotating steps of development: expanding the boundaries of the mind, developing perception skills, and developing discernment skills. To implement, test and develop intuition, intention and action are needed, while, to make this whole process possible, an atmosphere of trust and support is a prerequisite. This process is illustrated in Figure 12.

The main components of intuition teaching are illustrated as a black circle, with intention and action in the middle. The three elements of the black circle drill the ability to use attention, which, to-gether with intention, is needed in the process of intuiting. As presented earlier, the core of intuition development lies in the skills of perception and discernment. The development of these two skills usually leads to a more sensitive and precise ability to intuit. The skill of perception is needed in the recognition of signals and that of discernment in excluding the biases of intuition. To enable perceptions in new areas of sensing, as well as to sharpen existing ones, requires expanding the boundaries of the mind. Each individual has mental compartments storing, for example, beliefs and limitations that hinder intuiting. Therefore, the rational mind needs convincing that intuition is an integral and precious part of the thinking process, which supports numerous everyday functions and, in addi-

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an atmosphere
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perception
skills

**Figure 12.
A working model:
the components
of intuition
development.**

**Figure 13.
The shared
responsibility
of intuition
development.
The dotted
area visualizes
the teacher's
contribution and
the rest
the student's.**

tion, can lead to superior outcomes in decision making and creating.

Intuition cannot operate in the narrow compartment of the rational mind; hence, the compartment needs to be slowly expanded. I have found it essential that the teacher offers students scientific background material that supports accepting intuition as a relevant, valid and valuable form of information. It is useful if it includes cutting-edge science results to widen the student's understanding and acceptance of the hidden potentials of human capacities related to intuiting. In my experience, this often leads to emotional resistance, mental arousal, confrontation or even denial, but these are important signs of approaching the corners of one's mental compartment. This is a natural and important phase of the process in which the old belief systems, often hidden to the person themselves, are made visible, deconstructed or renewed.

However, neither convincing of nor believing in these scientific results is the core of the process, rather it is putting into action individual testing of personal intuition. Therefore, this phase serves only as a foundation to the development of perception and discernment skills. It is a step where the student educates their mind through a process of unlearning to accept possibilities that were earlier impossible.

The mental compartments are not solely barriers but sometimes serve as a shield supporting mental sanity and active decision making in everyday life. However, radical intuitions, in particular, need space and freedom in order to operate freely; therefore, these mental compartments need to be expanded at a slow pace. The process cannot happen too quickly since it may lead to strong mental and emotional resistance, which delays the process.

The model is dynamic in nature. The process of intuiting evolves and the phases of the process rotate. Actually, it does not matter from which point of the figure one starts when developing intuition. Further, the model is scalable and the time used can vary – even a short session including these components can help but the process can be continued for years or even decades. A one-hour session can certainly include these components and lead forward. My personal development of intuition has lasted for more than 15 years and if I ponder it retrospectively, these components, steps, and the deepening cycle of the process have always been at the core of my personal development.

The shared responsibility of a teacher and a student
In intuition development, the teacher and the student have different areas of responsibility. Those areas of shared responsibility are illustrated in Figure 13. The areas the teacher is responsible for are dotted and those the student is responsible for are in the centre. The setting becomes complete only if they both have impact on the intuition development sessions.

The most important role of a teacher is to support and encourage. When students are attuning to intuition they are confronted with ambiguity, change, and uncertainty. Therefore, it is necessary to create a trusting atmosphere where they can be incomplete and vulnerable while reaching for the unknown, in other words where they can be on the edge of their comfort zone. They should feel that someone supports and trusts in them, while letting them learn, grow and make mistakes. When developing intuition, all mistakes are precious, since they offer insights and great opportunities to learn. Without mistakes, nobody is able to learn how to discern trustwor-

thy intuition from biases. The teacher is responsible for creating and maintaining this atmosphere of trust and an active presence, where all the students are seen and heard, where they can share their sensations, feelings and thoughts without embarrassment. A safe atmosphere where growing and failing are allowed.

The teacher needs to be at least somewhat familiar with their own intuition in order to share their personal understanding and experiences. However, this does not mean that they need to have the answers or that they need to be able to solve design problems with their expertise. Neither does this mean that the complexity of intuition is crushed or that the design challenges are moderated. Likewise, the teacher has to expose themselves to the process of learning about themselves. Symbolically, the teacher needs enough courage to be able to "lean" towards labile situations and uncertainty. This allows new possibilities to emerge. In these new settings the teacher enhances and boosts the process.

The black circle is the shared area of responsibility containing intuition exercises that reinforce the perception and discernment skills. These exercises can be largely found in the literature, but like swimming, cannot be practised by reading books. Exercising intuiting through perception and discernment needs concrete implementation. Only active practice leads to development. The exercises can include, for example, observing embodied signals, emotions or mental processing. If the practice happens in the classroom, the student needs to integrate some type of practice into their own everyday life, usually in the form of observing and testing.

The exercises can also be integrated into design work or into a larger project. While practising intuition in a real design project, the students can be purposely made to face a seemingly impossible challenge. According to my experience, real-life design tasks and projects work best if they are truly meaningful to the student. Usually, this type of challenge is new to the teacher as well. However, the teacher has to have greater trust and endurance so that they can support students throughout the process. This means that they are mentally present in the moment, use and develop their intuition during the course, share their intuitions, and find the courage to withstand the ambiguity and evolution that take place during the whole pro-

cess. The more challenging the design task is, the more it requires the teacher to support the students, including mentally, emotionally and, if possible, spiritually – excluding religion.

Even though the teacher is responsible for organizing the settings where exercises and practice can take a place, the student is responsible for practising and learning. Therefore, the student alone is responsible for intention and action, which form the core of intuition development by making it real. In practice, the actions can include, for example, attuning, implementing, practising, testing, developing, or sustaining. Intention can manifest, for example, in the form of interest, motivation, inspiration, concentration, focus, patience, or the use of willpower. As presented in the beginning, the rational mind relies and is dependent on the work of the nonconscious mind. In intentional use of intuition this process is reversed. The rational mind is used intentionally to acquire information through intuition.

The process of intuition development focuses on sharpening the process of intuiting. Practising intuiting through the development of perception and discernment skills while expanding the boundaries of the mind marks out the way to an increased ability to evaluate the reliability of intuition. In an optimal situation, this is a process of co-learning where the student learns to better attune to, evaluate and benefit from intuitive information and the teacher learns to better support the whole learning process. In the self-development of intuition, a person is in charge of all the areas so they have to create and maintain an atmosphere of trust and support themselves.

Evaluating the outcomes of intuition development and intuition exercises depends on the given goals. One possibility to evaluate the outcomes is to ask a student to set their personal goal. Then in the process, the teacher enables the student to achieve this personal goal faster than would be possible if studying alone. In real-life design tasks, of course the use of intuition is just a way to acquire and use information. The design outcomes need to fulfil the given design goals – or more.

In my experience, intuition development takes quite a while. Starting to understand the huge untapped potential of the human mind takes time, since it requires a lot of unlearning of old beliefs

and limiting knowledge structures. The process cannot be too quick – of course this depends on the person, but it is quite typical that, after the first course, it may take several months before the person internalizes and digests the contents, is able to integrate them into their life, and starts to realize their potential. In most cases, one course launches a longer process of internal observation, during which the ideas presented are pondered and reflected on, tested and adjusted to one's personal world view and practices.

7

DISCUSSION AND CONCLUSIONS

This study collected accounts from designers of their varying, often highly personal and extraordinary, experiences of intuition. This related to the first objective: to research designers' intuitive experiences and processes as a mode of knowing. The stories revealed the diversity of intuition and managed to unfold some highly personal aspects that are not well identified in the field of design research. The research revealed considerable variation in the descriptions and processes of intuiting as well as some of the challenges and blocks that prevent creativity, flow or intuitive processing. However, whether the selection of experiences is able to describe the typical experiences of designers, in general, is unclear. Further, there may exist some aspects of intuitive experiences that this study was not able to detect.

Intuition coaching, especially naming and legitimizing intuition as well as observing and sharing intuitive experiences, helped designers to better understand their personal intuition. This was the second objective. Their highly personal and extraordinary intuitive experiences became more understandable and natural – both to the person experiencing them and to those listening to their stories.

The experiences of designers revealed that some individuals were already capable of using intuition as an intentional tool even before the commencement of the intuition coaching course. Most of the participants found more methods, whilst others were able to practise intentional intuitive processing and apply some working methods of utilizing intuition. It turned out that a single course helped most people to intuit, although there was variation between individuals. However, the amount of impact was not measured and, therefore, the degree of actual impact remained unclear, especially given that intuition development seemed to continue after the courses.

The outcomes revealed that for some individuals it was difficult to skilfully develop their intuition despite their sincere wish to do so. This may result from a lack of knowledge as to how intuition actually develops and how it can be best enhanced. Is intuition expanding, deepening or becoming multidimensional when developed? How are different types of intuition connected or related? How can the most revolutionary types of intuition be activated or developed? How can different types of people be best supported? These questions are all beyond current understanding, since little is known about the actual process of intuiting. However, from the design process and design education points of view, it is essential that these issues are researched.

The research resulted in some additional findings, which had not being part of the initial objectives. A meaningful new discovery was to realize that some designers use so-called confirmations when evaluating the reliability of their personal intuitive insights. As intuition is traditionally seen to be quite an unreliable form of information, yet at the same time superior to conscious reasoning in some situations, being able to evaluate the reliability of intuition has become extremely important. Equally important is the discernment of the possible biasing effects of intuitive information. For some individuals, the use of confirmations and biases seemed to work quite well. The personal stories, combined with consideration of the current literature, guided me to come to a new understanding of designers' intuitions: I was able to construct a tentative hypothesis and a practical application concerning the development and reliability of intuition. Whether these personal methods of evaluating

the reliability of intuition are then applicable on a wider scale is unclear but plausible. Even though the ideas presented in this research are tentative and based on a limited sample, the aspects of evaluating the reliability of intuition through confirmations and biases is a novel approach.

The world is full of artefacts and critical problems and ambiguity. Ongoing technological developments are not enough to solve the world's challenges. Though technological development is important, intuition can offer enormous, as yet untapped, potential to reach unknown, technical and non-technical solutions. At its best, intuition can be used intentionally to make progress in both of these areas. Further, the prevailing paradigm predefines the future problem area, which then narrows and initiates possible future solutions. However, if a person wants to search for radical breakthrough innovations with extreme novelty, then looking beyond the current paradigm is crucial. To succeed in this process, the use of intentional intuition is imperative. Generally, we are unaware of what we could possibly know. Through intuition, the approach to the unknown can be widened and these unknowns may become knowable. Through active and intentional intuitive processing, a person can gain clarity from ambiguity, reach beyond their own domain expertise, achieve exceptional outcomes and surpass the limits of the mind.

It is obvious that there is an urgent need to educate people who specialize in solving seemingly impossible problems and managing impossible situations. According to my teaching experience, the number of design students who feel a need to tackle such challenges is constantly growing. However, these students need guidance and support, both with external processes, such as design practice, and internal processes, such as the use of expanded thinking and integrated intelligence. There is no excuse for leaving these students alone, especially when methods exist that develop the skills required for wicked problem solving. For the purpose of this, I have outlined some pedagogical guidelines for intuition development.

Solving the seemingly impossible is based on developing abilities to think and act beyond current limitations. This is rooted in mental processes, including the development of the internal creative process and intuitive processing, as well as multidisciplinary

knowledge building and shared expertise between people. Dealing with a particularly wicked, or extremely challenging, problem requires facing very deep unknowns that can shake the foundations of one's personal beliefs. In the best case, facing the unknown and being able to go beyond it may result in a transformative learning experience. Based on one case study, the use of intuitive and empathetic skills in a trustful group and applying the information simultaneously to real-world problems, allowed designers to surpass the limits of their expertise and go beyond the ordinary. Further, when a student has a transformative experience, it may empower them and change their belief in their inner potential for the rest of their life. When this process takes place in a group, it can create empowered communities.

Future emphasis in design education should include an increasing amount of support targeted at the development of internal processes. As stated earlier, several examples of Nobel laureates reveal that, when facing seemingly impossible problems, an important act is to "work with oneself" instead of just working "on the problem". This method strongly contradicts the standard problem-solving approach, in which, when faced with a challenge, a person searches for new data, carries out deeper rational analysis and heightens conscious reasoning. However, it is time to reinforce the process by including internal information as one of its parts, or to shift the focus partly from the outer to the inner. From this perspective, the intentional use and development of intuitive faculties are fundamental. The ability to see and access information that is not easily seen by everybody, for example meaningful outliers, tacit knowledge or weak signals, requires sensitivity, including good inner perception and good discernment skills. Legitimizing intuition and crediting people who are able to acquire these meaningful or even precious data should be valued and acknowledged, otherwise the potential of intuition can be lost.

The discussions and interviews conducted during the research underline the importance of constructive discussion in the area of intuition. As stated recently by numerous scholars, open-minded, extensive research, as well as a radical change in its theoretical foundation, is needed to allow a meaningful discussion about intuition,

human consciousness and extraordinary phenomena. This requires actions also in the area of design research and design education since these areas need to react to new and more complex challenges and are for their part responsible for designing the future.

The research on intuition and intuition development requires courage both to test new methods and to present new ideas, and also when facing doubt or denigration. Often, new frontiers in science have been belittled (*"that doesn't prove anything"*), labelled (*"quack treatments"*) or shot down with false arguments (*"the research setting was not a proper one"* – even if it was). Working in new frontiers requires courage to make mistakes, humbleness to admit being wrong and strength to continue despite everything. Despite these challenges, further research on intuition is needed. The area also needs development of research units – but before this, intuition needs to be better understood. It is essential to understand how to measure this phenomenon such that its multidimensional nature is not restricted or narrowed. This, therefore, requires cooperation and research with other scientific domains. I am also convinced that there is much to learn and research if we take a closer look at the experiences and methods used by highly intuitive designers.

I am aware that my work may be exposed to premature generalization as well as misleading steps. At the same time, I think it opens up a corner of untapped potential and brings intuition to the forefront, unveiling what is hidden inside designers' heads and hearts. Therefore, I consider my work as an important opening, which hopefully gives visibility to this phenomenon, which has been bypassed and ignored. Since intuition is stigmatized in our culture, it causes unnecessary suffering to those individuals who are already capable of benefiting from intuitive information. They have to cover themselves by basing their decisions on pure conscious reasoning while hiding the existence of incoming intuitive information, which, in some cases, they rate as being very accurate and reliable.

Regarding the outcomes of this study, rather than providing solid proof any single aspect of intuition, they refer to wider perspectives connected to the areas of design practice and design education. I hope this work will provide tools and methods to individual designers and design education, in general, and that it will encourage

support for the development of mental skills and internal processes. Further, I hope that this work will encourage other people to research intuition further. The fields to which intuitive information can be applied are many. In fact, I am unaware of any area where accurate and reliable intuitive information could not be of benefit.

Study conclusions

The conclusions presented are based on the research carried out on designers' intuitions. The group used in this study consisted of university-level design students, practising designers, design teachers and some highly intuitive individuals. The research data were collected in semi-structured interviews, carried out in 2009-2012, and questionnaires completed by 33 design students and 20 university-level teachers. The data also include oral and written feedback collected from coaching courses, and selectively documented informal discussions that took place during intuition coaching sessions over the past 10 years with approximately 200 design students. The conclusions are made based on qualitative analysis and deduction of the research data. Even though the sample is small, the data collected give rise to some coherent statements. The outcomes are aligned with my personal observations made during teaching and coaching sessions over the past few years.

1. Intuitive experiences are very personal and the ways of intuiting vary

The research data collected for this study clearly confirm that intuitive experiences are very personal and that there is great variety in the descriptions of same. Individual designers have different and often very personal understanding of intuition, based on their own experiences and common understanding. Further, individuals have different, very personal, ways of understanding the process of intuiting and use different methods to both intuit and to exploit their intuition.

There is also much diversity in how aware individuals are regarding their own intuition, its nature and the process of intuiting. According to the research data, paying attention to personal intuitive

moments, for example after the intuitive moment, can greatly help in recognizing personal intuition and, hence, increase the awareness of it.

Based on my coaching experience, I have found that design students, in particular, are not very familiar with either their own creative process or that of intuiting. This makes their intuiting process weak and vulnerable. However, they seem to be more adaptive and flexible in their thinking than university-level teachers. Students are more willing to share intuitive experiences and to publicly step out of their comfort zone.

Some designers have highly personal experiences of intuition. These may include non-bodily feelings, extraordinary sensations or extrasensory perceptions. Due to the special nature of these experiences, they are usually kept hidden. An individual often feels insecure when facing such experiences, but when the experience is shared the person feels relief.

2. Intuitive experiences need legitimization

The oral and written feedback obtained from intuition coaching courses reveals that many participants felt that their intuitive processing and intuitive experiences had become legitimized due to their own intuition development as a result of the course. The process of legitimization requires rational accepting of both the phenomenon and the personal experiences. If personal experiences are extraordinary by their nature, it requires widening of one's perspective to encompass new dimensions of understanding, sensing and knowing.

Assessing intuitive experiences by the normative use of cognitive models can have a detrimental effect on understanding the nature of intuition as well as on its exploitation. In such cases, intuitive experiences can be denied or corrupted, they can be made to conform to non-descriptive models, or explanations given that make no sense to the person experiencing the intuition. Therefore, the current cognitive models of intuition are not enough but, when supplemented with alternative models, they are usually of benefit to many designers.

The use of other designers' stories and of alternative models of intuition contributes to making the experiences of intuition accepta-

ble – even if they are extraordinary by nature. This seems to increase both trust in personal intuition and in its use. The stories also legitimize the existence of highly personal experiences and, hence, make the sharing of personal experiences easier. In addition, these experiences usually foster the transformative learning of intuition and can lead to significant leaps in intuitive processing in the design process. In particular, if the objective is to develop intuition, it is essential to foster personal intuition, to make sense of personal intuitive experiences and to search for ways to support personal styles of intuiting.

The legitimization seems to be important to everyone, but especially to those individuals who can sense subtle signals and who have extraordinary experiences and who, therefore, struggle most with the incongruity of trusting themselves while feeling excluded by others. Currently, intuition has a cultural stigma attached to it. Therefore, its legitimization is an essential step on the way to developing intuition further as an intentional skill.

3. Intuition is a continuum and it can be developed

The descriptions given by the designers reveal that the preferable methods of intuiting vary between individuals. Therefore, the ways of developing intuition are also different. The research data from the questionnaires and feedback given by the students strongly suggest that intuition can be developed. In addition, the data suggest that with practice intuition can be used more intentionally, meaning an individual can attune to intuition and acquire information. This is in line with my own observations in intuition coaching sessions. Even a single course can activate and enhance intuitive processing and increase acceptance of it, which is promising. An encouraging outcome is that sometimes even a couple of exercises can help a person to access their embodied intuitive information, of which they have been previously unaware. However, for some individuals, an assured inner contact with their intuitive faculties and development of their intuition seem to be difficult.

The development of intuitive skills is strongly based on personal observations of intuitive moments and practical intuitive processing. The data collected from follow-up questionnaires after

the teachers' course on intuition development reveals an interesting outcome. Methods of utilizing intuition increased during the course, and continued to increase also after the course. This may vaguely suggest that intention and paying attention to intuition with an open mind may have an impact on intuition development.

The interviews and observations from coaching courses suggest that intuition development is a continuum – even though the continuum is partly unmapped and there are many unknown issues. This research neither targets nor answers the following questions: how can a certain type of intuition be best developed; how does the actual development take place; and which intuition dimension is being developed. There are alternative possibilities that involve the processes of widening and deepening existing intuitive skills or integrating them with new skills.

4. Development of intuitive skills can be supported

The material collected through questionnaires and through informal discussions during coaching sessions confirms that most of the designers felt that the course on intuition development strongly supported their personal process of intuiting. The outcomes reveal that all the students and the majority of the teachers who participated in the intuition coaching courses learned new methods for utilizing their intuition, which, therefore, can be considered proof of the development potential and the impact of such courses. However, some of the university teachers have not been able to find applicable methods that work well for accessing and utilizing their personal intuition.

Courses on intuition development can support a person by legitimizing intuitive experiences and by offering an atmosphere of trust and support to explore the personal intuitive process through exercises and discussions. According to the feedback, in many cases comprehension of the intuiting process increases the consciousness of personal intuitive perceptions. This creates new methods for exploiting intuition in creativity and decision making.

This process seems to cause a positive loop, where intuitive processing increases understanding about intuition, which then in-

creases readiness to benefit from intuition more often. However, there is variation between individuals. For some, it is extremely easy to sense the intuitive signals, for example through embodied cognition, while for others it is challenging.

In intuition development courses the issues that either block or support intuition are handled systematically. The exercises, stories, research-based informative material and group discussions form a whole that seems to help many individuals to better accept the role of intuitive information. As a result of such courses, participants find it easier to attune to intuition as well as to accept, trust, observe and test personal intuitive experiences and, hence, develop intuition. The role of a group comprising supportive peers is reported as playing an important part in this process.

The effectiveness of teaching intuition in small groups is obvious. Intuition operates in the area of uncertainty and many experiences are either difficult to describe or highly personal. An atmosphere of trust is essential since it allows the sharing of valuable personal observations of intuitive experiences, moments of hesitation, interpretations and vague preliminary thoughts. According to student feedback, when hearing stories told by others, the students are more open to sharing their own experiences. Sometimes it is important for a student to verbalize these personal experiences aloud, since it brings relief, increases understanding of the personal process, and acceptance of oneself. Discussions also encourage students to exchange mental models and attitudes with each other: understanding the varying ways to intuit and make decisions helps to widen the personal perspective and to accept contradictory work methods.

According to the data collected from questionnaires and through discussions, after the intuition development course students' attitudes towards their own intuition became more accepting. They consciously utilize intuition, in almost every case. It therefore seems that the course particularly increased utilization of intuition. Further, the students report an increased interest in trying out new methods to recognize and activate their personal intuition, as well as a desire to continue developing intuition further – even though all the exercises practised in the course do not work perfectly for everyone. These results support the outcomes from two teachers'

courses on intuition development: a single course on intuition can help to increase the amount of thinking on intuition and affect the quality of the thinking.

5. Using intuition may bring exceptional outcomes

Research data collected from one digital media study project and from several informal discussions with design students suggest that intentional intuitive processing may help to exceed the limits of personal expertise and result in exceptional outcomes. This observation is in keeping with my own design experience involving symbol design in the *Global Dignity* project.

Intentional intuiting can achieve exceptional outcomes and the results can far exceed expectations. In the study project *A Different Journey*, students were given a single design goal, but in the end they fulfilled nine. None of the students would have dared to take on such a challenge if the results achieved had been set as the project goals. Yet guided by intuition, they gained the courage to go beyond expectations. Based on the discussions with the design team, recognition of weak signals as confirmed by the group and the ability to value these signals seemed to be an important part of the intuitive process. Further, this single case suggests that working with oneself may be an essential component of intuitive problem solving.

6. Methods exist for evaluating the reliability of intuitive information

The interviews and discussions with designers and other intuitive people reveal that personal methods of evaluating intuitive information vary. Some described using special signals or subtle sensing, which relates to the quality of intuitive information. These signals are very personal, their nature varies, and different people utilize different types of signals. Particularly highly intuitive people and those who use a lot of intuition reported the importance of these signals as personal confirmations that underline the reliability or accuracy of intuitive insight. Further, some signals were reported as working conversely, underlining the biased and unreliable nature of the intuitive insight. This research outcome suggests that there are

individual methods for evaluating intuitive information, especially its reliability and accuracy. Whether these evaluation methods, the use of confirmations and recognition of biases, are more general or even applicable to intuition development is still unknown. However, further research would open up new possibilities to benefit the wide and untapped potential of the human mind.

The questions asked in intuition questionnaires targeted to Aalto University design students and Aalto University teachers.

The questions asked were:

● How would you *describe* your intuition?

● How you *understand* the process of intuiting? Where intuition comes from or how it works?

● How do you *use* your intuition in your work / life?

● How would you like to *develop* your intuition?

● How could intuition *help* you in your work?

● How could you *support* your students in the use or development of their intuition?

● How you wish your *students* could *utilize* intuition?

● These questions were used in the questionnaire before the course and after the course.

The extra question included in the questionnaire after the course was:

● Have you got yourself new *methods* to advantage intuition? If yes, please describe them.

In the follow-up questionnaire sent to Aalto University teachers 6–10 months after the course, contained the following questions:

The questions asked were:

● Have you been thinking intuition related issues? If yes, are you thinking them less or more than before the course and how important they are to you?

● What kind of thoughts related to intuition have you been thinking, what kind of observations and perceptions have you made?

● Have you utilized your personal intuition in your work / teaching / tutoring etc.? I so, please describe how.

● Have you found new methods for utilizing your intuition? If, so please describe what kind of methods.

● Have you given a possibility to your student to use intuition or actively encouraged your students / other people to use their intuition. If so, please describe how.

REFERENCES

Acarya, A. A. (1982) ● *Beyond the Superconscious Mind* ● Manila: Ananda Marga Publications ●

Agor, W. H. (1989) ● *Intuition in Organizations: Leading and Managing Productively* ● Newbury Park, Calif: Sage Publications ●

Anthony, M. (2003) ● Integrated Intelligence: The Future of Intelligence? ● *Journal of Futures Studies, 8*(2), 39–54 ●

Aron, E. (2006) ● The clinical implications of Jung's concept of sensitiveness ● *Journal of Jungian Theory and Practice, 8*, 11–43 ●

Aron, E., & Aron, A. (1997) ● Sensory-processing sensitivity and its relation to introversion and emotionality ● *Journal of Personality and Social Psychology, 73*, 345–368 ●

Arvidson, P. S. (1997) ● Looking intuit: A Phenomenological Exploration of Intuition and Attention ● In R. Davis-Floyd & P. S. Arvidson (Eds.), *Intuition: The Inside Story: Interdisciplinary Perspectives* (pp. 39–56) ● New York: Routledge ●

Atkinson, T., & Claxton, G. (2000) ● Introduction ● In T. Atkinson & G. Claxton (Eds.), *The intuitive practitioner: on the value of not always knowing what one is doing* (pp. 1–12) ● Buckingham, UK: Open University Press ●

Bastick, T. (2003) ● *Intuition: Evaluating the construct and its impact on creative thinking* ● Stoneman & Lang ●

Baylor, A. L. (2001) ● A U-shaped model for the development of intuition by level of expertise ● *New Ideas in Psychology, 19*(3), 237–244 ● doi:10.1016/S0732-118X(01)00005-8 ●

Beauregard, M., Schwartz, G. E., Miller, L., Dossey, L., Moreira-Almeida, A., Schlitz, M., ... Tart, C. (2014) ● Manifesto for a Post-Materialist Science ● *Explore: The Journal of Science and Healing, 10*(5), 272–274 ● doi:10.1016/j.explore.2014.06.008 ●

Bechara, A. (2004) ● The role of emotion in decision-making: evidence from neurological patients with orbitofrontal damage ● *Brain and Cognition, 55*(1), 30–40 ● doi:10.1016/j.bandc.2003.04.001 ●

Bechara, A., Damasio, H., Tranel, D., & Damasio, A. (1997) ● Deciding Advantageously Before Knowing the Advantageous Strategy ● *Science, 275*(5304), 1293–1295 ● doi:10.1126/science.275.5304.1293 ●

Bem, D. J. (2011) ● Feeling the future: Experimental evidence for anomalous retroactive influences on cognition and affect ● *Journal of Personality and Social Psychology, 100*(3), 407–425 ● doi:10.1037/a0021524 ●

Bereiter, C. (1993) ● *Surpassing ourselves: an inquiry into the nature and implications of expertise* ● Chicago: Open Court ●

Bergson, H. (1991) ● *Matter and memory* ● New York: Zone Books ●

Bergson, H. (2007) ● *The creative mind: an introduction to metaphysics* ● Mineola, N.Y: Dover Publications ●

Betsch, T. (2008) ● The nature of intuition and its neglect in research on judgment and decision making ● In H. Plessner, C. Betsch, & T. Betsch (Eds.), *Intuition in Judgment and Decision Making* (pp. 3–22) ● New York: Lawrence Erlbaum Associates ●

Boden, M. A. (1994) ● What is Creativity? ● In M. A. Boden (Ed.), *Dimensions of Creativity* (pp. 75–117) ● Cambridge, Mass: MIT Press ●

Boden, M. A. (2010) ● *Creativity and art: three roads to surprise* ● Oxford ; New York: Oxford University Press ●

Bohm, D. (1987) ● *Science, order, and creativity* ● Toronto ; New York: Bantam Books ●

Boucouvalas, M. (1997) ● Intuition: The Concept and the Experience ● In R. Davis-Floyd & P. S. Arvidson (Eds.), *Intuition: The Inside Story: Interdisciplinary Perspectives* (pp. 3–18) ● New York: Routledge ●

Bowden, E., Jung-Beeman, M., Fleck, J., & Kounios, J. (2005) ● New approaches to demystifying insight ● *Trends in Cognitive Sciences, 9(7)*, 322–328 ● doi:10.1016/j.tics.2005.05.012 ●

Bowden, J., & Marton, F. (2004) ● *The University of Learning: Beyond Quality and Competence* ● London; Sterling, VA: Routledge ●

Bowden, J., & Walsh, E. (Eds.) (2000) ● *Phenomenography* ● Melbourne: RMIT Univ. Press ●

Brennan, B. A. (1987) ● *Hands of Light: A Guide to Healing Through the Human Energy Field: A New Paradigm for the Human Being in Health, Relationship, and Disease* ● N.Y.: Pleiades Books ●

Bruner, J. S. (1960) ● *The Process of Education* ● Cambridge: Harvard University Press ●

Bruner, J. S. (1986) ● *Actual minds, possible worlds* ● Cambridge, Mass: Harvard University Press ●

Bunge, M. A. (1962) ● *Intuition and science* ● Englewood Cliffs, N.J: Prentice-Hall ●

Burnette, C. (n.d.-a) ● An Emotional Basis for Design Thinking ● Retrieved October 19, 2014, from http://www.academia.edu/251044/An_Emotional_Basis_for_Design_Thinking ●

Burnette, C. (n.d.-b) ● Creativity in Design Thinking ● Retrieved October 19, 2014, from http://www.academia.edu/3737301/Creativity_in_Design_Thinking ●

Burnette, C. (n.d.-c) ● Intuition, Imagination, and Insight in Design Thinking ● Retrieved May 20, 2014, from http://www.academia.edu/3737350/Intuition_Imagination_and_Insight_in_Design_Thinking ●

Cardeña, E. (2014) ● A CALL FOR AN OPEN, INFORMED STUDY OF ALL ASPECTS OF CONSCIOUSNESS ● *Frontiers in Human Neuroscience, 8:*, 17 ● doi:10.3389/fnhum.2014.00017 ●

Cartwright, T. (2004) ● *Developing Your Intuition: A Guide to Reflective Practice* ● Center for Creative Leadership ●

Celen, R. (2008) ● *A Different Journey – The puzzle behind the production* ● *Master's Thesis.* Helsinki: Media Lab, Univeristy of Art and Design Helsinki ●

Claxton, G. (2000) ● The anatomy of intuition ● In T. Atkinson & G. Claxton (Eds.), *The Intuitive Practitioner: On the Value of Not Always Knowing What One Is Doing* (pp. 32–52) ● Buckingham: Open University Press ●

Courteney, H. (2010) ● *Countdown to coherence: a spiritual journey toward a scientific theory of everything* ● London: Watkins ●

Cross, N. (2004) ● Expertise in design: an overview ● *Design Studies, 25*(5), 427–441 ● doi:10.1016/j.destud.2004.06.002 ●

Cross, N., Christiaans, H., & Dorst, K. (1994) ● Design Expertise Amongst Student Designers ● *Journal of Art & Design Education, 13*(1), 39–56 ● doi:10.1111/j.1476-8070.1994.tb00356.x ●

Csikszentmihalyi, M. (1996) ● *Creativity: flow and the psychology of discovery and invention* (1st ed.) ● New York: HarperCollinsPublishers ●

Csikszentmihalyi, M., & Csikszentmihalyi, I. S. (Eds.) (1988) ● *Optimal experience: psychological studies of flow in consciousness* ● Cambridge ; New York: Cambridge University Press ●

Damasio, A. (1994) ● *Descartes' Error: Emotion, Reason, and the Human Brain* ● N.Y.: Putnam ●

Damasio, A., & Carvalho, G. B. (2013) ● The nature of feelings: evolutionary and neurobiological origins ● *Nature Reviews Neuroscience, 14*(2), 143–152. doi:10.1038/nrn3403 ●

Dane, E., & Pratt, M. G. (2009) ● Conceptualizing and Measuring Intuition: A Review of Recent Trends ● In *International Review of Industrial and Organizational Psychology* (Vol. 24, pp. 1–40) ● Wiley ●

Daniels, S., & Piechowski, M. M. (2008) ● *Living with intensity: emotional development of gifted children, adolescents, and adults* ● Scottsdale, AZ: Great Potential Press ●

Davis-Floyd, R., & Davis, E. (1997) ● Intuion as Authorative Knowledge in Midwifery and Homebirth ● In *Looking intuit: A Phenomenological Exploration of Intuition and Attention* (pp. 145–176) ● New York: Routledge ●

Dayan, M., & Di Benedetto, C. A. (2011) ● Team intuition as a continuum construct and new product creativity: The role of environmental turbulence, team experience, and stress ● *Research Policy, 40*(2), 276–286 ● doi:10.1016/j.respol.2010.10.002 ●

Dennett, D. C. (2013) ● *Intuition pumps and other tools for thinking* (First edition) ● New York: W. W. Norton & Company ●

Dijksterhuis, A., Aarts, H., & Smith, P. K. (2005) ● The Power of the Subliminal: On Subliminal Persuasion and Other Potential Applications ● In R. R. Hassin, J. S. Uleman, & J. A. Bargh (Eds.), *The new unconscious* (pp. 77–106) ● New York, NY, US: Oxford University Press ●

Dijksterhuis, A., Bos, M. W., Nordgren, L. F., & van Baaren, R. B. (2006) ● On Making the Right Choice: The Deliberation-Without-Attention Effect ● *Science, 311*(5763), 1005–1007 ● doi:10.1126/science.1121629 ●

Dörfler, V., & Ackermann, F. (2012) ● Understanding Intuition: The Case for Two Forms of Intuition ● *Management Learning.* doi:10.1177/1350507611434686 ●

Dossey, L. (2009) ● *The Power of Premonitions: How Knowing the Future Can Shape Our Lives* ● New York, N.Y: Dutton ●

Dossey, L. (2013) ● *One mind: how our individual mind is part of a greater consciousness and why it matters* (1st edition) ● Carlsbad, California: Hay House, Inc ●

Dunne, B. (1997) ● Subjectivity and Intuition in the Scientific Method ● In R. Davis-Floyd & P. S. Arvidson (Eds.), *Intuition: The Inside Story: Interdisciplinary Perspectives* (pp. 121–128) ● New York: Routledge ●

Enkenberg, J. (2001) ● Instructional design and emerging teaching models in higher education ● *Computers in Human Behavior, 17*(5–6), 495–506 ● doi:10.1016/S0747-5632(01)00021-8 ●

Ericsson, K. A. (1999) ● Creative expertise as superior reproducible performance: Innovative and Flexible Aspects of Expert Performance ● *Psychological Inquiry, 10*(3), 329–361 ● doi:10.1207/S15327965PLI1004_5 ●

Ericsson, K. A. (2006) ● *The Cambridge Handbook of Expertise and Expert Performance* ● Cambridge: Cambridge University Press ●

Ericsson, K. A. (2008) ● Attaining Excellence Through Deliberate Practice: Insights from the Study of Expert Performance, 4 – 37 ● doi:10.1002/9780470690048.ch1 ●

Ericsson, K. A., Krampe, R. T., & Tesch-Römer, C. (1993) ● The role of deliberate practice in the acquisition of expert performance ● *Psychological Review, 100*(3), 363–406 ● doi:10.1037/0033-295X.100.3.363 ●

Evans, J., & Frankish, K. (2009) ● The duality of mind: An historical perspective ● In J. Evans & K. Frankish (Eds.), *In Two Minds: Dual Processes and Beyond* (pp. 1–28) ● Oxford: Oxford University Press ●

Fischbein, E. (1987) ● *Intuition in Science and Mathematics: An Educational Approach* ● Dordrecht: D. Reidel ●

Flynn, B. (2011) ● Maurice Merleau-Ponty. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Fall 2011.) ● Retrieved from http://plato.stanford.edu/archives/fall2011/entries/merleau-ponty/ ●

Frank, M. J., O'Reilly, R. C., & Curran, T. (2006) ● When memory fails, intuition reigns: midazolam enhances implicit inference in humans ● *Psychological Science: A Journal of the American Psychological Society / APS, 17*(8), 700–707 ● doi:10.1111/j.1467-9280.2006.01769.x ●

Gardner, H. (1991) ● *The unschooled mind: how children think and how schools should teach* ● New York: BasicBooks ●

Gibbs, G., Morgan, A., & Taylor, E. (1982) ● A review of the research of Ference Marton and the Goteborg Group: A phenomenological research perspective on learning ● *Higher Education, 11*(2), 123–145 ● doi:10.1007/BF00139684 ●

Gigerenzer, G. (2007) ● *Gut Feelings: The Intelligence of the Unconscious* ● New York: Viking ●

Gladwell, M. (2007) ● *Blink: The Power of Thinking Without Thinking* (1st Back Bay trade pbk. ed.) ● New York: Back Bay Books ●

Gladwell, M. (2008) ● *Outliers: the story of success* (Large type large print ed.) ● New York, NY: Little, Brown and Co ●

Glöckner, A., & Witteman, C. (2010) ● Foundations for tracing intuition: Models, findings, categorizations ● In A. Glöckner & C. Witteman (Eds.), *Foundations for tracing intuition: Challenges and methods* (pp. 1–23) ● Hove, East Sussex, New York, NY: Psychology Press & Routledge ●

Goel, V. (1995) ● *Sketches of Thought* ● The MIT Press ●

Goel, V., & Pirolli, P. (1992) ● The structure of design problem spaces ● *Cognitive Science, 16*(3), 395–429 ● doi:10.1016/0364-0213(92)90038-V ●

Goffin, K., & Koners, U. (2011) ● Tacit Knowledge, Lessons Learnt, and New Product Development ● *Journal of Product Innovation Management, 28*(2), 300–318 ● doi:10.1111/j.1540-5885.2010.00798 ●

Goldschmidt, G. (2001) ● Visual Analogy – A Strategy for Design reasoning and Learning ● **In C. M. Eastman & W. M. McCracken** (Eds.), *Design-Knowing and Learning: Cognition in Design Education* ● Oxford, UK: Elsevier ●

Gonçalves, M., Cardoso, C., & Badke-Schaub, P. (2014) ● What inspires designers? Preferences on inspirational approaches during idea generation ● *Design Studies, 35*(1), 29–53 ● doi:10.1016/j.destud.2013.09.001 ●

Guiley, R. (2001) ● *Breakthrough Intuition: How to Achieve a Life of Abundance by Listening to the Voice Within* (Berkley trade pbk. ed.) ● New York: Berkley Books ●

Hammond, K. R. (2007) ● *Beyond rationality: the search for wisdom in a troubled time* ● Oxford; New York: Oxford University Press ●

Harbort, B. (1997) ● Thought, Action and Intuition in Practice-Oriented Disciplines ● In R. Davis-Floyd & P. S. Arvidson (Eds.), *Intuition: The Inside story* ● London: Routledge ●

Hardman, D. (2009) ● *Judgment and Decision Making* ● Malden, MA: Wiley-Blackwell ●

Hassin, R. R., Uleman, J. S., & Bargh, J. A. (2005) ● *The New Unconscious* ● Oxford Univ. Press ●

Hayles, K. (2014) ● Cognition Everywhere: The Rise of the Cognitive Nonconscious and the Costs of Consciousness ● *New Literary History, 45*(2), 199–220 ● doi:10.1353/nlh.2014.0011 ●

Hayles, K. (n.d.) ● *Cognition Everywhere: The Rise of the Cognitive Nonconscious* ● unpublished ●

Hogarth, R. M. (2001) ● *Educating Intuition* ● Chicago: University of Chicago Press ●

Hogarth, R. M. (2008) ● On the learning of intuition ● In H. Plessner, C. Betsch, & T. Betsch (Eds.), *Intuition in Judgment and Decision Making* (pp. 91–105) ● New York: Lawrence Erlbaum Associates ●

Holton, G. J. (1973) ● *Thematic origins of scientific thought; Kepler to Einstein* ● Cambridge, Mass: Harvard University Press ●

Holton, G. J. (1978) ● *The scientific imagination: case studies* ● Cambridge, [Eng.]; New York: Cambridge University Press ●

Holyoak, K. J. (1995) ● *Mental leaps: analogy in creative thought* ● Cambridge, Mass: MIT Press ●

Honkasalo, M.-L. (2008) ● *Reikä sydämessä* ● Tampere: Osuuskunta Vastapaino ● Retrieved from https://www.ellibslibrary.com/book/978-951-768-260-2/reika-sydamessa ●

Honkasalo, M.-L. (2009) ● Hole in the heart: Loss and bereavement among North Karelian women ● In S. van der Geest & M. Tankink (Eds.), *Theory and Action* (pp. 96–103) ● Amsterdam: Amsterdam University Press ●

Honkasalo, M.-L. (2013) ● Katveessa – pieni toimijuus kriittisenä avauksena toiminnan teoriaan ● *Tiede & Edistys, 38*(1), 42–61 ●

Hotanen, J. (2003) ● Merleau-Pontyn fenomenologinen paluu alkuperäiseen havaintoon ● *Niin & näin: filosofinen aikakauslehti, 10*(4), 58–65 ●

Houtman, D., & Aupers, S. (2007) ● The Spiritual Turn and the Decline of Tradition: The Spread of Post-Christian Spirituality in 14 Western Countries, 1981-2000 ● *Journal for the Scientific Study of Religion, 46*(3), 305–320 ●

Husserl, E., & Husserl, E. (1999) ● *The idea of phenomenology* ● Dordrecht; Boston: Kluwer Academic ●

Huttunen, M. (2013) ● *Lääketieteellinen Aikakauskirja Duodecim, 129*(23), 2453–7 ●

Hyppänen, O. (2013) ● Decision Makers' Use of Intuition at the Front End of Innovation ● Retrieved from https://aaltodoc.aalto.fi:443/handle/123456789/8843 ●

IONS, Institute of Noetic Sciences. (2014) ● [Homepage] ● Retrieved from http://noetic.org/about/what-are-noetic-sciences/ ●

Jagiellowich, J., Xu, X., Aron, E., Aron, A., Cao, G., Feng, T., & Weng, X. (2010) ● The trait of sensory processing sensitivity and neural responses to changes in visual scenes ● *Social Cognitive and Affective Neuroscience, 6,* 38–47 ●

Järvilehto, L. (forthcoming) ● *The Nature and Function of Intuitive Thought and Decision Making* ● Springer ●

Jones, J. C. (1992) ● *Design methods* (2nd ed.) ● New York: Van Nostrand Reinhold ●

Jung-Beeman, M. (2008) ● How Insight Happens: Learning From the Brain ● *NeuroLeadership Journal, 1,* 20–25 ●

Jung, C. G. (1915) ● *The theory of psychoanalysis* ● New York: The Journal of nervous and mental disease publishing company ●

Jung, C. G. (1956) ● *Two essays on analytical psychology* ● New York: Meridian Books ●

Jung, C. G., & Jung C. G. (1959) ● *The archetypes and the collective unconscious* ● New York: Pantheon Books ●

Kahneman, D. (2003) ● A perspective on judgment and choice: mapping bounded rationality ● *The American Psychologist, 58*(9), 697–720 ● doi:10.1037/0003-066X.58.9.697

Kahneman, D. (2011) ● *Thinking, fast and slow* (1st ed.) ● New York: Farrar, Straus and Giroux ●

Kahneman, D., & Tversky, A. (1982) ● Judgment under uncertainty: Heuristics and biases ● In D. Kahneman & A. Tversky (Eds.), *Judgment Under Uncertainty: Heuristics and Biases* (pp. 3–22) ● Cambridge: Cambridge University Press ●

Kalsched, D. (1996) ● *The inner world of trauma: archetypal defenses of the personal spirit* ● London, New York: Routledge ●

Kautz, W. H. (2005) ● *Opening the inner eye: explorations on the practical application of intuition in daily life and work* ● New York: iUniverse ●

Keller, E. F. (1983) ● *A feeling for the organism: the life and work of Barbara McClintock* ● San Francisco: W.H. Freeman ●

Klein, G. (1998) ● *Sources of Power: How People Make Decisions* ● Cambridge, Mass: MIT Press ●

Klein, G. (2004) ● *The Power of Intuition: How to Use Your Gut Feelings to Make Better Decisions at Work* ● Crown Business ●

Kolko, J. (2009) ● Abductive Thinking and Sensemaking: The Drivers of Design Synthesis ● *Design Issues, 26*(1), 15–28 ● doi:10.1162/desi.2010.26.1.15 ●

Kujala, M. (2010) ● Social perception and cognition: processing of gestures, postures and facial expressions in the human brain [PhD Dissertation] ● Retrieved January 15, 2014, from https://helda.helsinki.fi/handle/10138/19768 ●

Laamanen, T.-K., & Seitamaa-Hakkarainen, P. (2014) ● Interview Study of Professional Designers' Ideation Approaches ● *The Design Journal, 17*(2), 194–217. doi:10.2752/175630614X13915240575988 ●

Lahti, H., Seitamaa-Hakkarainen, P., & Hakkarainen, K. (2004) ● Collaboration patterns in computer supported collaborative designing ● *Design Studies, 25*(4), 351–371 ● doi:10.1016/j.destud.2003.12.001 ●

Lakoff, G. (1980) ● *Metaphors we live by* ● Chicago: University of Chicago Press ●

Lakoff, G. (1999) ● *Philosophy in the flesh: the embodied mind and its challenge to Western thought* ● New York: Basic Books ●

Lappalainen, P. (2012) ● *Socially Competent Leadership - predictors, impacts and skilling in engineering* ● Lappeeenranta: Lappeenranta University of Technology ●

Larsson, U. (2001) ● *Cultures of creativity: the centennial exhibition of the Nobel prize* ● Canton, MA: Science History Publications ●

Laszlo, E. (2004) ● *Science and the Akashic field: an integral theory of everything* ● Rochester, Vt: Inner Traditions ●

Laszlo, E. (2009) ● In Defense of Intuition: Exploring the Physical Foundations of Spontaneous Apprehension ● *Journal of Scientific Exploration, 23*(1), 51 ●

Laughlin, C. (1997) ● The Nature of Intuition: A Neurophysiological Approach ● In R. Davis-Floyd & P. S. Arvidson (Eds.), *Intuition: The Inside Story: Interdisciplinary Perspectives* (pp. 19–37) ● New York: Routledge ●

Lawlor, L., & Moulard Leonard, V. (2013) ● Henri Bergson. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Winter 2013) ● Retrieved from http://plato.stanford.edu/archives/win2013/entries/bergson/ ●

Lawson, B. (1997) ● *How designers think: the design process demystified* (Completely rev. 3rd ed.) ● Oxford, Boston: Architectural Press ●

Lipton, B. H. (2005) ● *The biology of belief: unleashing the power of consciousness, matter and miracles* (1st ed.) ● Santa Rosa, CA: Mountain of Love/Elite Books ●

Mäkelä, M., & Numkulrat, N. (2011) ● Making Design Matter ● In I. Koskinen, T. Härkäsalmi, R. Mazé, B. Matthews, & J. J. Lee (Eds.), *Practise-led Design Research* (pp. 120–128) ● NORDES ●

Marton, F. (1997) ● *Learning and awareness* ● Mahwah, N.J: L. Erlbaum Associates ●

Marton, F. (2014) ● *Necessary Conditions of Learning* (1 edition.) ● New York u.a.: Routledge ●

Marton, F., Fensham, P., & Chaiklin, S. (1994) ● A Nobel's eye view of scientific intuition: discussions with the Nobel prize-winners in physics, chemistry and medicine (1970-86) ● *International Journal of Science Education, 16*(4), 457 ● doi:10.1080/0950069940160406 ●

Massumi, B. (2002) ● *Parables for the virtual: movement, affect, sensation* ● Durham, NC: Duke University Press ●

Mayer, E. (2007) ● *Extraordinary Knowing: Science, Skepticism, and the Inexplicable Powers of the Human Mind* ● New York: Bantam Books ●

McCraty, R., Atkinson, M., & Bradley, R. T. (2004a) ● Electrophysiological evidence of intuition: part 1 ● The surprising role of the heart ● *Journal of Alternative and Complementary Medicine (New York, N.Y.), 10*(1), 133–143 ● doi:10.1089/107555304322849057 ●

McCraty, R., Atkinson, M., & Bradley, R. T. (2004b) ● Electrophysiological evidence of intuition: Part 2. A system-wide process? ● *Journal of Alternative and Complementary Medicine (New York, N.Y.), 10*(2), 325–336 ● doi:10.1089/107555304323062310 ●

Merleau-Ponty, M. (1962) ● *Phenomenology of perception* ● New York: Humanities Press ●

Merleau-Ponty, M. (1968) ● *The visible and the invisible; followed by working notes* ● Evanston [Ill.]: Northwestern University Press ●

Mielonen, S., Keinänen, M., Raami, A., & Rouhiainen, L. (2009) ● Intuitive knowledge processes among design students, professional designers and expert intuitive practitioners ● In *Proceedings of the Communicating (by) Design 2009 conference* (pp. 85–93) ● Brussels: Sint-Lucas School of Architecture ● Retrieved from http://www.architectuur.sintlucas.wenk.be/index.php?id=3855 ●

Mielonen, S., Raami, A., Keinänen, M., & Rouhiainen, L. (2009) ● Designer's Highly Personal Experiences of Intuition - Modeling for Developing Intuition ● In *IASDR 2009 Proceedings, 18-22 September 2009*. Seoul: COEX ●

Mishlove, J. (1997) ● *The Roots of Consciousness: The Classic Encyclopedia of Consciousness Studies Revised and Expanded* (Rev Sub edition.) ● New York: Marlowe & Co ●

Monsay, E. H. (1997) ● Intuition in the Development of Scientific Theory and Practice ● In R. Davis-Floyd & P. S. Arvidson (Eds.), *Intuition: The Inside Story: Interdisciplinary Perspectives* (pp. 103–120) ● New York: Routledge ●

Myss, C. (2004) ● *Intuitive Power [your Natural Resource]* ● Carlsbad, CA: Hay House Audio ●

Myss, C. (2005) ● *Intuitive Power: Your Natural Resource* ● Hay House ●

Nabhaniilananda, D. (2005) ● *Close Your Eyes & Open Your Mind* ● *An introduction to spiritual meditation* ● London, UK: Ananda Marga Publications ●

Nadel, L. (2006) ● *Sixth Sense: Unlocking Your Ultimate Mind Power* (1st ed.) ● Lincoln, USA: ASJA Press ●

Nelson, H. G., & Stolterman, E. (2003) ● *The Design Way: Intentional Change in an Unpredictable World: Foundations and Fundamentals of Design Competence* ● Englewood Cliffs, N.J: Educational Technology Publications ●

Nordgren, L. F., Bos, M. W., & Dijksterhuis, A. (2011) ● The best of both worlds: Integrating conscious and unconscious thought best solves complex decisions ● *Journal of Experimental Social Psychology, 47*(2), 509–511 ● doi:10.1016/j.jesp.2010.12.007 ●

Nordgren, L. F., & Dijksterhuis, A. (2009) ● The Devil Is in the Deliberation: Thinking Too Much Reduces Preference Consistency ● *Journal of Consumer Research, 36*(1), 39–46 ● doi:10.1086/596306

Orloff, J. (2001) ● *The Power of Intuition* ●
Carlsbad, CA: Hay House ●

Orloff, J. (2007) ● *Beconing an Intuitive Healer:
A professional Development Course for Health
Practitioners* ● Boulder, U.S.A: Sounds True ●

Parviainen, J. (2006). *Meduusan liike : mobiiliajan
tiedonmuodostuksen filosofiaa* ● Helsinki, Finland:
Gaudeamus Kirja ● Retrieved from https://www.
ellibslibrary.com/book/9516629717/meduusan-liike-
mobiiliajan-tiedonmuodostuksen-filosofiaa ●

Pasteur, V.-R. (Ed.). (1939) ● *Oeuvres de Pasteur* ●
Paris, France: Masson and Co ●

Pearsall, P., Schwartz, G. E., & Russek, L. G.
(2005) ● Organ Transplants & Cellular Memories ●
Nexus Magazine, 12(3) ●

Pedgley, O. (2007) ● Capturing and analysing own
design activity ● *Design Studies,* (5), 463–483 ●
doi:10.1016/j.destud.2007.02.004 ●

Peirce, P. (2009) ● *Frequency: The Power of
Personal Vibration* ● Atria Books/Beyond Words ●

Peirce, P. (2013) ● *Leap of perception: the
transforming power of your attention* ● First Atria
Books/Beyond Words, hardcover edition ●

**Persinger, M. A., Roll, W. G., Tiller, S. G., Koren,
S. A., & Cook, C. M.** (2002) ● Remote viewing
with the artist Ingo Swann: neuropsychological
profile, electroencephalographic correlates,
magnetic resonance imaging (MRI), and possible
mechanisms ● *Perceptual and Motor Skills, 94*(3 Pt
1), 927–949 ●

Petitmengin-Peugeot, C. (1999) ● The intuitive
experience ● In F. Varela & J. Shear (Eds.), *The View
from Within: First-person Approaches to the Study
of Consciousness* (pp. 43–77) ● London: Imprint
Academic ●

Piatelli-Palmarini, M. (1994) ● *Inevitable illusions:
how mistakes of reason rule our minds* ● New York:
Wiley ●

Piechowski, M. M. (1979) ● Developmental
potential ● In N. Colangelo & R. T. Zaffrann (Eds.),
New Voices in Counseling the Gifted ● Dubuque, IA:
Kendall/Hunt ●

Piechowski, M. M. (1986) ● The concept of
developmental potential ● *Roeper Review* ● *Special
Issue: The IQ Controversy, 8*(3), 190–197 ●

Piechowski, M. M. (2006) ● *"Mellow out," they
say, if only I could: intensities and sensitivities of the
young and bright* ● Madison, Wis: Yunasa Books ●

Plessner, H. (2008) ● *Intuition in Judgment and
Decision Making* ● New York: Lawrence Erlbaum
Associates ●

Polanyi, M. (1958) ● *Personal Knowledge; Towards
a Post-Critical Philosophy* ● Chicago: University of
Chicago Press ●

Polanyi, M. (1966) ● *The tacit dimension* (1st ed.) ●
Garden City, N.Y: Doubleday ●

Policastro, E. (1995) ● Creative Intuition: An
Integrative Review ● *Creativity Research Journal,
8*(2), 99 ● doi:10.1207/s15326934crj0802_1 ●

Policastro, E. (1999) ● Intuition ● In M. A. Runco
& S. R. Pritzker (Eds.), *Encyclopedia of Creativity*
(Vols. 1-2, Vol. 2, pp. 89–93) ● San Diego, Calif:
Academic Press ●

Preston, S. D., & de Waal, F. B. M. (2002) ●
Empathy: Its ultimate and proximate bases ●
The Behavioral and Brain Sciences, 25(1), 1–20;
discussion 20–71 ●

Raami, A. (2004) ● *Luova designprosessi ja sen kehittäminen* ● *Taiteen maisterin opinnäyte* ● Helsinki: Medialaboratorio, Taideteollinen korkeakoulu ●

Raami, A. (2013) ● Experiences on Developing Intuitive Thinking among University-level Teachers ● In *Proceedings of the International Conference 2013 of the Design Research Society Special Interest Group on Experiential Knowledge* (pp. 345–357) ● Loughborough University , UK ● Retrieved from http://www.experientialknowledge.org.uk/proceedings_2013_files/EKSIG%202013%20Conference%20Proceedings.pdf ●

Raami, A., Celen, R., & Puntila, P. (2008) ● A case study of intuition and design: Building a tool for parents of premature babies and the nursing staff who care for them ● In *Undisciplined! Design Research Society Conference 2008* ● Sheffield Hallam University, Sheffield, UK, 16-19 July 2008: Design Research Society ● Retrieved from http://shura.shu.ac.uk/501/1/fulltext.pdf ●

Raami, A., & Mielonen, S. (2011) ● Kokemuksia intuitiovalmennuksesta – Intuition implisiittisestä oppimisesta kohti tietoista kehittämistä ● *Aikuiskasvatus, 31*(4), 167–174 ●

Raami, A., Mielonen, S., & Keinänen, M. (2010) ● Designers' Experiences of Intuition: Coaching Intuitive Skills as part of Creative Design Process ● In *Melbourne, Cumulus Working Papers.* (pp. 52–57) ● Aalto University, School of Art and Design ●

Raami, A., & Rouhiainen, L. (2006) ● Perceiving with a Difference: Tools and techniques for developing embodied personal creative thinking. In *Media Lab Research Symposium: Tools* ● Media Lab, Univeristy of Art and Design, Helsinki ●

Radin, D. (2006a) ● *Entangled Minds: Extrasensory Experiences in a Quantum Reality* ● New York: Paraview Pocket Books ●

Radin, D. (2006b) ● Psychophysiological Evidence of Possible Retrocausal Effects in Humans (Vol. 863, pp. 193–213). AIP ● doi:10.1063/1.2388755

Radin, D. (2008) ● Testing nonlocal observation as a source of intuitive knowledge ● *Explore (New York, N.Y.), 4*(1), 25–35 ● doi:10.1016/j.explore.2007.11.001 ●

Radin, D., & Sheehan, D. P. (2011) ● Predicting the Unpredictable: 75 Years of Experimental Evidence (pp. 204–217) ● doi:10.1063/1.3663725

Ray, M., & Myers, R. (1989) ● Practical Intuition ● In W. H. Agor (Ed.), *Intuition in organizations: leading and managing productively* (pp. 247–261) ● Newbury Park: Sage Publications ●

Rittel, H. W. J., & Webber, M. M. (1973) ● Dilemmas in a general theory of planning ● *Policy Sciences, 4*(2), 155–169 ● doi:10.1007/BF01405730 ●

Roberts, A. (2006) ● Cognitive styles and student progression in architectural design education ● *Design Studies, 27*(2), 167–181 ● doi:10.1016/j.destud.2005.07.001 ●

Rogers, C. R. (1980) ● *A way of being* ● Boston: Houghton Mifflin ●

Rogers, C. R., & Freiberg, H. J. (1994) ● *Freedom to learn* ● New York; Toronto; New York: Merrill; Maxwell Macmillan Canada; Maxwell Macmillan International ●

Root-Bernstein, R., & Root-Bernstein, M. (2003) ● Intuitive tools for innovative thinking ● In L. V. Shavinina (Ed.), *International Handbook on Innovation* (pp. 377–387) ● Amsterdam; Boston: Elsevier Science ●

Root-Bernstein, R. S. (2002) ● Aesthetic cognition ● *International Studies in the Philosophy of Science, 16*(1), 61 ● doi:10.1080/02698590120118837 ●

Rosanoff, N. (1991) ● *Intuition Workout: A Practical Guide to Discovering and Developing Your Inner Knowing* (2nd ed.) ● Aslan Publishing ●

Saucier, G., & Skrzypinska, K. (2006) ● Spiritual But Not Religious? Evidence for Two Independent Dispositions ● *Journal Of Personality, 74*(5), 1257–1292 ●

Schmidt, F. L., & Hunter, J. E. (1993) ● Tacit knowledge, practical intelligence, general mental ability, and job knowledge ● Retrieved from http://psycnet.apa.org/psycinfo/1993-32165-001 ●

Schön, D. A. (1988) ● Toward a Marriage of Artistry & Applied Science in the Architectural Design Studio ● *Journal of Architectural Education, 41*(4), 4–10 ● doi:10.1080/10464883.1988.10758496 ●

Seitamaa-Hakkarainen, P. (2008) ● Learning by collaborative designing in technology enhanced learning ● *Revista de Investigaciones UNAD, 7*(2), 12–38 ●

Seitamaa-Hakkarainen, P., Huotilainen, M., Mäkelä, M., Groth, C., & Hakkarainen, K. (2014) ● The Promise of Cognitive Neuroscience in Design Studies ● In K. Niedderer, L. Youn-kyung, J. Redström, E. Stolterman, & Valtonen (Eds.), *DRS 2014 – Design's Big Debates* (pp. 834–846) ● Umeå, Sweden: Umeå Institue of Design ●

Seitamaa-Hakkarainen, P., Laamanen, T.-K., Viitala, J., & Mäkelä, M. (2013) ● Materiality and Emotions in Making ● *Techne Series: Research in Sloyd Education and Craft Science A, 20*(3) ● Retrieved from https://journals.hioa.no/index.php/techneA/article/view/702 ●

Seligman, M. E. P., & Kahana, M. (2009) ● Unpacking Intuition: A Conjecture ● *Perspectives on Psychological Science, 4*(4), 399 –402 ● doi:10.1111/j.1745-6924.2009.01145.x ●

Shabel, L. (2014) ● Kant's Philosophy of Mathematics ● In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Fall 2014.) ● Retrieved from http://plato.stanford.edu/archives/fall2014/entries/kant-mathematics/ ●

Shavinina, L. V. (2003) ● Understanding Scientific Innovation: The Case of Nobel Laureates ● In L. V. Shavinina (Ed.), *The International Handbook on Innovation* (1st ed., pp. 445–457) ● Amsterdam: Elsevier Science ●

Shavinina, L. V. (Ed.). (2009) ● Scientific Talent: The Case of Nobel Laureates ● In *International Handbook on Giftedness* (pp. 649–669) ● Dordrecht: Springer Netherlands ● Retrieved from http://www.springerlink.com/content/kk0t0781810vu322/ ●

Shefy, E., & Sadler-Smith, E. (2004) ● The intuitive executive: Understanding and applying "gut feel" in decision-making ● *Academy of Management Executive, 18*(4), 76–91 ●

Sheldrake, R. (2009) ● *Morphic Resonance: The Nature of Formative Causation* (4th, rev. and expanded U.S. ed.) ● Rochester, Vt: Park Street Press ●

Sheldrake, R. (2011) ● *The Presence of the Past: Morphic Resonance and the Habits of Nature* ● Icon Books Ltd. ●

Sheldrake, R. (2012) ● *The Science Delusion: Freeing the Spirit of Enquiry* ● London, UK: Coronet

Simon, H. (1987) ● Making Management Decisions: The Role of Intuition and Emotion ● *The Academy of Management Executive (1987-1989), 1*(1), 57–64 ● doi:10.2307/4164720 ●

Sinclair, M. (2011) ● An integrated framework of intuition ● In M. Sinclair (Ed.), *Handbook of intuition research* (pp. 3–16) ● Cheltenham; Northampton, MA: Edward Elgar Publishing Limited ●

Smith, P. H. (2005) ● *Reading the enemy's mind: Inside Star Gate, America's psychic espionage program* (1st ed.) ● New York: Tom Doherty Associates ●

Steiner, R. (1995) ● *Intuitive Thinking As a Spiritual Path: A Philosophy of Freedom* ● (M. Lipson, Trans.) ● Hudson, NY: Anthroposophic Press ●

Stephens, G. J., Silbert, L. J., & Hasson, U. (2010) ● Speaker–listener neural coupling underlies successful communication ● *Proceedings of the National Academy of Sciences, 107*(32), 14425–14430 ● doi:10.1073/pnas.1008662107 ●

Stocks, J. L. (1939) ● *Reason & intuition, and other essays* ● London, New York [etc.]: Oxford University Press ●

Surel, D. (2007) ● *Identifying Intuition in the Decision-making Process: A Phenomenological Research Study* ● University of Phoenix ●

Surel, D. (2012, April 18) ● *Intuitive intelligence – accessing your thinking potential and inner wisdom.* Lecture in Aalto University, Helsinki ● Retrieved from http://vimeo.com/41405334 ●

Suwa, M., Gero, J., & Purcell, T. (2000) ● Unexpected discoveries and S-invention of design requirements: important vehicles for a design process ● *Design Studies, 21*(6), 539–567 ● doi:10.1016/S0142-694X(99)00034-4 ●

Svedholm, A. (2013) ● *The cognitive basis of paranormal, superstitious, magical and supernatural beliefs: The roles of core knowledge, intuitive and reflective thinking, and cognitive inhibition* ● Helsinki, Finland: University of Helsinki, Institute of Behavioural Sciences, Studies in Psychology ●

Targ, R. (2004) ● *Limitless mind: a guide to remote viewing and transformation of consciousness* ● Novato, Calif: New World Library ●

Targ, R. (2012) ● *The reality of ESP: a physicist's proof of psychic phenomena* (1st Quest ed.) ● Wheaton, Ill: Quest Books ●

Targ, R., & Puthoff, H. (1974) ● Information transmission under conditions of sensory shielding ● *Nature, 251*(5476), 602–607 ● doi:10.1038/251602a0 ●

Tart, C. T. (2009) ● *The End of Materialism: How Evidence of the Paranormal Is Bringing Science and Spirit Together (co-published with the Institute of Noetic Sciences)* (1st ed.) ● New Harbinger Pubns.

Thibodeau, L. (2005) ● *Natural-Born Intuition: How to Awaken and Develop Your Inner Wisdom* ● Franklin Lakes, N.J: New Page Books ●

Utts, J. (1995) ● An Assessment Of The Evidence For Psychic Functioning ● *Journal of Scientific Exploration, 10*, 3–30 ●

Uusikylä, K. (2008) ● *Naislahjakkuus* ● Jyväskylä: PS-kustannus ●

Varela, F. (1999) ● *Ethical Know-How: Action, Wisdom, and Cognition* ● Stanford, Calif: Stanford University Press ●

Varela, F., Thompson, E., & Rosch, E. (1991) ● *The embodied mind: cognitive science and human experience* ● Cambridge, Mass: MIT Press ●

Vartiainen, H., Liljeström, A., & Enkenberg, J. (2012) ● Design-Oriented Pedagogy for Technology-Enhanced Learning to Cross Over the Borders between Formal and Informal Environments ● *Journal of Universal Computer Science, 18*(15), 2097–2119 ●

Vaughan, F. E. (1979) ● *Awakening Intuition* (1st Anchor Books Ed.) ● New York: Doubleday ●

Vaughan, F. E. (1989) ● Varieties of Intuitive Experience ● In W. H. Agor (Ed.), *Intuition in organizations: leading and managing productively* (pp. 40–61) ● Newbury Park: Sage Publications ●

Volz, K. G., & von Cramon, D. Y. (2008) ● Can Neuroscience Tell a Story About Intuition? ● In H. Plessner, C. Betsch, & T. Betsch (Eds.), *Intuition in Judgment and Decision Making* (pp. 71–87) ● New York: Lawrence Erlbaum Associates ●

Vrugtman, R. (2009) ● *Dimensions of Intuition first-round validation studies* ● St. Louis, Mo.: University of Missouri--St. Louis ●

Wilber, K. (1980) ● *The atman project: a transpersonal view of human development* ● Wheaton, Ill: Theosophical Publ. House ●

Wilber, K. (1997) ● An integral theory of consciousness ● *Journal of Consciousness Studies, 4*(1), 71–92 ●

Wilber, K. (2007) ● *The integral vision: a very short introduction to the revolutionary integral approach to life, God, the universe, and everything* (1st ed.) ● Boston: Shambhala ●

Wilson, C. (2009) ● *Super consciousness: the quest for the peak experience* ● London: Watkins ●

Zimmermann, M. (1989) ● The Nervous System in the Context of Information Theory. In R. F. Schmidt & P. D. D. G. Thews (Eds.), *Human Physiology* (pp. 166–173) ● Springer Berlin Heidelberg ● Retrieved from http://link.springer.com/chapter/10.1007/978-3-642-73831-9_7 ●

I

**EXPERIENCES ON DEVELOPING
INTUITIVE THINKING
AMONG UNIVERSITY-LEVEL
TEACHERS**

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Abstract
This study investigates the impact from two courses focusing on the development of intuition. Intuition is an integral part of human thinking, and its role is essential in all creative processes. Yet the potential of intuition is completely ignored in school education.

The data consists of 20 University level teachers who joined a course in intuition development. The teachers represent domains varying from design to architecture, engineering and economics, and the major research goals shared in these domains are production of creative ideas, innovation and complex problem solving skills.

The focus of the study is to research how the course affects teachers' *opinions* on intuitive thinking, their *use* of intuition, as well as the *utility* of the methods used to develop intuition. Teachers' opinions and experiences of intuition were asked *before* and *after* the course. The follow-up part of the research aims at measuring the actual *impact* of the course: the change in frequency of utilizing intuitive thinking in their personal life and in teaching, as well as if the teachers were supporting students' intuitive faculties.

The outcomes suggest that even a single course encourages participants to pay more attention to intuition and increases the awareness and use of intuitive faculties. Most of the participants felt that they had learned new methods of observing and utilizing their intuition during the course, and most of them had deepened their understanding of their personal intuitive process.

An interesting outcome is that after the course the amount of time used for thinking about intuition-related issues had increased remarkably. Furthermore, most of the teachers had found brand new methods of developing their intuition further.

Introduction

Intuition is an integral part of human thinking. Together with conscious reasoning it forms a pair which is an essential component of human thinking. Intuition is considered to be an instant and rapid process of knowing, which relies at least partially on unconscious knowledge structures (Bastick, 2003; Glöckner & Wittermann, 2010; Polanyi, 1958). Research on people suffering from specific neurological damages confirms that even simple everyday life is impossible without intuition (Volz & Von Cramon, 2008). Even though recent research proposes that there are several types of intuition, very little agreement remains as to what the specific types are. However, the effects of using intuition are well recognized. Numerous studies in art, science and business have proved that intuition has a central role in the development of breakthrough innovations and novel ideas (Klein, 1998; Gigerenzer, 2007). Several Nobel-laureates have mentioned intuition as their primary tool. (Shavinina, 2009; Larsson, 2002)

Researchers in the area of decision-making have noticed that in some problem-solving situations intuition generates solutions that are remarkably better than with conscious reasoning. Intuition can be superior especially if there is either too little or too much information, or even simultaneous over- and under-load of information: too much information and lack of essential information at the same time. The analytical mind usually chokes with too many alternatives and starves by the lack of information. Under these types of conditions the advantage of intuitive thinking is profound. (Dijksterhuis, Bos, Nordgren, & van Baaren Klein, 1998; Frank, O'Reilly & Curran, 2006; 2006; Gigerenzer, 2007.) Increasing amount of problems in design – as well as in the world in general – tend to be like these, tangled knots, which cannot be solved by conscious reasoning alone. We need the ability to utilize intuition to solve these types of wicked problems.

Conscious reasoning vs. intuition

In psychology, the most prevailing theory of human mind is the dual-process model, where our thinking is divided into two parts: conscious reasoning and non-conscious, intuitive faculties. Both of them are integral and essential parts of our everyday thinking (Kahneman & Tversky, 1982).

While our conscious mind is analytical, linear, controlled and based on rules, the intuitive mind is non-conscious, automatic, quick, associative, parallel, and can process huge amounts of information simultaneously (Kahneman, 2003). Our thinking hovers between these two different faculties mostly automatically. When working with challenging cognitive tasks, such as visioning and complex problem solving, we need to integrate them.

Research findings confirm that without intuitive faculties a human cannot cope with everyday life (Volz & Von Cramon, 2008). Damasio researched persons whose faculties of intuitive thinking had been damaged, and as a result, their ability to make good decisions, or to make any decisions at all, had been severely compromised (Damasio, 1994).

If simplified, the difference between these two different thinking modalities can be illustrated as follows: when reasoning consciously "we know consciously that we are thinking this thought", and when intuiting "we know without knowing how we know".

Several Nobel-laureates from Einstein to Pauling and Schrödinger mention intuition as being indispensable for new inventions – conscious reasoning is then used for argumentation (Shavinina, 2003; Shavinina, 2009; Larsson, 2002). Most of the designers interviewed in our earlier research mention intuition as their primary tool (Raami, Mielonen & Keinänen 2010; Raami & Mielonen, 2011).

The majority of the problems designers are facing today are so complex, multi-dimensional and wicked that conscious reasoning is simply not enough (Rittel & Webber, 1973). We need both

the potential of intuition and expanded intelligence. However, the paradox remains: intuition in the educational system is ignored, or even destroyed, and therefore its potential is lost. Formal teaching in schools, as well as in Universities, focuses firmly on developing the rational faculties and conscious reasoning.

Defining intuition

Intuition is still lacking a clear identification and definition (Betsch, 2008). In the dual-process model intuition is considered an umbrella term, including all forms of non-conscious thinking such as instincts, fears, automatic reactions and over-learned skills, which are not of interest for the purpose of this study. Therefore the dual process model is not detailed enough when researching intuition in connection with design creativity.

Based on recent research and understanding, intuition is used as a general label for a variety of phenomena that are most likely based on completely different cognitive mechanisms (Glöcker & Witteman, 2010; Shefy, & Sadler-Smith, 2004). Most definitions agree that intuition is based on automatic processes, which rely on knowledge structures that are acquired by different methods of learning. They operate, at least partially, without people's awareness and result in feelings, signals, or interpretations. Intuition is a phenomenon for complex information integration processes, and usually described as a flash-like, sudden, immediate form of knowledge. (Bastick, 2003; Dörfler & Ackermann, 2012).

Glöckner and Witteman (2010) have categorized intuition in four general types: associative intuition, matching intuition, accumulative intuition and constructive intuition. Each type is a mental activity, which is based on a slightly different integration process utilizing pattern matching, memory traces and currently perceived information. Researchers stress that it is not useful to argue which kind of intuition is "real", but to clearly define which kind of pro-

cesses one is investigating and refrain from using the term intuition without further qualification.

Even though all these forms of intuition may be present when designers are inventing and designing, at the same time they ignore something essential. Consequently, I find the above-mentioned categories limited and the definitions too narrow. Through my personal experience and study of the stories told by many designers, intuition has aspects which are not included in the models. For example, none of these definitions include a possibility of intuition coming outside of professional expertise or personal experiences. Yet many designers describe these types of intuitive insights and consider them to be among the most valuable and desirable ones.

Therefore, in this research I use the definition by William H. Kautz who, for several decades, has been researching highly intuitive persons he calls expert intuitives. Kautz is among those few researchers who acknowledge a specific type of intuition, so-called "true" intuition, as opposed to other types of "general intuition" in current psychology.

> *"Intuition is the mental process of acquiring information and knowledge directly into the mind, without the use of [conscious] reasoning, sensing or even memory (in the usual sense of that word). This definition implies that, if one is to show that a piece of new information is truly intuitive, he must demonstrate that it could not have been obtained by one of these other three means."* **(Kautz, 2005, pp. 8)**

This definition includes the possibility of insights coming out of thin air – a situation described by several designers (Raami & al, 2010). However, in this study I am neither focusing on the source of intuition nor on the type of it, researching instead the developmental aspects and utility of intuition.

Utility vs. validity

When coaching intuition, I always focus on the experiences of intuition and the personal aspects of it. For me it is essential to stress the meaningfulness and the *utility of it* for a person, not the *validity*. That is, if the methods, theories or experiences are *usable* and help a person's creative process, it doesn't matter if they are objectively perceived as *true* or not.

We cannot fully understand intuitive thinking since at least some parts of intuition are hiding under our conscious thoughts. There is always something unexplainable and mysterious. If we try to fully understand the intuitive process, or we try to make a model of it, we most likely set ourselves inside of a box (Surel, 2012). Usually, we are not very aware of how we make decisions. We tend to think we are thinking rationally, yet we may be using intuition as well. Even when consciously using intuition, we may dress our arguments to be rational since in many situations only rational explanations are accepted. We have a cultural tendency to deny intuitive experiences (Mayer, 2007).

However, intuition can be researched. Even though we cannot understand the insight itself, we can research the intuitive process, that is, right before and after intuitive insights (Klein, 1998; Petitmengin-Peugeot, 1999). Also, we can rely on the experiences and research them, which is my focus in this paper. At the beginning of the course the teachers were asked to describe their personal intuition. The answers were then compared with the definitions given in the end of the course. Intuitive experiences are usually unique, very personal and hard to verbalize. This may be illustrated with a couple of examples.

One teacher described her/his personal intuition in the beginning of the course:

> "Intuition is a part of my own inner world, part my real self. I want to be in good terms with my intuition, otherwise 'it doesn't feel good'. Emotion and balance are included, as well as an experience being a part of a bigger plan. My intuition is probably quite strong, but often it's also covered under 'noise'."

After the course she/he described:

> "Earlier emotion and suspicion were mixed with my intuition. Now my intuition is becoming clearer and more lucid. It has become smooth and trustworthy."

Another teacher described:

> "There is some kind of pressure or anxiety involved. Two simultaneous directions and the contradiction between them, a struggle."

And afterwards:

> "Describing it [intuition] is difficult, but I'll try. My intuition is very rational, real and strong. It is hard for me to accept that I argue against it, consider it and have doubts. I want to make difference between intuition and imagination."

It is important to make these observations even it is not always easy to step out of one's comfort zone or to face something which cannot be fully understood or even turned into words (Hogarth, 2001; Kautz, 2005; Raami & Mielonen, 2011). It requires courage to linger in sensations without a need to rationalize them. Sometimes this can be easier with the support from others. Most of the students, as well as the teachers, joining the courses have stressed the importance of group discussions. It is easier to accept and credit personal experiences through stories told by others. Through these, one can find similarities, as well as contradictions, which can help to understand the varying process in others.

Coaching intuition

I have been running courses focusing on intuition development for MA-level design students and professional designers since 2003, coaching more than two hundred students. The corner stones of my intuition coaching are removing blocks that hinder intuition as well as strengthening each person's bond with their personal intuition.

Some research suggest that intuition can be developed (Seligman & Kahana, 2009; Vrugtman, 2009). One of the most essential aspects in developing intuition is to unlearn earlier beliefs and habits. Kautz (2005) mentions three things which hinder intuition: beliefs, mental habits and emotional conditioning. All these require inner work and introspection and intentional quieting of the mind. We also tend to be so trained to rely on our rational mind that it may block intuition even before we are able to identify any intuitive insights. Indeed, the rational mind is the one which most effectively blocks intuition (Surel, 2007).

We may also be too dependant on instructions and truths coming from outside. In the course of my teaching experience, many design students have expressed the will to know "the correct way" to be creative, or to learn how "the professional creative design process " proceeds and follow that. In many cases they have very little trust in their own creative process and seek outside experts to tell them the correct answers.

Beliefs that block intuition may, at least partly, be removed by giving valid and supportive arguments to the rational mind about intuition. (Surel 2009). Therefore, in the coaching sessions I am using recent research material related to intuition. This material usually challenges participants – the more one's perspective is based on a purely materialistic worldview, the more it challenges. However, I have found this method conducive since intuition does not happen in material dimensions, and therefore it is essential to open one's thinking into other dimensions as well. The focus of presenting these theories and research is to encourage out-of-the-box think-

ing when a person is ready to expand his thinking (Surel, 2012). Personally, I think that we all are inside various boxes all the time, but the smaller the box is, the less room there is for conscious use of intuition (Adair, 2007).

Strengthening personal intuition takes place through practical exercises, which rely on two major components: perceptions and the discernment skills. That is, developing sensitivity to notice even weaker signals and to better evaluate the significance of the signals. Intuition may easily be mixed with emotions, fears, wishful thinking or emotional attachments. If these are not recognized, they may distort one's intuition or even be confused with intuition. Therefore, it is essential to reach for the original perceptions as directly as possible.

During the coaching sessions we are going through various kinds of exercises so that everyone can find support for their personal way of intuiting and not vice versa, that is, to attach a method on top of one's personal way. From my experience, everyone has their own way of perceiving information as well as subjective ways of gathering and processing it.

At any given time an enormous amount of information passes through our mind, but only a fraction of it is noticed. Our subconscious mind processes several orders of magnitude more information that the conscious mind (Lipton 2005). Those things our mind picks to be noticed are presumably significant to us – for some reason. All of us sense in slightly different ways and use different sensory channels. Through exercises we can expand our way of sensing so that we are able to either recognize weaker signals or learn new ways of sensing. Some of the designers describe even extraordinary or highly personal experiences while receiving intuitive insights (Raami & al., 2010).

Sharing these experiences takes place in discussions, and therefore it is important to create an atmosphere of trust inside the group. Many students have described their experience when learning to tune into intuition as "homecoming"

EXPERIENCED CHANGES AFTER THE COURSE	yes	no	interpretative / can not be classified
More methods for utilizing intuition	12/15 (80%)	1/15 (6,7%)	2/15 (13,3%)
Description of intuition more personal and specific	9/15 (60%)	1/15 (6,7%)	5/15 (33,3%)
Increased understanding of personal intuitive process	6/15 (40%)	3/15 (20%)	6/15 (40%)
Increased trust in personal intuition	4/15 (26,7%)	2/15 (13,3%)	9/15 (60%)

(Raami & al., 2010). They describe it as getting closer to themselves or closer to their own way of creating. Intuition has also been compared to the mental capacity to learn a language: it is innate, everyone can do it, but there has to be an intention or need before the development occurs (Kautz, 2005).

Focus of the study and data collecting
During the academic term 2011-2012, I ran two courses for University-level teachers focusing on the development of intuition. The courses were targeted Aalto University teachers who wanted to develop their personal intuitive skills, integrate intuition as part of their teaching as well as support the development of intuitive faculties in their students. The backgrounds of the teachers varied from design (8/20) to architecture (3/20), engineering (4/20), economics (4/20) and education (1/20). Six of the participants were males and 14 females.

The number of participants was limited to ten in both of these courses, since the contact hours focused on intuition exercises reflections about personal experiences and discussions, which cannot take place in a big group. The courses lasted for one semester and consisted of 7-10 contact lessons, each lasting 3 hours at a time. The first

Table 1.
Experiences reported after the course.

course had 21 contact hours and the second one 30 hours. Additionally, there were 100 hours reserved for personal study and practice at home.

The research focused on opinions and understanding about personal intuitive processes and changes in the use of intuition. I was interested in teachers' experiences and descriptions since the development of intuition is hard to measure objectively. The follow-up part was targeted to observe if there had been any actual impact, especially on the amount of thinking used towards intuition, utilizing it in one's own teaching as well as encouraging students to use their intuition. Moreover, one of my main interests was to find out whether teachers found any new, personal methods to develop their intuition further after the course.

The data was collected through three questionnaires which were handed out at the very beginning of the course, at the end of it and 6-10 months later. The answers of the first two ques-

CHANGE IN ENCOURAGEMENT WHILE TEACHING	yes	no	interpretative / cannot be classified
Encouraging students to utilize their intuition more	6/9 (66,7%)	2/9 (22,2%)	1/9 (11,1%)

Table 2.
Change in encouragement towards use of intuition after the course.

tionnaires were compared in order to define the impact of the intuition course. Both questionnaires were filled-out anonymously – teachers were using pseudonyms in order to allow the matching of both answers with the same person. Altogether 20 persons joined two courses, and 15 persons returned both answers with matching names (N_1=15). Eighteen persons returned the follow-up questionnaire (N_2=18).

I was interested in finding out if the course gave the teachers a better understanding of their personal intuition, and if they were able to use intuition better after the course. The questions were phrased so that the issues were not addressed directly. Instead, the ways of using intuition were queried more indirectly, and then the answers, before and after the course, were compared. For example, the teachers were asked to *describe* the ways of understanding their personal intuition, the ways of using it and the ways of encouraging students to use intuition. Only the question "have you learned new methods of utilizing intuition" was asked directly in all of these three questionnaires.

The answers were classified in simple "yes", "no" and "interpretative" categories in order to

identify the changes and differences before and after the course. Since the teachers were asked to write descriptions, it was easy to notice the direction of change and classify the answers with simple "yes" and "no" categories in most of the cases. However, there were some descriptions using different verbal output, so I decided to classify all these even slightly unclear answers as "interpretative", as well as the answers with no significant change.

The first two questionnaires focused on different aspects of personal intuition. The questions focused on personal intuition, the ways of using it, expectations of developing it further, and how intuition could possibly help them at work. In the latter course I also asked about the possible methods of enhancing students' intuition and ways of utilizing intuition in studying.

Discussions that took place in the group also played an important role in the research. They broadened my understanding and gave new perspectives and background information to the answers.

Experienced changes after Developing Intuitive Thinking –course
After the intuition development course I was able to link 15 answers with matching names. 3 persons had forgotten their pseudonyms, but I decided not to match the answers based on the style of handwriting. The answer percentage was 75% (N1=15).

Most of the teachers felt they had acquired more methods for utilizing intuition after the

THE AMOUNT OF THINKING 6–10 MONTHS LATER	a lot / every day	yes, sometimes	less than before / no	interpretative / cannot be classified
Thinking about intuition after the course	10/18 (55,6%)	7/18 (38,9%))	0/18 (0%)	1/18 (5,6%)

Table 3.
Change in the amount of thinking intuition related issues after 6–10 months.

course. One answer was negative, and two answers were interpretative and therefore were not classified.

Most of the descriptions of personal intuition were more unique, detailed and specific after the course. Only one description was not more personal. It was mostly the same detailed and specific version as the earlier one since it was visible already in the first answer that the person in question had been using a lot of intuition already at the beginning of the course. In five cases the results were unsure, described either vaguely or just in such a different way that it was not possible to compare the answers. None of the descriptions had changed to more abstract or vague direction after the course.

Based on the questionnaires, the course did not have a significant impact on increasing the understanding of personal intuitive process or trust in personal intuition.

The table below is the summary of the results.

Many teachers reported that the encouragement towards their students' use of intuition has increased. This was not asked directly, but instead the questions focused on the methods of supporting student's intuition, and these aspects

were asked only in the questionnaire of the latter course. The percentage of answers was 90% (N_3=9). The methods for encouraging the use of intuition that were mentioned in most answers were conscious presence, self-trust, sensitivity and courage, including general encouragement.

Experienced changes six months later
The follow-up questionnaire was carried out 6-10 months afterwards (10 months after the first course and 6 months after the second course). Some discussions taking place during the course had indicated that the course most likely activates a lifelong process, where intuition related issues start to unfold. In this study I was also highly interested in the actual impact of the course, that is, if teachers have long lasting interest on issues related to intuition, and if they have adapted a habit of encouraging their own students to use intuition.

In this last questionnaire teachers answered with their names – even though they were given a possibility to answer anonymously. This enabled me to match the answers with the discussions that took place earlier during the course. The percentage of answers in this study was 90% (N_2=18).

The questions were worded so that the teachers could not give direct yes/no answers to the questions, but they were asked to describe their observations or methods of using intuition. I asked them to *describe* the ways and the amount of thinking about intuition, the use of it and the methods used. I also asked them to describe *how*

they had been observing and utilizing intuition as part of their work, if at all. Furthermore, they were asked to report *what kind of* new applicable methods they had found in order to utilize their personal intuition, if any, and *how* they have been supporting students to utilize their intuition while studying.

The answers were classified as previously, in "yes", "no" and "interpretative / cannot be classified" –categories. However, there was one question where I wanted to illustrate the outcome differently. When I asked about the amount of thinking intuition, the answers clearly indicated two types of differences in the amounts. Therefore, I formed two categories based on given answers: "A lot / every day" reporting an enormous growth in thinking, and "yes, sometimes" reporting a significant amount, or at least more than before. Nobody mentioned thinking about intuition less than before or ignoring intuition related issues altogether.

Most of the teachers described that they were thinking about intuition a lot, even daily. One teacher did not answer whether she was thinking about intuition or not, and therefore her answer was classified as interpretative. She reported neither having found new methods of intuition nor encouraging students to use their intuition. So this can be expected to imply that she had not been spending time thinking about intuition related issues either. In the "yes, sometimes" category most of the persons reported a change in the quality of thinking. They described that they had been thinking about intuition "more consciously" than before even if there had not been a big change in the amount of thinking.

Two other aspects I was interested in were if any of the teachers had discovered (new) personal methods for utilizing their intuition, and if they were utilizing intuition as part of their teaching or encouraging their student to use intuition. The question about the discovering of new methods was the only one which I asked directly.

The number of persons who had found new methods surprised me in a positive way. Even some persons who had been utilizing intuition for many years described they had found brand new ways to use intuition. One teacher described:

> *"I am thinking about intuition daily, which is remarkably more than before. … There are several methods coming to me constantly, even out of the blue. It feels like a good journey."*

**Table 4.
Experienced changes in "discovery of new methods"and "intuition encouragement" 6–10 months afterwards.**

EXPERIENCED CHANGES 6–10 MONTHS LATER	yes	no	interpretative / cannot be classified
Discovered (new) personal methods for utilizing intuition	12/18 (66,7%)	6/18 (33,3%)	–
Encouraging students / other people to use intuition	12/18 (66,7%)	2/18 (11,1%)	4/18 (22,2%)

EXPERIENCED CHANGES AFTER THE COURSE BY STUDENTS (VS. TEACHERS)	yes students (teachers)	no students (teachers)	interpretative students (teachers)
More methods for utilizing intuition	100% (80%)	0% (6,7%)	0% (13,3%)
Description of intuition more personal and specific	48% (60%)	43% (6,7%)	9% (33,3%)
Increased understanding of personal intuitive process	86% (40%)	10% (20%)	4% (40%)
Increased trust in personal intuition	76% (26,7%)	10% (13,3%)	14% (60%)

Table 5.
The reported experiences of teachers compared with experiences of students after the course.

Most common methods mentioned were quieting the mind, calming down, listening to sensations, and openness.

The "No" answer category contained roughly two different types of persons. Some of the persons answering "No" were intuitive and using many different methods already in the beginning of the course, while some persons in this "No" category did not have a flowing contact with their intuition and wished to discover good working methods to develop their intuition.

I also wanted to know if teachers encouraged their own students to accept and promote intuitive knowledge, and what kind of methods they were using. The majority encouraged students and other persons, and only in two questionnaires I did not find any sign of encouragement. I was not able to classify four answers. The most common methods mentioned were general encouragement through discussions, support towards openness, and tuning into observations of inner feelings and sensations.

Several persons mentioned growth in appreciation of intuitive knowledge or intuition as a new dimension in their life. Some mentioned that during the course intuition became "named" and therefore accepted. A few persons also mentioned increased dissonance in thinking, and new challenges in balancing intuition with conscious reasoning or previous ways of doing. This may be illustrated with a following quotation:

> *"Now I am encouraging children to listen to themselves – which contradicts educational advice in general"*.

Comparison with students' experiences
One of my interests in this research was to find out whether the results were different from the earlier studies with MA-level design students and their intuition development. The intuition development courses for students took place two

years earlier and the data consists of two different courses on intuition development (Raami & Mielonen, 2011).

When these results from the teachers' intuition development course were compared with the ones from the students' courses, some differences were found. Students reported the following after the coaching course (N=21):

One possible explanation for the changes in results is experience as some teachers already had functional methods for utilizing their personal intuition when joining the course. Moreover, teachers can generally be expected to have more life experience than students. They also have more professional expertise, and many of them have been using intuition as a part of their, especially artistic, work for many years or even decades. Even if the use of intuition among teachers was not so conscious or intentional before the course, it was used in many situations – based on the comments and discussions taking place in the course. Therefore it is natural that there is such disparity compared with students' answers, especially in the two last aspects, "increased trust in personal intuition" and "increased understanding of personal intuitive process ". This hypothesis is aligned with previous interviews made with expert designers. Most of them mentioned intuition as their most valuable tool (Raami & Mielonen, 2011).

Discussion

The results of this study strongly suggest that intuition can be developed. A single course can activate and enhance the use of intuition and increase the acceptance of it, which is promising. Most of the teachers felt they had acquired new methods for utilizing intuition and were increasingly encouraging their students to use their intuitive faculties.

Many teachers pointed out the importance of group discussions and sharing when talking about intuitive experiences, which I think is one of the cornerstones in accepting intuitive information, since our culture often dismisses intuition.

If compared with earlier intuition researches with MA-level students, the understanding of personal intuitive processes during the course did not increase to the same equivalent. However, those teachers who had deepened their understanding of intuitive process during the course reported a major change in quality.

Methods of utilizing intuition increased during the course, but they increased also *after* the course. I think this aspect needs further studying. It is still unclear if the exercises used and theories presented during the course actually caused this development, or was pure *intention* and *paying attention* enough? Is it enough to tune into intuition with an open mind? This is plausible since most persons reported that also *the amount* of thinking about intuition had grown remarkably after the course. This is an area for further research.

REFERENCES:

Adair, J. E. (2007) ● *The art of creative thinking: how to be innovative and develop great ideas* (Pbk. ed.) ● London; Philadelphia: Kogan Page Ltd. ●

Bastick, T. (2003) ● *Intuition. Evaluating the Construct and its Impact on Creative Thinking* ● West Indies: Stoneman & Lang ●

Betsch, T. (2008) ● The nature of intuition and its neglect in research on judgment and decision making ● In H. Plessner, C. Betsch, & T. Betsch (Eds.), *Intuition in Judgment and Decision Making* (pp. 3–22) ● New York: Lawrence Erlbaum Associates ●

Damasio, A. R. (1994) ● *Descartes' Error: Emotion, Reason, and the Human Brain* ● New York: Putnam.

Dijksterhuis, A., Bos, M. W., Nordgren, L. F., & van Baaren, R. B. (2006) ● On making the right choice: the deliberation-without-attention effect ● *Science,* 311(5763), 1005–1007 ●

Dörfler, V. & Ackermann, F. (2012) ● Understanding Intuition: The Case for Two Forms of Intuition ● *Management Learning, March 22, 2012.* Sage Journals ● Retrieved December 10, 2012, from, http://mlq.sagepub.com/content/early/2012/03/21/1350507611434686 ●

Frank, M. J., O'Reilly, R. C., & Curran, T. (2006) ● When memory fails, intuition reigns: midazolam enhances implicit inference in humans ● *Psychological Science: A Journal of the American Psychological Society / APS,* 17(8), 700–707 ●

Gigerenzer, G. (2007) ● *Gut feelings: the Intelligence of the Unconscious* ● New York:Viking ●

Glöckener & Wittermann (Eds.) (2010) ● *The Foundations for Tracing Intuition* ● New York: Psychology Press ●

Hogarth, R. M. (2001) ● *Educating Intuition* ● Chicago: University of Chicago press ●

Kahneman, D., & Tversky, A. (1982) ● Judgment under uncertainty: Heuristics and biases ● D. Kahneman & A. Tversky (Eds.), *Judgment under uncertainty: heuristics and biases* (pp. 3–22) ● Cambridge: Cambridge University Press ●

Kahneman, D. (2003) ● A perspective on judgment and choice: mapping bounded rationality ● *The American psychologist, 58*(9), 697-720 ●

Kautz, W. (2005) ● *Opening The Inner Eye* ● Explorations on the Practical Application of Intuition in Daily Life and Work ● iUniverse ●

Klein, G. A. (1998) ● *Sources of power: How people make decisions* ● Cambridge, Mass: MIT Press ●

Larsson, U. (ed.) (2002) ● *Cultures of Creativity* ● USA: Science history Publications/The Nobel Museum ●

Lipton, B. (2008) ● *The Biology of Belief* ● USA: Hay house ●

Mayer, E. L. (2007) ● *Extraordinary knowing: science, skepticism, and the inexplicable powers of the human mind* ● New York: Bantam Books ●

Petitmengin-Peugeot, C. (1999) ● The intuitive experience ● In F. J. Varela & J. Shear (Eds.), *The view from within: first-person approaches to the study of consciousness* (pp. 43–77) ● London: Imprint Academic ●

Polanyi, M. (1958) ● *Personal knowledge; towards a post- critical philosophy* ● Chicago: University of Chicago Press ●

Rittel, H. W. J., & Webber, M. M. (1973) ●
Dilemmas in a general theory of planning ● *Policy Sciences, 4(2), 155–169* ●

Raami, A., Mielonen, S., & Keinänen, M. (2010) ● Designers' experiences of intuition: coaching intuitive skills as part of creative design process ● *Melbourne, Cumulus Working Papers. Publication series G, 52–57* ●

Raami, A. & Mielonen, S. (2011) ● Kokemuksia intuitiovalmennuksesta – Intuition implisiittisestä oppimisesta kohti tietoista kehittämistä ● *Aikuiskasvatus 4/2011 s. 164–174* ●

Seligman, M.E., & Kahana, M. (2009) ● Unpacking intuition: a conjecture ● *Perspectives on Psychological Science, 4(4), 399–402* ●

Shavinina, L. V. (2003). Understanding scientific innovation: the case of Nobel Laureates ● In L. V. Shavinina (Ed.), *The international handbook on innovation*,1st ed. (pp. 445–457) ● Amsterdam: Elsevier Science ●

Shavinina, L. V. (Ed.). (2009) ● Scientific Talent: The Case of Nobel Laureates ● *In International Handbook on Giftedness* (pp. 649-669) ● Dordrecht: Springer Netherlands ● Retrieved December 10, 2012, from, http://www.springerlink.com/content/kk0t0781810vu322/ ●

Shefy, E., & Sadler-Smith, E. (2004) ● The intuitive executive: Understanding and applying 'gut feel' in decision-making ● *Academy of Management Executive,* 18(4), 76–91 ●

Surel, D. (2007) ● *Identifying Intuition in the Decision-making Process: A Phenomenological Research Study* ● Dissertation, UMI number: 3333908 ● University of Phoenix ●

Surel, D. (2012) ● Lecture in Aalto University, Helsinki ● Retrieved February 8, 2013, from http://vimeo.com/41405334 ●

Volz, K. G., & von Cramon, D. Y. (2008) ● Can Neuroscience Tell a Story About Intuition? In H. Plessner, C. Betsch, & T. Betsch (Eds.), *Intuition in Judgment and Decision Making* (pp. 71-87) ● New York: Lawrence Erlbaum Associates ●

Vrugtman, R. (2009) ● *Dimensions of Intuition first-round validation studies* ● St. Louis, Mo. University of Missouri-St. Louis ●

II

**EXPERIENCES FROM
INTUITION COACHING**

**From an implicit learning of intuition
towards a conscious development**

A summary of the article
"Kokemuksia intuitiovalmennuksesta"

**Asta Raami
Samu Mielonen**

Abstract

Intuition is an integral and inseparable component of human thinking yielding, in some circumstances, better results than conscious reasoning. Currently, the tools employed in teaching emphasize the processing of information that is explicit and articulated, while intuitive thinking is not developed as intentionally. This article describes our experiences of intentional development of intuition and reports findings based on interviews with designers, who frequently resort to intuition. We also review the literature on intuition and the dual process model of the human mind to highlight the importance and challenges in design education. We argue that a person can develop active intuiting and that this development can be supported with conscious learning exercises.

The objectives of the study

This study examines the development of intuition related especially to design and content production coaching through our own teaching experiences. The development is limited to the intentional (vs random) utilization of intuition and its signals. We do not take a stance on whether the ability to intuit is innate; instead we are interested in its learnability, that is, whether the skill to activate and utilize intuition can be improved through exercises. Further, we do not limit the handling of intuition only to intuition within the design domain but consider it a form of general intuitive thinking that is applicable to other activities. We also discuss how intuitive experiences can be adopted more widely in all teaching: how to make these experiences visible, share them and integrate them into personal learner development.

Data collecting and data analysis

The data were collected through questionnaires distributed at two intuition coaching courses held for MA design students in Aalto University, as well as at a continuing education course for design practitioners. The questionnaires were completed and collected before and after each course. In the questionnaires, the students and designers described their understanding of their personal intuition. Further, the MA students kept a learning diary during the course. Altogether the data were collected from 23 participants. Additionally, the data include our personal written observations from the coaching sessions and general feedback from the courses. The participants used pseudonyms while answering. This ensures anonymity but enables matching the answers given in two different questionnaires.

The questionnaires collected before and after the course were compared (N=21). In both questionnaires, the participants described their understanding of personal intuition, perceptions while intuiting, their views on how they could develop and apply the intuiting process in the future, their

personal experiences of intuition and their personal beliefs. The second questionnaire addressed the utilization of intuition exercises and the functionality of the methods adopted in the course.

The issues were not approached directly (e.g. did your self-knowledge increase), but through asking questions related to the experiences of intuition, intuitive processing, its utility and the application of intuition in the future. The only exception was the unambiguous question relating to the methods of exercising intuition: "Have you found new methods of utilizing your intuition?"

The changes between the questionnaires collected before and after were classified into three categories: 1) evident change (yes); 2) not a significant change (no); and 3) cannot be classified with certainty (?). The results were classified by comparing the answers given before and after the course. The changes were monitored also through the quality, accuracy and attitude of the written expression (positive/ negative/ hesitance/ certainty). Table 1 summarises the outcomes of the questionnaires and trends found in the answers.

Intuition coaching

In intuition coaching courses, we gave students methods to understand their personal intuition and intuition in general. The exercises aimed to activate the awareness of intuition and the process of intuiting. Further, we highlighted the importance of constant utilization and evaluation of intuition as a part of the development process. An important element of the course has been helping students to open up to the possibilities of intuition and to help them to increase their trust in their own personal skills. Sometimes this requires encountering strong resistance and emotional reactions before a student starts to trust him/herself and opens up to intuition through exercises.

Intuition development can be supported through the different phases of intuiting. These include: understanding, trusting, tuning into, monitoring, discerning, interpreting and test-

ing of intuition. During the course, students are supported in finding personal ways to follow and process intuitive information. They are encouraged to accept all sensations, emotions and feelings without evaluating them as good, bad, suitable or unsuitable. The starting point is the meaningfulness of the sensation for oneself.

As the course advances, the students practise recognizing their sensations and knowledge related to intuition. They practise perceiving these signals and their importance, as well as how intuitive information relates to conscious reasoning and decision making. An important part of the course is sharing these experiences with other participants. We employed a great variety of exercises, such as meditation, mindfulness, visualization, conscious and targeted questioning, as well as exercises focusing on concentration, breathing, relaxation, sensing and reflection of experiences. We focused on different forms of information: embodied knowledge, seeing, hearing, levels of consciousness, mental images and weak signals from the surroundings. Further, we reflected on the focus of attention (the focus of attention), personal reactions (feelings, emotions) and the personal way of handling reactions (confirmations, reasoning, control). Additionally, we resorted to several alternative models of intuition in order to support students' understanding about their personal intuition, while not trying to fit their experiences into a model. We emphasized the personal *utility* of the model instead of concentrating on its theoretical truthfulness or *validity*.

Results

The preliminary research results suggest that one can learn to develop one's intuition. To support this development, it is essential to use intuition intentionally and to reflect on intuitive experiences. We do not have the perfect solution for integrating intuition more widely into teaching structures, but our own teaching experiments give some pointers on how this issue can be approached.

The major changes relate to the learning of new methods and awareness of the personal processes of intuiting. In approximately half of the students' answers, the description of intuition had grown to become more personal and specific, while the remainder showed no evident change in the descriptions. Further, some of the latter descriptions were more abstract and less personal. The smallest change was found in the development of self-knowledge. Several students spontaneously mentioned this in their answers, while others did not mention it at all. Also, some answers were so hard to classify that the result for this parameter is uncertain.

Since the sample was small and there was ambivalence relating to the unclassified answers, the final conclusions are difficult to derive. However, the results of the questionnaires are in accordance with our personal observations of the students' reactions and the group discussions. A typical reaction to the increasing consciousness is the improved awareness of the intuiting process (for example, embodied signals) (yes=86%).

All students gained new applicable methods for exercising their personal intuition (yes=100%). The univocal result probably stems from two possible explanations. First, during the course, we explored more than a dozen different methods, some of which were very unusual. Second, this is the only category where the question was asked directly and, in such formatted questions, the answers tend to be more positive.

After the course, almost all the students significantly changed their definition of personal intuition. The parameters compared in this question comprised personality growth, personal sensing and concrete examples. A significant deepening in the personal description is found in half of the answers (yes=48%). This finding is not in accordance with our personal written observations, where almost all of the definitions given by the students became more personal as the course progressed. Typically, the descriptions were more abstract and general in the beginning. At the end

THE EXPERIENCED CHANGES AFTER INTUITION COACHING	yes	no	?
More methods for utilizing intuition	100%	0%	0%
Improved awareness of the intuiting process	86%	10%	4%
More personal description of intuition	48%	43%	9%
Better trust in intuition	76%	10%	14%
Better understanding about oneself (not just about intuition)	52%	19%	29%

of the course, students accentuated their personality more in their experiences, as well as in their personal process of intuiting.

Based on our notes, some of the students felt that they had experienced significant personal development. Further, most of the participants reported being more conscious of the process of intuiting. Their understanding about intuition had become more diverse, not just including emotions and flashes, but expanding from emotions into more verbalized expressions of their embodied experiences, including a variety of experiences and hints through multiple senses. The understanding of oneself as an intuitive operator had become more positive: they had more trust in the potential to use and develop their intuition.

All experiences were not univocally positive. One student reported in the middle of the course that she was not as convinced as she had been in the beginning of whether she was truly intuitive or not. Several students expressed frustration both in the discussions and when completing questionnaires that verbalizing intuition is extremely difficult. In all the groups, some students resisted, either intellectually or emotionally, some of the presented models of intuition, as they conflicted with their earlier beliefs – even though we offered the models as alternatives to each other.

Of the teaching modes adopted, students reported personal coaching and exercises as being important. Further, the group discussions were

Table 1:
The experienced changes reported by the students after the coaching course

highly valued in every feedback form. In particular, in mind-challenging areas, such as expanding personal thinking and removing excessive scepticism, the group played a significant role and hearing the stories of others was reported as meaningful. The students stated that receiving positive acceptance of their personal experiences and thoughts was crucial in accepting personal intuitive experiences. At the end of the course, attitudes related to intuition widened – both through our own observations and through the stories told by students. Several students reported a change in attitudes towards more accepting ones in issues where previously their attitudes had been categorically negative.

The results support the current view presented in the literature, according to which conscious intuition exercises can help a student recognize, activate and develop the internal processes of intuiting. Our experiments suggest that these developmental skills of intuition give them new knowledge. According to students, this knowledge is a valuable instrument both in their own decision making and in the process of creation.

The feedback collected from the course is in accordance with the current understanding reported in the literature, where intuition is seen as developmental potential. This development is rooted in the observation of personal intuitive experiences and utilization of intuitive information, as well as testing it in decision making. Intuition coaching courses offer a guided and accepting atmosphere in which to encounter the process of intuiting and to test different methods. A general understanding about the process has increased the awareness of personal observations and competence to utilize intuition. Based on our experience, this can lead to a positive loop, where the use of intuition increases understanding of intuition, which, in turn, increases the readiness to utilize intuition.

Another important observation relates to the group dynamics of coaching. In a larger, lecture-type group, students are not as ready to test methods and share their experiences as in a small group. Students reported that the experiences, doubts and interpretations shared in an atmosphere of trust were an important part of the development. After hearing stories told by others, students were more willing to share their own experiences and more accepting of them. The stories also broadened their perspectives and created more understanding of the varying work methods used during group work. After the course, nearly everyone's attitude towards intuition became more accepting. The participants made a conscious decision to increase their utilization of intuition. Students reported being ready to test new ways to recognize and activate personal intuition and to continue to develop it – even though not all the exercises in the course suited everyone.

Asta Raami
& Samu Mielonen

KOKEMUKSIA
INTUITIOVALMENNUKSESTA
Intuition implisiittisestä oppimisesta
kohti tietoista kehittämistä

Ihmiselle on tyypillistä ajatella ensin intuitiivisesti. Intuitiivista ajattelua seuraa usein rationaalinen ajattelu – viiveellä. Useat kokeet neurologisista vaurioista kärsivillä ihmisillä ovat vahvistaneet intuitiivisen ajattelun ensijaisuuden: vaikka rationaalinen ajattelu olisi täysin vaurioitumaton, johtaa vaurio intuitiivisessa ajattelussa kykenemättömyyteen tehdä yksinkertaisimpiakin arkipäiväisiä päätöksiä. Mutta voiko intuitiivista ajattelua opettaa ja oppia? Taideteollisessa korkeakoulussa on kartutettu tietämystä Coaching Creativity -kurssien avulla.

Intuitio on olennainen osa luovaa prosessia, ja sen elintärkeä rooli on tunnustettu myös matematiikassa, yritystoiminnassa ja useilla tieteiden alueilla (Agor 1989; Bunge 1962; Bastick 1982; Fischbein 1987). Intuition merkitys on oleellinen uuden luomisessa ja toteuttamisessa, joissa se voi toimia hyödyllisenä ja nopeana apuna päätöksenteossa. Intuitio voi myös johdattaa uuteen ymmärrykseen tai näyttää lupaavan suunnan ja auttaa näin ratkaisun kehittelyssä. Intuition kautta voi saada välähdyksiä uudesta ideasta tai ratkaisusta, jota voi tietoisen mielen avulla työstää eteenpäin. Intuitio voi myös erityisissä tilanteissa johtaa merkittävästi parempiin tuloksiin kuin tietoinen, rationaalinen päättely keskimäärin (Gigerenzer 2007; Klein 1998).

Historiallisesti intuitio on myös yhdistetty osaksi sanattoman tiedon prosesia (Polanyi 1958). Intuitio on määritelty yleisesti tietämisen tavaksi, jonka prosessi ei ole tietoisuuden tavoitettavissa, vaikka lopputulos onkin. Koska tiedostamatonta prosessia on vaikea tutkia, ei intuition tarkasta määritelmästä vallitse yksimielisyyttä (Betsch 2008). Intuitiosta onkin tarjolla myös runsaasti vaihtoehtoisia selitysmalleja, jotka pyr-

kivät intuition kokemuksen kuvaamiseen ja mallintamiseen ei-tieteellisin menetelmin, keskittyen subjektiivisen kokemuksen laatuun (Nadel 2006).

Intuition ymmärtämisen vaikeus on usein johtanut sekä mystifiointiin että käsitykseen intuitiosta jonkinlaisena ennustamisena, selvänäköisyytenä tai täydellisesti selittämättömänä ilmiönä (Atkinson & Claxton 2000). Vaikka intuitioprosessin sisällöstä on vain vähän kokeellista tietoa, tutkimukset antavat näyttöä, että intuition prosessia on mahdollista tutkia ainakin sen reuna-alueilla – siis juuri ennen ja jälkeen intuitiivisen hetken (Klein 1998; Petitmengin-Peugeot 1999). Viime aikoina on myös alkanut löytyä selkeitä viitteitä siitä, että intuitiota voidaan tietoisesti kehittää (Vrugtman 2009; Seligman & Kahana 2009).

Käsittelemme tässä artikkelissa intuition kehitettävyyttä erityisesti design- ja sisältötuotannon valmennuksessa, omien opetuskokemustemme kautta. Kehityksen rajaamme tässä erityisesti intuition tietoiseen (vrt. sattumanvaraiseen) hyödyntämisen ja sen signaalien tiedostettuun hyödyntämiseen. Emme siis ota kantaa, onko kyky jo valmiina ihmisessä, vaan olemme kiinnostuneita siitä, voiko harjoittelun avulla parantaa valmiutta aktivoida ja hyödyntää intuitiota. Emme myöskään rajaa intuition käsittelyä designalueen designintuitioon, vaan yleiseen intuitiiviseen ajatteluun, joka on kirjallisuuden perusteella sovellettavissa myös muilla toiminnan alueilla. Pohdimme, kuinka henkilökohtaisia intuitiivisia kokemuksia voitaisiin hyödyntää laajemmin kaikessa opetuksessa: kuinka tuoda kokemuksia näkyväksi, jakaa niitä ja integroida niitä omaan kehitykseen oppijana.

	HAVAINTO	INTUITIO systeemi 1	PÄÄTTELY systeemi 2
OMINAISUUDET		Evolutiivisesti vanha	Evolutiivisesti nuori
		Tiedostamaton, esitietoinen	Tiedostava
		Implisiittistä tietoa	Eksplisiittistä tietoa
		Automaattinen	Intentionaalinen, kontrolloitu
		Nopea	Hidas
		Rinnakkainen	Sarjallinen
		Intuitiivinen	Reflektiivinen
		Kontekstuaalinen	Abstrakti
		Käytännöllinen	Looginen
		Assosiatiivinen	Sääntöpohjainen
		Vaivaton	Työläs
		Emotionaalinen	Neutraali

Rationaalinen ja intuitiivinen ajattelu

Intuition laajasta käsitteestä ei vallitse yksimielisyyttä, mutta käytännöllinen tapa ajatella intuitiota on pitää se monoliittisena käsitteenä, joka pohjautuu ajattelun yleiseen kaksoissysteemimalliin (Evans & Frankish 2009). Kaksoissysteemimalli jakaa ihmisen ajattelun kategorisesti kahteen erilaiseen prosessiin: tiedostamattomaan intuitiiviseen (systeemi 1) ja tietoiseen rationaaliseen (systeemi 2). Mallin muunnelmia on useampia ja ne ovat kehittyneet samoihin aikoihin eri tieteenaloilla. Viimeisen kahden vuosikymmen aikana niistä on tiivistetty yleinen kaksoissysteemimalli, jota voidaan kuvata oheisen jaottelun mukaisesti (Kuvio 1).

Intuitio monoliittisesti määriteltynä on osa ensimmäistä systeemiä (Kuvio 1). Näin määriteltynä esimerkkejä intuitiivisista prosesseista voisivat olla esimerkiksi periytyvät kyvyt (kielen oppiminen), vaistonvaraiset toiminnot (pään kääntäminen kohti ääntä), yliopitut kyvyt (harjaantunut autolla ajaminen), välähdyksenomainen oivaltaminen (ahaa-elämys), tuntemus potentiaalisuudesta (valinta vaihtoehtojen välillä), tuntemus asian oikeellisuudesta (sisäinen varmuus)

Kuvio 1:
Ajattelun kaksoissysteemimalli, mukaillen
(Evans & Frankish 2009)

tai vaikkapa tunnereaktio (pelko). Emme tee tässä tarkempaa jakoa erilaisten intuitioiden välille, vaan keskitymme käsittelemään niitä toistaiseksi jakamattomana joukkona. Oleellista intuitiossa on sen välitön, tiedostamaton, vaivaton ja tiedonkäsittelyllisesti kokonaisvaltainen luonne.

Ajattelun kaksoissysteemimallin tutkimus on intuition osalta viime vuosikymmeninä keskittynyt erityisesti systeemi 1:n systemaattisten ajatteluvirheiden ymmärtämiseen. Tämä heuristiikkoja ja vinoumia käsittelevä traditio on yksi kokeellisen kognitiivisen psykologian tärkeitä kartoituksia ihmisen ajattelun taipuvaisuuksista ja niille ominaisista virheistä (Kahneman & Tversky 1982). Sen vaikutukset ulottuvat yleisestä päätöksentekoteoriasta sekä käyttäytymistaloustieteistä aina ennustamisen tarkkuuteen ja asiantuntijoiden ajatteluun (Tetlock 2005; Gilovich &

Griffin 2002). Luonnollisen päätöksenteon ja tieteellisen keksinnön tutkimukset ovat kuitenkin osoittaneet intuitiivisen ajattelun toisen puolen; se ei ole yksinään ajattelua nopeuttavia ja virheisiin sortuvia oikoteitä, vaan myös elintärkeä osa ihmisen perusajattelua, mukautuvaa älykkyyttä ja kykyä tuottaa uutta tietoa (Bastick 1982; Klein 1998; Shavinina 2009; Stanovich 1994).

Intuitio erottamaton osa ajattelua

Ihmiselle on tyypillistä ajatella ensin intuitiivisesti. Tätä intuitiivista ajattelua seuraa usein viiveellä tietoinen rationaalinen ajattelu. Intuitio on kuitenkin jo arkipäiväisessä toiminnassa ensisijainen ja elintärkeä osa ajattelua. Kokeet neurologisista vaurioista kärsivillä ihmisillä ovat vahvistaneet intuitiivisen ajattelun ensisijaisuuden: vaikka testihenkilöiden rationaalinen ajattelu olisi täysin vaurioitumaton, johtaa vaurio intuitiivisessa ajattelussa kykenemättömyyteen tehdä yksinkertaisempiakin arkipäiväisiä päätöksiä tai integroida kokemuksia osaksi tulevia päätöksiä (Volz & von Cramon 2008). Tiivistäen voi todeta, että itsenäinen elämä ilman intuitiivista ajattelua on mahdotonta. Intuition vaikutus ei rajoitu päätöksentekoon asioista ja ongelmista, vaan se integroituu oleelliseksi osaksi ihmisten välistä vuorovaikutusta. Tutkimalla ihmisen empatian ja intuition kykyä peilata toisten toimintaa on huomattu niiden tärkeys onnistuneelle kanssakäymiselle (Preston & de Waal 2002). Empatia on hyvin pitkälle tiedostamatonta, intuitiivista toimintaa, mikä tekee intuitiosta välttämättömän myös sosiaalisessa vuorovaikutuksessa.

Innovaatiotutkija Shavininan laaja katsaus Nobel-palkittujen tiedemiesten työstä ja haastatteluista on lisäksi vahvistanut, että näistä useat pitävät intuitiota uuden tieteellisen innovaation synnyttämisen kannalta keskeisenä. Rationaalista ajattelua sovelletaan uuden tiedon analysointiin ja testaamiseen, mutta ilman intuitiota ei synny uutta ymmärrystä (Shavinina 2003; Root-Bernstein & Root-Bernstein 2003; Shavinina & Seeratan 2004; Shavinina 2009). Tiedemaailman rationaalisen ajattelun ja systemaattisen etenemisen korostaminen on johtanut myös toisinaan harhaluuloon, että intuitio tuottaisi automaattisesti heikompia tai epäkelvompia ratkaisuja kuin puhdas rationaalinen päätöksenteko. Päätöksenteon tutkijat ovat kuitenkin huomanneet, että hyvin monimutkaisissa ja aikarajoittuneissa päätöksentekotilanteissa intuitio tuottaa usein täysin ylivertaisia päätöksiä tietoiseen päättelyyn verrattuna (Klein 1998; Dijksterhuis 2006). Tyypillisesti tällaisia tilanteita ovat sellaiset, jossa ei ole tarpeeksi tietoa päätöksen tekemisestä tai sitä on yksinkertaisesti liikaa – pahimmassa tapauksessa samanaikaisesti liian vähän oleellista ja liikaa turhaa tietoa. Intuition hyöty korostuu erityisesti, jos aikaa päätökselle on vähän. Neurologiset tutkimukset viittaavat intuition olevan parempi silloin, kun eksplisiittinen muisti pettää (Frank, O'Reilly & Curran 2006).

Tutkimustuloksista kaikista haastavimpia ovat koetulokset, joissa osoitetaan ihmisen kehollisesti tietävän asioita tarkemmin kuin rationaalisesti ja toisinaan jopa ennen kuin hänen rationaalinen mielensä voi niitä edes teoriassa tietää, tai ilman että tämä perustuu aikaisempaan kokemukseen (Bechara 1997; Bem 2011). Vaikka nämä tulokset ovat alustavia, ne muistuttavat, että intuition jakamaton käsite voi pitää sisällään tietämisen prosesseja, joita emme tunne vielä kovinkaan hyvin. Intuition ja rationaalisen ajattelun keskinäinen suhde on siis monisyisempi, kuin usein oletamme. Molemmat tuottavat sekä hyviä että huonoja päätöksiä. Suuri osa intuition prosesseista tunnetaan heikosti ja näiden kahden eri systeemin soveltuvuus vaihtelee tilanteen ja päätöksentekijän mukaan. Ajattelun systeemien ei kuitenkaan tarvitse sulkea toisiaan pois, ja ajattelutavat yhdistämällä syntyykin usein paras lopputulos.

Intuitio nykyopetuksessa

Intuition tärkeys opetuksessa on tunnistettu jo pitkään. Bruner kirjoitti uraauurtavassa teoksessaan jo 1960-luvulla intuition tärkeydestä psyko-

logiassa ja opetuksessa (Bruner 1960). Noddings on puolustanut intuition roolia opetuksessa esimerkiksi luovien prosessien ja moraalisen kehityksen näkökulmasta (Noddings 1998). Intuition vähyyteen opetuksessa on myös kiinnitetty huomiota, etenkin kun sen tärkeys on tunnustettu vuosikymmenien ajan (Fischbein 1987). Viimeisen kymmenen vuoden aikana on jo esitetty ajatuksia siitä, kuinka intuitio kehittyy ja kuinka sitä voidaan opettaa (Quirk 2006).

Intuitio on siis ymmärretty keskeiseksi osaksi ihmisen kognitiota ja sen tärkeys opetuksessa tunnustetaan yhä useammin. Tästä huolimatta intuitio tuntuu useimmiten puuttuvan niin opetuksesta kuin sen suunnittelusta (Harvey 1999). Ajattelun taitojen kehittäminen painottuu nykyopetuksessa pääosin systeemi 2:n tietoisten ja rationaalisten ajattelun harjoittamiseen sekä eksplisiittisen tiedon omaksumineen. Todistus tälle on käänteinen: kouluista löytyy hyvin vähän opetusta, jossa intuition kehittäminen tehdään tietoisesti ja eksplisiittisesti. Intuitio, sikäli kuin se näkyy koulutussuunnitelmissa tai itse kursseissa, on usein nähty liittyvän taide- ja taitoaineisiin. Niissä intuition rooli on pääosin implisiittisen oppimisen kautta tapahtuvaa, sanattoman tiedon ja taidon oppimista näissä aineissa. Intuition tietoiselle hyödyntämiselle, kehittymiselle ja metakognitiolle ei tunnu tutkimustuloksista ja mahdollisuuksista huolimatta löytyvän sijaa.

Intuitio voidaan ymmärtää – asiantuntijuuskeskeisestä sanattomasta tiedosta poiketen – joukkona erilaisia aktivoitavia tiedostamattomia prosesseja, jotka ovat yhteisiä eri tieteen- ja tekemisen alueille (Shefy & Sadler-Smith 2004; Raami, Mielonen & Keinänen 2010). Eli intuitio harjoitettavana kykynä ei ole vain toimialakohtaisia sanattomia tietorakenteita, vaan myös näistä riippumattomia tuntemusprosesseja. Vaikka intuition prosessin tarkka sisältö onkin määritelmällisesti tietoisuuden tavoittamattomissa, voidaan intuition kokemusta tarkastella ennen ja jälkeen itse intuition tapahtuman, eli miten virittyä intuitioon ja miten havainnoida

sen tuottamaa tietoa. Eroa perinteisesti ajatellun asiantuntija-aluekohtaisen sanattoman tiedon ja intuition tahdonvaraisen hyödyntämisen välillä voidaan kuvata myös seuraavasti: sanaton tieto tarjoaa hyödynnettäviä sisäisiä tietorakenteita, joihin voidaan päästä helpommin käsiksi intuitiota aktivoimalla, tätä tietoa tietoisesti reflektoimalla ja sanattoman tiedon ratkaisujen hyödyllisyyttä arvioimalla. Implisiittisiä tietorakenteiden kertymistä ymmärretään nykyään painottaa, mutta intuition tietoista ja tahdonvaraista kehittämistä puolestaan ei opeteta.

Toisin sanoen oppimisen käytännöistä puuttuvat vielä: 1) metakognitio systeemi 1:n ja 2:n käytön valinnan välillä, 2) intuition tietoinen kehittäminen ja 3) intuitiivisten ajatusten tietoinen hyödyntäminen ja reflektointi. Tarkemmin, näiden taitojen opettaminen puuttuu lähes tyystin, samoin kuin intuition käytön lisäämiseen tähtäävä opetus. Intuition opetuksessa on nähtävissä ainakin kaksi erillistä vaihetta: 1) olemassa olevan intuition hyödyntäminen ja 2) intuitiivisen kyvyn kehittäminen. Jotta oppija voisi kehittyä ajattelemaan laadullisesti paremmin myös intuitiolla (2), täytyy hänen ensin oppia aktivoimaan oma intuitionsa, havainnoimaan sen signaalit ja integroimaan niitä ajatteluunsa (1). Opetus taidealoilla sisältää systeemi 1:n aluetta implisiittisesti kehittävää opetusta. Pääsääntöisesti taide- ja taitoaineiden opetus keskittyy ainekohtaisten taitojen harjaannuttamiseen. Harvoin ajattelu tuodaan meta-tasolle ja pohditaan tietoisesti sitä, miten voin aktivoida oman intuitioni. Miten havainnoin ja hyödynnän sen tietoa? Käytänkö ensisijaisesti intuitiota vai rationaalista ajattelua tässä tilanteessa?

Haastattelemamme asiantuntijat kertovat käyttävänsä intuitiota tietoisesti ja uskovat osaavansa hyödyntää sitä tahdonvaraisesti. Usein tällaiselle osaamiselle ei ole sijaa opetuksessa eikä sitä pidetä tärkeänä osana omaa tietoista ammatillista ja menetelmällistä kehittymistä. Intuitio ei usein ole riittävä tai hyväksyttävä perustelu – vain rationaaliset selitysmallit hy-

väksytään. Riskinä on systeemi 1:n potentiaalin hukkaaminen.

Alustavat tutkimustulokset viittaavat siihen, että intuition käyttöä voi kehittää ja intuition kehittymisen kannalta on oleellista käytön ja kokemusten tietoinen käsittely. Meillä ei ole esittää täydellistä ratkaisua intuition integroimiseen opetusjärjestelmään, mutta omat opetuskokeilumme antavat mielestämme viitteitä siitä, miten asiaa on mahdollista lähestyä.

Intuitiivisen kokemuksen tärkeys

Viimeisen seitsemän vuoden aikana olemme valmentaneet yli sataa design- ja sisältötuotannon opiskelijaa ja haastatelleet kahtakymmentä ammatissa vuosia toiminutta asiantuntijaa, joille intuitio on keskeinen apuväline. Lisäksi olemme perehtyneet kirjallisuuden kautta henkilökohtaisiin kertomuksiin intuition käytöstä.

Intuitiiviset kokemukset ovat erittäin tärkeitä kokijalleen. Ne ovat monesti perinteisten normiemme ulkopuolella ja siten sekä herkkiä että määrittelyjä pakenevia. Ne myös menettävät helposti merkityksensä, jos niitä yritetään sovittaa perinteisiin suunnittelun malleihin tai ymmärrykseen siitä, miten ammattitaitoisen suunnittelijan luovan ideoinnin tulisi edetä ollakseen asiantuntevaa ja herättääkseen arvostusta. Tällainen henkilökohtainen kokemus tulee merkitykselliseksi kuitenkin vasta sitten, kun siitä voidaan puhua ja se hyväksytään tärkeänä kokemuksena. Liiallinen analysointi tai rationalisointi voivat vääristää intuition luonnetta tai jopa kieltää kokemuksen merkityksen ja olemassaolon. Olemme erittäin taitavia kieltämään intuitiiviset kokemuksemme, rationalisoimaan ja selittämään ne pois (Mayer 2007; Myss 2004). On erittäin tärkeää hyväksyä, havainnoida ja reflektoida näitä henkilökohtaisia intuitiivisia kokemuksia, jotta intuitiota voidaan kehittää eteenpäin (Hogarth 2001; Mielonen, Raami, Keinänen, & Rouhiainen 2009).

Haastattelemamme asiantuntijat kertoivat intuition olevan heidän tärkeimpiin kuuluvia työvälineitään, mutta silti he eivät useimmiten osaa kuvata kokemuksiaan muuten kuin metaforien kautta. Eräs suunnittelija kuvaa intuition käyttöään sanoin *"olla pää tötteröllä"*, kun taas toinen sanoo intuitiivisen kokemuksen olevan *"kuin sytyttäisi valot pimeään huoneeseen"*. Intuition käsitteistön ja sanaston puuttuminen saattaa johtaa myös liialliseen mystifiointiin ja siihen, ettei ilmiöstä edes pyritä ottamaan selvää (Atkinson & Claxton, 2000). Poikkeuksena ovat erilaiset itsetuntemukseen liittyvät traditiot, itseilmaisuun liittyvät alueet ja ns. "hörhöilyksi" leimatut alueet, joissa on vapaus ajatella vertauskuvallisella käsitteistöllä ja ilmaisuilla.

Kulttuurimme suhtautuminen intuitiivisiin kokemuksiin on helposti polarisoivaa: joko se hyväksytään kritiikittömästi mystisenä tietona tai sitä vähätellään ja halutaan kieltää sen arvo kokonaan. Väitämme, että kokemusten vähäisen käsittelyn ja intuition polarisoinnin takia valtavirrassa on suhteellisen vähän tietoisia pyrkimyksiä kehittää intuitiota ajattelussa tahdonvaraisena, harjoitettavana kykynä.

Intuition harjoittaminen pienryhmäopetuksella

Aalto-yliopiston Taideteollisen korkeakoulun Medialaboratorion *Coaching Creativity* -kursseilla valmensimme vuosien 2004–2011 aikana yli sataa opiskelijaa. Viimeisen kolmen vuoden aikana keskitymme pääasiallisesti intuition valmentamiseen Aalto-yliopistossa ja sen ulkopuolella. Kahdelta viimeisimmältä kurssilta keräsimme aineistoa systemaattisesti. Maisteriopiskelijoiden kurssilta keräsimme aineistoa kahdeksalta opiskelijalta. Kokosimme aineistoa myös yhdeltä täydennyskoulutuskurssilta, jolle osallistui 15 sisältötuotannon ammattilaista. Kaikki opiskelijat kuvasivat intuitio-käsityksiään kyselylomakkeella sekä ennen kurssin alkua että sen loputtua. Lisäksi maisteriopiskelijat pitivät intuitioon liittyvää oppimispäiväkirjaa kurssin ajan. Yhteensä aineistoa kerättiin 23 opiskelijalta. Omat muistiinpanomme ja edellä mainittu opiskelijoilta saatu aineisto muodostavat keskeisen tutkimusaineistomme.

Annoimme kursseilla opiskelijoille keinoja jäsentää omaa intuitiotaan ja intuitiota yleisesti. Pyrimme harjoituksilla aktivoimaan ja havainnoimaan intuitiivista tietoa itsessä. Näiden lisäksi korostimme intuition jatkuvan käytön ja arvioinnin tärkeyttä kehittymiselle. Tärkeä osa kurssien sisältöä oli avautuminen intuition mahdollisuudelle ja luottamus omiin kykyihin. Kokemuksemme mukaan tämä edellyttää toisinaan hyvinkin voimakkaiden skeptisten ja emotionaalisten asenteiden kohtaamista, ennen kuin opiskelijat luottavat itseensä ja avautuvat intuitiiviselle tiedolle harjoituksissa. Opetuskokemustemme perusteella olemme hahmottaneet seuraavan työskentelymallin intuition kehittämisen eri vaiheista (kuvio 2). Mallin yksityiskohtainen läpikäynti on rajattu tämän artikkelin ulkopuolelle. Keskitymme tässä vaiheisiin, joiden harjoitteiden opettamiseen olemme täh-

dänneet viitatuilla kursseilla.

Intuitiota harjoitettiin kursseilla ensisijaisesti ymmärryksen, luottamuksen, virittymisen, havainnoinnin, erottelun, tulkinnan ja testaamisen kautta (Kuvio 2). Tuimme ymmärrystä esimerkeillä intuitiosta, tarinoilla ja intuitioprosessin malleilla. Rakensimme luottamusta jakamalla yhteisesti kunkin omia intuitiokokemuksia ja rohkaisimme opiskelijoita arvostamaan omia subjektiivisia intuitiokokemuksiaan. Virittymistä ja havainnointia kursseilla harjoiteltiin karsimalla ulkoisia ärsykkeitä, tyhjentämällä tietoista mieltä ajatuksista ja tarkkailemalla omia sisäisiä aistimuksia ja tuntemuksia. Erottelu, tulkinta ja testaaminen nivoutuivat harjoitteissa usein toisiinsa: opiskelijoita harjoitettiin erottamaan erilaisia sisäisiä havaintoja toisistaan (esimerkiksi kehon tuntemukset, mielikuvat, sisäinen puhe) ja tulkitsemaan niiden tärkeyttä sekä merkitys-
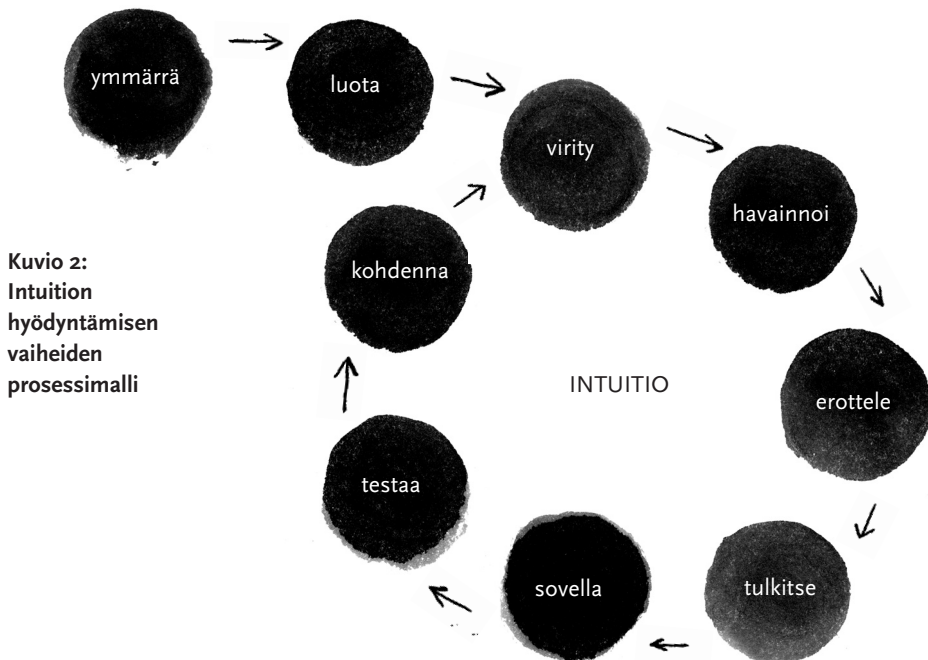
**Kuvio 2:
Intuition
hyödyntämisen
vaiheiden
prosessimalli**

tä (esimerkiksi pelot, toiveet, ideat). Testaamiseen liittyi kaikkien aikaisempien vaiheiden erottelua, tulkintoja ja oikeellisuuden arviointia (esimerkiksi oliko kyseessä intuitio, tulkitsiko tai sovelsiko sitä oikein tai oliko siitä hyötyä). Kohdentamis- ja soveltamisvaiheiden harjoitteet tähtäsivät intuition hyödyntämiseen konkreettisissa haasteissa.

Autoimme kursseilla opiskelijoita löytämään omia tapoja henkilökohtaiseen tiedon havainnointiin ja käsittelyyn. Rohkaisimme opiskelijoita hyväksymään kaikki aistimukset, tunteet ja tuntemukset ilman niiden arvottamista hyväksi, huonoksi, sopivaksi tai epäsopivaksi. Lähtökohtana on avautuminen sille, mitä tämä aistimus voi viestiä itse kullekin. Havainnoinnin, huomiokyvyn herkkyyden ja havaintojen erottelukyvyn kehittäminen ovat keskeisiä elementtejä intuition henkilökohtaisessa tutkimisessa, jotta intuition oikeellisuutta ja merkityksellisyyttä voi arvioida (Nadel 2006).

Oppijat harjoittelivat tunnistamaan, millaista aistimusta tai tietoa he havaitsevat itsessään, mikä siitä ovat merkityksellisiä ja kuinka se suhteutuu omaan tietoiseen ajatteluun ja päätöksentekoon. Tärkeä osa opetusta oli sekä omien kokemusten jakaminen puhumalla että ajattelun ulkoistaminen itselle kirjoittamalla. Käytimme intuition kehittämisessä apuna muiden muassa mielikuvaharjoituksia, meditaatiota, tietoista keskittymistä, ajattelun suuntaamista mielikuvilla ja kysymyksillä, havainnointiharjoituksia, hengitysharjoituksia, rentoutumista ja koetun reflektointia. Keskityimme myös erilaisiin subjektiivisiin kokemuksiin tiedon kanavasta ja luonteesta: keholliset aistimukset, näkö ja kuulo, tietoisuuden tasot, mielikuvat ja ympäristötekijät olivat vuorollaan olleet tarkkailun kohteena. Tarkasteltavana olivat myös olleet oman huomion kohteen tiedostaminen (tiedosta mihin kiinnität huomiota), omat reaktiot aistimuksille (tunteet, tuntemukset) ja oma tapa käsitellä reaktioita (vahvistaminen, järkeily, kontrollointi).

Käytämme opetuksessa lukuisia vaihtoehtoisia intuition malleja, joiden moninaisuus helpottaa opiskelijoita löytämään merkityksiä heidän omille henkilökohtaisille kokemuksilleen; he voivat sovittaa alkuperäiset kokemuksiensa sopivaan malliin eikä päinvastoin. Toisinaan hyödynnämme jopa keskenään yhteensopimattomia malleja intuitiosta. Tavoitteenamme on antaa välineitä opiskelijan oman intuition havainnoimiseen ja sisäiseen ymmärtämiseen, minkä vuoksi sekä tieteelliset että ei-tieteelliset mallit ovat hyödyllisiä (Sheldrake 1989; Radin 2006). Olemme korostaneet mallin henkilökohtaista käyttökelpoisuutta (*hyödyllisyys*) sen sijaan, että keskittyisimme siihen, onko malli teoreettisesti oikea ja totuudenmukainen (*oikeellisuus*).

Opiskelijoiden kokemuksia intuitiovalmennuksesta

Keräsimme kursseilta palautetta sekä alussa että lopussa. Vertasimme loppukyselyn vastauksia alkukyselyn vastauksiin. Käytimme samoja kyselykaavakkeita 23 opiskelijalla, joista 21:ltä saimme vastaukset sekä alku- että loppukyselyihin (n=21). Loppukyselyissä kysyimme oman intuition määritelmää, intuition käyttöä tulevaisuudessa, omia tuntemuksia intuitiosta, omia uskomuksia, harjoitusten hyödyllisyyttä ja opetettujen menetelmien toimivuutta.

Olemme koonneet oheiseen taulukkoon yhteenvetona opiskelijoiden vastausten suhteellisista muutoksista kurssin alku- ja loppukyselyiden välillä (taulukko 1). Pääosin emme kysyneet suoraan (ei siis "lisääntyikö itsetuntemuksesi"), vaan kysyimme yleisesti kokemuksista, käytöstä, hyödyllisyydestä ja intuition omasta soveltamisesta tulevaisuudessa. Ainoa poikkeus oli menetelmiä koskeva kysymys, jossa kysyimme suoraan: *"Oletko saanut uusia menetelmiä intuitiosi hyödyntämiseen"*. Luokittelimme vastausten muutokset alku- ja loppukyselyiden välillä kolmeen kategoriaan: 1) selkeä muutos (Kyllä), 2) ei merkittävää muutosta (Ei) ja 3) vastausta ei voitu luokitella varmuudella (?). Teimme luokittelut vertaamalla alkukyselyn vastauksia loppukyselyihin ja vertaamalla, ovatko opiskelijoiden

KOETUT MUUTOKSET INTUITIOVALMENNUKSEN JÄLKEEN	kyllä	ei	?
Enemmän menetelmiä intuition käyttämiseksi	100%	0%	0%
Parempi tietoisuus oman intuition prosessista	86%	10%	4%
Intuition kuvailu omakohtaisempi (henkilökohtaisempi)	48%	43%	9%
Parempi luottamus omaan intuitioon	76%	10%	14%
Parempi ymmärrys itsestä (ei pelkästään intuitiosta)	52%	19%	29%

**Taulukko 1:
Intuitiovalmennettavien
omien käsitysten muutos
kurssin jälkeen**

kuvaukset muuttuneet sanallisesti merkittävästi niin laadultaan, tarkkuudeltaan kuin ilmaisun asenteiltaan (myönteisyys/kielteisyys/epäilys/varmuus).

Selkeimmät muutokset koskivat opiskelijoiden itsensä mielestä uusien menetelmien oppimista ja oman intuition prosessin tiedostamista. Noin puolella oman intuition määritelmä muuttui henkilökohtaisemmaksi ja tarkemmaksi. Tästä huolimatta toisella puolella ei ollut havaittavissa selkeästi tulkittavaa muutosta oman intuition määrittelyssä. Lisäksi intuition määritelmä muuttui joillain vastanneilla kurssin jälkeen abstraktimmaksi ja vähemmän omakohtaisemmaksi. Tuloksista kaikista epävarmin on muutos oman itseymmärryksen kasvusta. Vaikka useampi opiskelija toi tämän esiin spontaanisti vastauksissaan, osa ei maininnut sitä lainkaan. Osan vastaukset oli taas niin vaikeasti luokiteltavissa, että epävarmuus tästä tuloksesta jäi hyvin suureksi.

Vastausten pienen määrän ja luokittelemattomien vastausten luoman epävarmuuden takia tuloksista ei voi vetää täysin varmoja johtopäätök-

siä. Kuitenkin kyselyn tulokset vastaavat pitkälti omia havaintojamme opiskelijoiden reaktioista ja heidän kanssaan käydyistä keskusteluista. Hyvin tyypillinen reaktio tietoisuuden lisääntymisestä oli kehon roolin avautuminen oman intuition havainnoinnissa (Kyllä=86 %). Tyypillisiä opiskelijoiden reaktioita kehohavainnoinnista jo aivan ensimmäisten harjoitusten jälkeen kuvaavat seuraavanlaiset kommentit:

> "Olen hämmästynyt siitä kuinka voimakkaat tuntemukset sain käsiini tässä harjoituksessa."

> "On hämmästyttävää että vain muutaman harjoituksen jälkeen pystyn huomaamaan havainnoissani näin suuren eron."

Kaikki vastanneet kokivat saaneensa uusia sovellettavia menetelmiä oman intuition harjoittamiseen (Kyllä=100 %). Tämän vastauksen yksiselitteisyys voi johtua ainakin kahdesta asiasta. Ensinnäkin kursseilla käytiin läpi toistakymmentä hyvin erilaista menetelmää, joista osa on hyvinkin epätavallisia. Toinen ilmeinen syy on, että tämä on ainoa kategoria, jota kysyttiin suoraan ja vastaajat ovat usein taipuvaisempia vastaamaan myönteisesti näin muotoiltuihin kysymyksiin. Tyypillinen kommentti käsittelee harjoitusten soveltamista menetelminä omaan elämään:

*"Hiljentyminen, rauhoittuminen tulee
olemaan päivittäisessä ohjelmassa
jatkossa. Vaikka 5 min/pv."*

Lähes kaikki opiskelijat muuttivat intuiti-
on määritelmäänsä kurssin jälkeen merkittä-
västi. Pelkästä kuvailun muutoksesta on kuiten-
kin vaikea päätellä muutoksen laatua yleisesti.
Keskityimme vertaamaan kuvailussa omakohtai-
suuden, omien tuntemusten ja konkreettisuuden
lisääntymistä. Tämänkaltaista kuvauksen oma-
kohtaisuuden selkeää syventymistä ilmenee vas-
tauksissa noin puolella (Kyllä=48 %). Vastauksista
tämä tulos vertautuu huonoiten omiin opetus-
muistiinpanoihimme. Opetustilanteissa käytyjen
keskusteluiden perusteella oma käsityksemme
on, että lähes kaikkien intuitiomääritys muut-
tuu omakohtaisemmaksi kurssin aikana. Alussa
opiskelijoiden suulliset kuvaukset ovat usein hy-
vin abstrakteja ja yleisiä. Kurssin lopussa he taas
puhuvat enemmän omista kokemuksistaan ja
oman intuitionsa prosessista. Ohessa joitain lai-
nauksia intuition kuvailuista kurssin alussa ja
sen jälkeen:

Kurssin alussa:

*"Tiedostamaton, toimii rauhassa, vaatii
aikaa ja tilaa."*

Kurssin jälkeen:

*"Voin nyt erottaa ajattelun välähdykset
ja intuition välähdykset toisistaan."*

*"Voin kerätä tietoa eri lähteistä nopeasti,
ja minulla on tunne että pystyn
havainnoimaan itseäni miksi saan jonkin
tunteen. Siis, voin kerätä paremmin
tietoa. Se auttaa myös pienissä
päätöksissä."*

Omien havaintomuistiinpanojemme perus-
teella osa piti omaa kehittymistään merkittävä-
nä. Lisäksi suurin osa osallistujista arvioi olevan-

sa kurssin jälkeen tietoisempia omasta intuitio-
prosessistaan. Kokemuksemme mukaan kurssin
myötä opiskelijoiden yleinen käsitys intuitios-
ta ilmiönä on muuttunut monimuotoisemmaksi.
Se ei ole enää pelkästään tunteita tai välähdyksiä,
vaan hyvin paljon erilaisia tuntemuksia ja vihjei-
tä monien eri aistien kautta. Monelle myös käsi-
tys itsestä intuitiivisena toimijana on muuttunut
myönteisemmäksi: he uskovat enemmän mah-
dollisuuksiinsa käyttää ja kehittää intuitiotaan.

Kaikki opiskelijoiden huomioimat kokemuk-
set itsessään eivät kuitenkaan ole yksiselitteisen
myönteisiä. Yksi opiskelijoistamme kertoi kurs-
sin puolivälissä, ettei ole enää yhtä varma kuin
kurssin alussa siitä, onko hän itse hyvin intuitii-
vinen vai ei. Moni ilmaisi turhautumistaan sekä
keskusteluissa että kyselykaavakkeissa, että in-
tuition sanallistaminen on usein hyvin vaikeaa.
Kaikissa opettamissamme ryhmissä osa opiske-
lijoista myös vastusti älyllisesti tai emotionaali-
sesti joitain opetuksessa käytettyjä intuition mal-
leja, jos ne olivat vahvasti ristiriidassa heidän us-
komustensa kanssa, vaikka tarjosimme malleja
vaihtoehtoisina toisilleen.

Käytetyistä menetelmistä opiskelijat kokivat
henkilökohtaisen valmennuksen ja harjoitukset
erittäin tärkeäksi. Lisäksi pienen ryhmän sisäisiä
keskusteluita pidettiin erityisen tärkeinä lähes
kaikissa palautteissa. Etenkin haastavilla alueilla,
kuten oman ajattelun avartamisessa ja skeptisyy-
den poistamisessa, ryhmällä ja toisten kertomus-
ten kuulemisella koettiin olleen tärkeä merkitys.
Opiskelijat myös kertoivat palautteessaan, että
myönteisen hyväksynnän saaminen omille koke-
muksille ja ajatuksille oli tärkeää henkilökohtais-
ten intuitiivisten kokemusten hyväksymisessä.
Kurssin lopussa opiskelijoiden suhtautuminen
intuitioon avartui – sekä omien havaintojemme
että opiskelijoiden omien kertomusten mukaan.
Useat opiskelijat kertoivat muuttaneensa suhtau-
tumisensa myönteiseksi sellaisiin asioihin, joi-
hin aiemmin ovat suhtautuneet kategorisen kiel-
teisesti. Kokemuksemme mukaan intensiivinen
pienryhmäopetus on tukenut hyvin intuition

käytön harjoittelua mahdollistaen sekä henkilö-
kohtaisen valmentamisen että ryhmäkeskustelut.

Havaintoja intuition opettamisesta
Kursseilta keräämämme opiskelijapalaute ja omat
havaintomme vahvistavat alan kirjallisuuden kä-
sitystä intuition yleisestä kehityspotentiaalis-
ta. Lähtökohtana kehittymiselle on havainnoida
henkilökohtaisia intuitiivisia kokemuksia ja hyö-
dyntää intuitiivista tietoa ja testata sitä päätöksis-
sä ja valinnoissa. Kurssit ovat tarjonneet ohjatun
ja sallivan ympäristön oman intuitiivisen pro-
sessin käsittelylle ja kokeilulle erilaisilla mene-
telmillä. Prosessin ymmärrys on vuorostaan nos-
tanut tietoisuutta omista intuitiivisista havain-
noista ja valmiutta hyödyntää niitä päätöksissä.
Kokemuksemme perustella tämä voi parhaimmil-
laan johtaa myönteiseen kehään, jossa intuition
käyttö lisää ymmärrystä intuitiosta ja se puoles-
taan lisää valmiutta käyttää intuitiota useammin.
Havaintojemme mukaan intuition hyödyntämi-
sessä ja integroimisessa päätöksentekoon kurssi-
en ulkopuolella on kuitenkin merkittävää vaihte-
lua opiskelijoiden välillä, mikä näkyy myös alan
kirjallisuudessa päätöksentekotyylin taipuvai-
suuden tutkimuksissa (Betsch & Kunz 2008).

Toinen havaintomme intuition kehittymisen
tukemisesta on pienryhmädynamiikan hyödylli-
syys intuition harjoittelemisessa. Suuremmissa
luentotyyppisissä opetustilanteissa opiskelijat ei-
vät ole yhtä valmiita heittäytymään harjoituksiin
ja jakamaan kokemuksiaan. Pienryhmän luotta-
muksen ilmapiirissä käydyt keskustelut omis-
ta kokemuksista, epäilyistä ja tulkinnoista ovat
opiskelijoiden mukaan tärkeitä oman ymmärryk-
sen kehittymiselle. Kuultuaan toistensa poikke-
uksellisia intuition kokemuksia opiskelijat ovat
valmiimpia myös jakamaan omiaan ja suhtautu-
maan niihin hyväksyvämmin. Keskustelut autta-
vat opiskelijoita vaihtamaan malleja ja suhtautu-
mistapoja keskenään: tietoisuus toisen henkilön
hyvin erilaisesta tavasta tehdä päätöksiä auttaa
sekä avartamaan omaa näkökulmaa että ymmär-
tämään ryhmätyötilanteiden erilaisia työsken-

telytapoja. Kurssin jälkeen opiskelijoiden suh-
tautuminen omaan intuitioon muuttui lähes
poikkeuksetta hyväksyvämmäksi ja tietoiseen
hyödyntämiseen tähtääväksi. Opiskelijat kertoi-
vat olevansa valmiita kokeilemaan uusia tapoja
tunnistaa ja aktivoida omaa intuitiotaan ja jatka-
maan sen kehittämistä, vaikka kaikki harjoituk-
set eivät aina olleet jokaiselle onnistuneita.

Kohti intuition tietoista kehittämistä
Intuitio on erottamaton osa ajattelua ja sillä on
oleellinen rooli niin arkiajattelussa kuin uuden
luomisessa. Rationaalisen ajattelun lisäksi käy-
tämme lähes jatkuvasti intuitiivista päätöksente-
koa apunamme. Nämä molemmat ajattelun tavat
ovat hyödyllisiä, ja molemmat voivat erityisissä
tilanteissa johtaa ylivoimaisesti parempaan lop-
putulokseen. Alan kirjallisuuden ja omien ope-
tuskokeilujemme mukaan sekä intuitiivinen ajat-
telu (systeemi 1) että tietoinen, rationaalinen ajat-
telu (systeemi 2) tarvitsevat kehittyäkseen tukea:
malleja, harjoitusta, havainnointia, testausta ja
reflektointia.

Tutkimustuloksemme tukevat alan kirjalli-
suutta siinä, että tietoisilla intuitioharjoitteil-
la voidaan auttaa opiskelijoita tiedostamaan,
aktivoimaan ja kehittämään omia intuitiivisia
prosesseja. Opetuskokeilumme antavat myös
viitteitä, että nämä kehitettävät intuitiiviset ky-
vyt antavat opiskelijoille uudenlaista tietoa, jon-
ka he kokevat arvokkaana apuna sekä omassa
päätöksenteossaan että ideointiprosessissaan.

Miten intuition tietoinen kehittäminen liit-
tyy aikuiskasvatukseen? Suurin osa kurssiem-
me opiskelijoista on ollut iältään kypsiä aikuisia.
Oma tuntumamme on, että intuition kehittämi-
sellä voi olla merkitystä ihmisen kasvulle, vaikka
tämä ei kyselyaineistosta vahvasti tulekaan esil-
le. Käyttämämme intuition hyödyntämisen mal-
li sisältää paljon oman sisäisen maailman tie-
toista havainnointia, arviointia ja soveltamis-
ta. Tämänkaltainen harjoittelu tuo yksilön omien
tiedollisten, tottumuksellisten ja tunteellisten
haasteiden äärelle. Näiden haasteiden käsittely

on tärkeä osa intuition kehittämistä ja uskoisimme, että myös osa ihmisenä kasvamista.

Omien kokemusten pohjalta kannustaisimme muita kokeiluihin intuitiivisten taitojen kehittämisen eteenpäinviemiseksi, koska uskomme intuitiota tietoisesti hyödyntävien ihmisten kykenevän joustavampaan ja kokonaisvaltaisempaan ajatteluun.

KIRJALLISUUS

Agor, Weston H. (1989) ● *Intuition in organizations: leading and managing productively.* Newbury Park: Sage Publications ●

Atkinson, T., & Claxton, G. (2000) ● *The intuitive practitioner: on the value of not always knowing what one is doing* ● Buckingham [England]: Open University Press ●

Bastick, T. (1982) ● *Intuition, how we think and act* ● Chichester: Wiley ●

Bechara, A. (1997) ● Deciding advantageously before knowing the advantageous strategy ● *Science,* 275(5304), 1293–1295 ●

Bem, D. J. (2011) ● Feeling the Ffuture: experimental evidence for anomalous retroactive influences on cognition and affect ● *Journal of Personality and Social Psychology,* 100 (3), 407–425.

Betsch, C., & Kunz, J. J. (2008) ● Individual strategy preferences and decisional fit ● *Journal of Behavioral Decision Making,* 21(5), 532–555 ●

Betsch, T. (2008) ● The nature of intuition and its neglect in research on judgment and decision making ● In H. Plessner, C. Betsch, & T. Betsch (Eds.), *Intuition in Judgment and Decision Making,* 3–22 ● New York: Lawrence Erlbaum Associates ●

Bruner, J. S. (1960) ● *The process of education* ● Cambridge: Harvard University Press ●

Bunge, Mario (1962) ● *Intuition and science* ● Eaglewood Cliffs, NJ: Prentice-Hall ●

Dijksterhuis, A., Bos, M. W., Nordgren, L. F., & van Baaren, R. B. (2006) ● On making the right choice: the deliberation-without-attention effect ● *Science, 311*(5763), 1005–1007 ●

Evans, J., & Frankish, K. (2009) ● The duality of mind: An historical perspective ● In J. Evans & K. Frankish (Eds.), *In two minds: dual processes and beyond,* 1–28 ● Oxford: Oxford University Press ●

Fischbein, E. (1987) ● *Intuition in science and mathematics: an educational approach* ● Mathematics education library ● Dordrecht: D. Reidel ●

Frank, M. J., O'Reilly, R. C., & Curran, T. (2006) ● When memory fails, intuition reigns: midazolam enhances implicit inference in humans ● *Psychological Science: A Journal of the American Psychological Society / APS,* 17(8), 700–707 ●

Gigerenzer, G. (1999) ● *Simple heuristics that make us smart* ● New York: Oxford University Press ●

Gigerenzer, G. (2007) ● *Gut feelings: the intelligence of the unconscious* ● New York: Viking ●

Gilovich, T., & Griffin, D. (2002) ● Introduction – Heuristics and Biases: Then and Now. In T.Gilovich, D. Griffin, & D. Kahneman (Eds.), *Heuristics and biases : the psychology of intuitive judgment,* 1–18 ● New York: Cambridge University Press ●

Harvey, N. (1999) ● A brief note on knowledge ● *Horizons* (5), 5–8 ●

Hogarth, R. M. (2001) ● Educating intuition ● Chicago: University of Chicago Press ●

Kahneman, D., & Tversky, A. (1982) ● Judgment under uncertainty: Heuristics and biases ● D.Kahneman & A. Tversky (Eds.), *Judgment under uncertainty: heuristics and biases,* 3–22 ● Cambridge: Cambridge University Press ●

Klein, G. A. (1998) ● *Sources of power: How people make decisions* ● Cambridge, Mass: MIT Press ●

Mayer, E. L. (2007) ● *Extraordinary knowing: science, skepticism, and the inexplicable powers of the human mind* ● New York: Bantam Books ●

Mielonen, S., Raami, A., Keinänen, M., & Rouhiainen, L. (2009) ● *Designer's highly personal experiences of intuition – modeling for developing intuition* ● IASDR 2009 Proceedings, 18–22 September 2009 ● Presented at the IASDR 2009, Seoul: COEX ●

Myss, C. M. (2004) ● *Intuitive power [your natural resource]* ● Carlsbad, CA: Hay House Audio ●

Nadel, L. (2006) ● *Sixth sense: unlocking your ultimate mind power* (1st ed.) ● Lincoln, USA: ASJA Press ●

Noddings, N. (1998) ● *Awakening the inner eye: intuition in education* ● Troy, NY: Educator's International Press ●

Petitmengin-Peugeot, C. (1999) ● The intuitive experience ● In F. J. Varela & J. Shear (Eds.), *The view from within: first-person approaches to the study of consciousness,* 43–77 ● London: Imprint Academic ●

Polanyi, M. (1958) ● *Personal knowledge; towards a post-critical philosophy* ● Chicago: University of Chicago Press ●

Preston, S. D., & de Waal, F. B. M. (2002) ● Empathy: Its ultimate and proximate bases ● *The Behavioral and Brain Sciences,* 25(1), 1–20; discussion, 20–71 ●

Quirk, M. E. (2006) ● *Intuition and metacognition in medical education: keys to developing expertise* ● New York, NY: Springer Pub. Co ●

Raami, A., Mielonen, S., & Keinänen, M. (2010) ● *Designers' experiences of intuition: coaching intuitive skills as part of creative design process* ● Melbourne, Cumulus Working Papers ● Publication series G, 52–57 ● Aalto University, School of Art and Design.

Radin, D. I. (2006) ● *Entangled minds: extrasensory experiences in a quantum reality* ● New York: Paraview Pocket Books ●

Root-Bernstein, M., & Root-Bernstein, R. (2003) ● Intuitive tools for innovative thinking ● In L.V. Shavinina (Ed.), *International handbook on innovation,*1st ed., 113–114 ● Amsterdam: Elsevier Science ●

Seligman, M.E., & Kahana, M. (2009) ● Unpacking intuition: a conjecture ● *Perspectives on Psychological Science,* 4(4), 399–402 ●

Shavinina, L. V. (2003) ● Understanding scientific innovation: the case of Nobel Laureates ● In L. V. Shavinina (Ed.), *The international handbook on innovation,*1st ed., 445–45 ●. Amsterdam: Elsevier Science ●

Shavinina, L. V., & Seeratan, K. L. (2004) ● Extracognitive phenomena in the intellectual functioning of gifted, creative, and talented individuals ● In L. V. Shavinina & M. Ferrari (Eds.), *Beyond knowledge: extracognitive aspects of developing high ability,* 73–102 ● Mahwah, NJ: Lawrence Erlbaum Associates ●

Shavinina, L. V. (Ed.). (2009) ● *Scientific talent: the case of Nobel Laureates. In international handbook on giftedness* (649–669) ● Dordrecht: Springer Netherlands ● Retrieved from http://www. springerlink.com/content/kk0t0781810vu322/ ●

Shefy, E., & Sadler-Smith, E. (2004) ● The intuitive executive: Understanding and applying 'gut feel' in decision-making ● *Academy of Management Executive, 18*(4), 76–91 ●

Sheldrake, R. (1989) ● *The presence of the past: morphic resonance and the habits of nature* (1st ed.) ● New York: Vintage Books ●

Stanovich, Keith E. (1994) ● Reconceptualizing intelligence: dysrationalia as an intuition pump ● *Educational Researcher, 23*(4), 11–21 ●

Tetlock, P. E. (2005) ● *Expert political judgment: how good Is it? How can we know?* Princeton, N.J: Princeton University Press ●

Volz, K. G., & von Cramon, D. Y. (2008) ● Can neuroscience tell a story about intuition? In H. Plessner, C. Betsch, & T. Betsch (Eds.), *Intuition in judgment and decision making,* 71–87 ● New York: Lawrence Erlbaum Associates ●

Vrugtman, R. (2009) ● *Dimensions of Intuition first-round validation studies* ● St. Louis, Mo. University of Missouri-St. Louis ●

III

DESIGNERS' EXPERIENCES OF INTUITION

Coaching intuitive skills as part of creative design process

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Abstract

The intuitive discovery of ideas is an important for creativity. Yet there is limited discussion on how intuition is experienced and understood by designers themselves. Experiences of intuition are often absent or neglected. Lack of discussion and understanding on intuitive experiences can hamper the education of novice designers who have limited experience with their creative process. Novice designers are often unsure and rely heavily on normative models for understanding their experiences.

Based on our experience in coaching intuition for designers, interviews with designers, and a survey of intuition literature, we call for legitimization of personal intuition experiences. We propose an approach to advance experiences as part of the personal creative process for utilization and development of intuition as a skill.

1 Intuition essential to creativity

Intuition is considered to be essential to the creative process (Goldberg, 1983; Boden, 1994; Policastro, 1999; Bastick, 2003). In addition, intuition in decision making can also be highly useful, accurate and in some situations superior to rational reasoning (Gigerenzer, 2007; Klein, 1999). Yet there is very little overall agreement as to how the process of intuition exactly works (Betsch, T. 2008; Sinclair & al., 2005; Bastick, 2003). The confusion surrounding intuition has lead historically to mystification of intuition as a form of 'divination' or as something completely unexplainable (Atkinson & al., 2003).

Intuition has also historically been grouped together with the body of tacit knowledge and the act of serendipitous tacit knowing (Polanyi, 1962). Further, highly developed intuitive creative professionals appear to be using intuition also as an active and intentional skill for making decisions, which in turn may draw from tacit knowledge sources (Sternberg et al., 2000).

Recent research has shown that the process of intuition can be at least studied at the periphery – that is right before and after moments of intuitive thought (Hogarth, 2008; Petitmengin-Peugeot, 1999; Policastro, 1999; Klein, 1999). In addition, there are plenty of non-scientific explanations for intuition that attempt to model and make sense of intuition (Brennan, 1988; Lloyd-Mayer, 2007; Sheldrake, 1995; Vaughan 1978).

This paper discusses *experiences* of intuition described by designers and creative artists, attempts to explain their importance, and focuses specifically on *how to handle intuitive experiences and how to develop intentional intuitive skill.* The paper does not make an attempt at *modeling* intuition further and the concept of intuition is taken from the monolithic definition implied by the dual process models of cognition (Betsch, 2008).

2 Significance of personal intuition experiences

Personal intuitive experiences can be extraordinary, multi-sensory, and appear as extra-sensory in their character (Lloyd-Mayer, 2007; Guiley, 2001; Petitmengin-Peugeot, 1999). Due to their character and difficulty in verbalizing them, such experiences are often not studied personally or researched at more general level (Petitmengin-Peugeot, 1999). However, based on the literature and the our own experience it is important to accept and reflect on the personal experience for the development of intuition (Hogarth, 2001; Brennan, 1988).

We have interviewed two dozen of highly experienced creative artists as well as students and professional designers about their experience and use of intuition. In addition, literature search has uncovered more of personal stories of intuition. The stories are important for two purposes. First, they show how personal and sometimes extraordinary experiences appear as highly important to the person who has experienced them, granted they are given a trusting environment in which to accept, share and make sense of them. Second, these experiences lie often beyond the normative and as such are very delicate. They easily lose their meaning if they are over-fitted to pre-given normative models of how designers ought to think and act in order to be considered respectable or professional. That is, the personal truth embedded in such experiences becomes useful only when they are made visible and accepted as they are – without overt rationalization, which risks denying their meaningfulness.

Novice design students are at the beginning of their journey as designers, just getting started in managing their personal creative process. Many are also very unsure of their professional competence. We have noticed that the students interviewed face challenges in expressing and verbalizing their experiences of intuition. It is not easy to talk about the highly personal experiences, partly due to the fact that their vocabulary might be limited in describing such experiences (Wallace, 2007; Brennan, 1993). The students also find it demanding to admit the existence of extraordinary experiences, or to talk

about them without distorting them through rationalizations.

Rationalizing one's own experiences through normative cognitive models can hinder the development of intuitive capability: experiences can be denied altogether (e.g. 'trick of the mind'), they can be over-fitted to certain categories (e.g. 'a mere heuristic'), or their explanations can be evaluated as erroneous (e.g. 'your reasoning is just biased towards that outcome'). This rarely advances the students' understanding of their own intuitive experiences. For the purposes of modeling intuition with the intent of developing it, we have found it beneficial to include several different, even contradicting models of intuition in their education practice (see references, particularly Bastick, 2003; Betsch, 2008; Gigerenzer, 2007; Hogarth, 2001; Lloyd-Mayer, 2007; Polanyi, 1962; Sheldrake, 1995; Sinclair, 2005). As no single specific definition of intuition exists (Sternberg et al., 2000; Betsch, 2008) , it is likely that the multitude of varied intuitions also manifest differently (Goldberg, 1983). The plurality of intuition models has made it easier for students to find meaning in their experiences by fitting a suitable model to their personal context of experience rather than vice versa. The aim is to give tools to designers for personal sense-making, and therefore several alternative non-scientific models have been introduced to the students (Brennan, 1993; Sheldrake, 1995; Vaughan, 1978). Designers' have the luxury of not being limited by validity alone and should consider the utility of models alongside with their scientific validity (Nelson & Stolterman, 2002).

The student feedback appears to confirm that making sense of personal experiences increases the understanding of personal intuitive process. Better understanding in turn leads to an increased ability to use the knowledge gained through intuition. The highly experienced designers and artists interviewed report further that intuition is the most significant method guiding their creative process. The intuition has

grown during years or decades of personal experiential experimentation. Our teaching experience suggests that understanding intuition at large and on level of personal experiences in particular can lead to a positive feedback loop, where use increases understanding, which in turn further increases the use of intuition in design.

3 Coaching intuitive skills

Intuitive thinking appears to be both a personality trait (Bastick, 2003) and a developmental skill or ability (Bastick, 2003; Hogarth, 2001). As a skill, intuition potentially develops through a continuum that changes according to practice and experience (Baylor, 2001; Mielonen, Keinänen, Raami, Rouhiainen, 2009). Designer's domain intuition can develop through acquisition of expert knowledge (Hogarth, 2008). Further, the development of intuitive skill may benefit from managed practice, which is dependent on quality of corrective feedback (Hogarth, 2001, 2008). Due to the initially non-conscious nature of intuitive thought it is often modeled as utilizing the tacit knowledge source created by implicit experience. However, the source and the act are at least partially different (Sternberg et al., 2000). While tacit body of knowledge is an important source to intuitions, if the skill of using intuition is under-developed or unused, this tacit knowledge may offer very little additional benefit for a designer. Further, while the skill of rational thought is officially accepted and taught, the skill of intuitive thought is often bypassed or assumed as a given (Hogarth, 2001). What remains for education of intuition is the accumulation of potential intuitive knowledge sources (e.g. tacit knowledge) through continued experience and the subsequent development of expertise in particular knowledge domains.

Our experience is that designers often lack access to more intentional training of the thinking intuitively (for brevity, 'intuitive thought' is referred to as 'intuition' for the remainder of this paper). While non-professional intuition is un-

doubtedly used every day, it's intentional application and development is often neglected. This is due to many factors, some stemming from cultural-historical baggage such as changes in educational trends (McCoy, 2005), and others from difficulty of consciously training non-conscious processes (Varela, 1999). However, we believe that intuitive skill can be practiced, even if no clearcut practice methods that guarantee success exist.

We have been coaching more than hundred design students on a course called *Coaching Creativity* in Media Lab at the University of Art & Design, Helsinki. In this class we have experimented with different educational approaches that we believe can foster the students' understanding of personal intuitive experiences. Based on student feedback to these approaches described below, we observed positive qualitative changes in the use of intuition among students. The students report that they experience the exercises from course as meaningful, and that they help them to trust and learn more about their personal intuition. Based on our teaching experience on the courses, the following approaches have been found constructive (details follow after the list):
● Create an environment of trust for sharing intuition experiences
● Accept and appreciate the personal experiences
● Linger in the personal sensations and perceptions
● Embrace the ambiguous and the extraordinary
● Open up to all sensations and tune into intuition
● Practice recognition and separation of internal signals
● Reflect on the process and accuracy of personal intuition
● Deepen understanding of intuition by sharing, discussing and reading

When the social environment feels safe students are able to share personal stories and experiences outside the norm. Some students achieve a feeling of trust sooner and their stories encourage others to join the discussion. Feelings of acceptance and safety have been best achieved in small groups through informal discussions. One of the most important factors to promote is personal validity. Since each student's intuition may appear differently, and as the reactions are very personal, it is important to stress that there is no one true way to experience or interpret intuition. Discussions focus on reflection of personal perceptions and processes connected to intuitive moments (e.g. emotions, stimuli), which students have documented in their personal learning diaries.

Further, students can be guided and encouraged to develop methods for sensitive observation. This starts by accepting personal feelings, affects, sensations and states – however minute. Being sensitive to one's own internal states helps to develop the ability to monitor them and find meaning in them. Observation, sensitivity and meaning-making form the basis of intuitive practice and reflection: intuition is practiced as a way of knowing and judging, and this process is then reflected on.

We feel it is essential to foster the appreciation of everyone's own authentic experience, instead of over-fitting one's intuitive experiences to a single pre-given model of intuition that does not make personal sense. Therefore the student as well as the teacher needs courage and patience to face ambiguous and incomplete situations; this requires tolerance to linger in the original sensations without trying to normatively grade these perceptions. As an example, some students report that their intuition is based on emotional responses, while others stress the total absence of emotions is essential in order to get reliable information through intuition.

Tuning into intuition is about opening up all senses to all perceptions, including those that feel extra-sensory. An important part of the process of accepting unusual personal experience is opening one's mind to new sensations and perceptions that may have been previously denied,

and acknowledging their part in the creative process (Lloyd-Mayer, 2007). Great benefit have been found from mental exercises, in which the placement of consciousness is 'moved' either within or outside of the body (e.g. feel one's thought inside the stomach or above one's head). Through these exercises students appear to get closer to the original sensations. For example, one exercise encourages students to observe the sensations outside of their bodies by stating that their body is not limited to what's inside their skin. The students report they are able to reach new kind of information, which many of them feel as clear, trustworthy and easy to access. Sometimes students report that the new information is contradictory to their previous reasoned judgments, but that the new intuitive understanding is what they trust more when making decisions.

We have discovered that observation of personal perceptions develop a sensitivity to distinguish signals related to intuition. Observation combined with shared discussions help students to develop the ability to recognize their specific intuitive signals. This is essential when practicing intuition as a skill separate from unconscious behavioral habits, emotional response patterns and the like.

We encourage students to constantly apply intuition in small matters of personal life. If a student is lacking trust in intuitive skills, it can be beneficial to nourish intuition through imaginary trust, i.e. believing and acting to be an intuitive person. Through trust, even if initially a fake one, one can observe vague signals, which may give hints on how intuition operates. This feeds back encouragement to further personal experimentation, resulting in a positive feedback loop: the signals become clearer, trust grows, and practice increases.

Practice and trust appear to be crucial steps when interpreting intuitive signals and reliability of intuition (Nadel, 2006). Remarkably, the trust in intuition can grow even if it turns out that not all intuitions are correct. This requires appreciating the fact that intuition is a skill that can be improved and that not all signals rising from the non-conscious are necessarily worthwhile intuitions. Further, reflection after the intuitive moment may reveal essential information of the process of personal intuition: sensations that originate from valid intuition or sensations that are may mask reliable intuition (e.g. strong moods).

We have been using several exercises to practice these skills, i.e. meditation, mindfulness, focusing of attention, breathing, relaxation and concentration exercises. For reflection it has been beneficial to keep a diary of intuitive process, observing specifically awareness and quality of sensations, actual intuitive judgments and decisions made, as well as resulting success and satisfaction. Through this, the nature and causality of personal intuitive process may slowly reveal itself, and its intentional application can be increased.

When eliciting students' personal stories of intuition it has been beneficial to present various models of intuition. We have been using stories of famous artists and designers where they reveal the intimate and sometimes extraordinary nature of their personal intuitions, which students can compare to that of their own. Through this reflection students are able to deepen their personal understanding of intuition on personal level and in general. Alternative non-scientific literature presents alternative models of intuition and consciousness, which we have found to be beneficial in helping students give meaning to their own intuitions (Mielonen, Raami, Keinänen & Rouhiainen, in preparation). It is important to engage students in sense-making of their own intuitive experiences and also to let them share these meanings trough reflection with peers.

4 Legitimizing intuitive experiences

Much of the experiences told by students on courses or which appear in the literature may feel extraordinary, even supernatural when experienced. A novice designer often reflects himself with a public image of the designer – which these days usually excludes such experiences. However,

intuition is a very personal experience (Bastick, 2003). Therefore it is important to remain open-minded towards all kinds of feelings and perceptions, and consider them valid in the sense of first person lived experience (Petitmengin-Peugeot, 1999).

According to psychologist Elizabeth Lloyd-Mayer we suffer from an underlying cultural disinclination for publicly acknowledging certain highly subjective, highly personal experiences. We're especially reluctant to credit those personal and subjective factors when it comes to things we prefer to be dictated by rational and objective thinking. The fear of appearing credulous leads many people to disavow their personal reality, which can paralyze their creativity (Lloyd-Mayer, 2007).

One of the methods of the coaching course has been a first person perspective on intuition. The highly personal intuitive experienced are legitimized: the experiences are subjectively true, regardless of how scientific models. This act frees the designer to pay attention to the intuitive signals, to learn more about personal intuition – as well as to acknowledge the information gained through intuition. In the progress of our teaching we have seen students frame their intuitive experiences as meaningful events to themselves and become encouraged to use them in their creative work. Through a transformative process students' progress step-wise in their attitude towards personal intuitive experiences: First they understand that is it is common, even desirable to have these experiences even if the they cannot be always put into words properly or that they may appear quite unusual when explained. Then the students learn to appreciate that these intuitions can be used to guide their own design decisions – alongside with their rational, deliberate faculties. Finally, the designers can intentionally utilize these experiences and even develop them further as a skill.

In addition to personal sense-making, students have been introduced to models that view intuition primarily as a judgment heuristic, which is prone to judgment errors and reasoning biases (Betsch, 2008). This leads easily to grading of one's experiences normatively with cognitive models. This is not often fruitful for the purposes of developing intuitive capabilities.

The normative grading of personal intuition experiences according to models poses problems for the development of intuition. Especially the scientifically educated designers can often err on the side of over-rationalization when thinking about their own intuitive experiences: experiences not accepted or legitimized by models may be rationalized as useless or denied altogether before their usefulness has even been tested. We have experienced this type of "validity over utility" attitude in their own and in their students' thinking. Often the suspension of judgment of experiences requires considerable effort and justification on the part of the one experiencing. Without actually trying to use intuition and suspending one's disbelief, further development of intuition is difficult.

Regardless of the models chosen, we argue that students benefit from not only making sense of, but also from accepting and trusting their own intuitions. This acceptance is fostered through external legitimization: shared stories and presented descriptive models can ease the students in accepting the sometimes peculiar nature of their intuitions, and help them to further use their intuitive capabilities (Taylor, 1998; Brennan, 1993). In effect, students frame their intuitive experiences as desirable and meaningful events to themselves and become encouraged to use them and talk about them. Based on our experience, this process can lead to a transformation in the students, which becomes evident as marked qualitative leaps in student's creative process and creative output.

5 Conclusion
We have argued for the essentiality of personal intuitive thought in developing designers' think-

ing. Further, we have noted how important and yet delicate the personal experiences of intuition are for the people within the creative process. We believe that by accepting, trusting, observing and testing these experiences it is possible to develop intuition further as an *intentional skill*. We also believe in helping people to make personal sense of their own experiences, instead of fitting them normatively to models of thought. In addition, the application of stories and alternative models frame even the more extraordinary personal experiences as acceptable, thus legitimizing their existence and enabling their sharing. Through this process, reflection on the personal experiences of intuition becomes essential to the development of intuition.

Yet, many issues are unknown for the development of a more integrated approach towards intuition education. The developmental continuum of intuition appears unmapped and the targeted methods for specific types of intuitions within this continuum are incidental at best. We are pursuing further educational experiments to advance these issues in practice.

REFERENCES

Atkinson, T. & Claxton, G. (2003) ● *The intuitive practitioner* ● Berkshire UK: Open University Press.

Bastick, T. (2003) ● *Intuition: evaluating the construct and its impact on creative thinking* ● Kinsgton, Jamaica: Stoneman & Lang ●

Betsch, T. (2008) ● The nature of intuition and its neglect in research on judgment and decision making, in H. Plessner, C. Betsch, T. Betsch (Eds) *Intuition in judgment and decision making* (pp. 3–22) ● New York: Lawrence Erlbaum Associates ●

Baylor, A. (2001) ● A u-shaped model for the development of intuition by expertise ● *New ideas in psychology,* 19(3), 237–244 ●

Boden, M. (1994) ● What is creativity? In M.A. Boden (Ed.), Dimensions of creativity (pp. 75–117) ● Cambridge: MIT Press ●

Brennan, B. A. (1988) ● *Hands of light – A guide to healing through the human energy field* ● U.S.A: Bantam Books ●

Brennan, B. A. (1993) ● *Light emerging – the journey of personal healing* ● U.S.A: Bantam Books.

Gigerenzer, G. (2007) ● *Gut feelings: the intelligence of the unconscious* ● London: Penguin Books ●

Goldberg, P. (1983) ● The intuitive edge, Los Angeles, CA: Jeremy Tarcher Inc ●

Guiley, R. E. (2001) ● *Breakthrough intuition: how to achieve a life of abundance by listening to the voice within* ● New York: Berkeley Book ●

Hogarth, R. M. (2001) ● *Educating intuition* ● Chicago: University of Chicago Press ●

Hogarth, R. (2008) ● On the learning of intuition, in H. Plessner, C. Betsch, T. Betsch (Eds) *Intuition in judgment and decision making* (pp. 91–105) ● New York: Lawrence Erlbaum Associates ●

Klein, G. (1999) ● *Sources of power* ● Cambridge: MIT Press ●

Lloyd-Mayer, E. (2007) ● *Extraordinary knowing: science, skepticism, and the inexplicable powers of the human mind* ● New York: Bantam Books ●

McCoy, K. (2005) ● Education in an adolescent profession, in S. Heller (Ed.), *The education of a graphic designer, 2nd ed* ● New York: Allworth Press.

Mielonen, S., Keinänen, M., Raami, A., Rouhiainen, L. (2009) ● Intuitive knowledge processes among design students, professional designers and expert intuitive practitioners ● In Proceedings of the Communicating (by) Design 2009 conference (pp. 85–93) ● Brussels, Belgium: Sint-Lucas School of Architecture ●

Mielonen, S., Raami, A., Keinänen, M. & Rouhiainen, L. (in preparation, 2009) ● Designer's highly personal experiences of intuition – modeling and developing personal creative processes ● *To be published in Proceedings of IASDR 09 conference* ● South Korea: Korea Society of Design Science ●

Nadel, L. (2006) ● *Dr. Laurie Nadel's sixth sense* ● Lincoln: NE: AJSA Press ●

Nelson, H., Stolterman, E. (2002) ● *The design way* ● New Jersey: Educational Technology Publications, Englewood Fliffs ●

Petitmengin-Peugeot, C. (1999) ● The intuitive experience, in *The view from within – first-person approaches to the study of consciousness* (pp. 43–77) ● London: Imprint Academic ●

Polanyi, M. (1962) ● Personal knowledge, London: Routledge ●

Policastro, E. (1999) ● Intuition, in M. Runco, S.R. Pritzker (Eds) *Encyclopedia of creativity* (Vol. 2., pp. 89–93) ● San Diego, CA: Academic Press ●

Sternberg, R. J., Forsythe, G. B., Hedlund, J., Horvath, J., Snook, S., Williams, W. M., Wagner, R. K., & Grigorenko, E. L. (2000) ● *Practical intelligence in everyday life* ● New York: Cambridge University Press ●

Sheldrake, R. (1995) ● *The presence of the past: morphic resonance and the habits of nature* ● Rochester, VA: Park Street Press ●

Sinclair, M., Ashkanasy, N. (2005) ● Intuition – myth or a decision-making tool? In *management learning*, 36(3), (pp. 353–370) ●

Taylor, E. W. (1998) ● The theory and practice of transformative learning: a critical review ● *Information series no. 374. Columbus: ERIC clearinghouse on adult, career, and vocational education* ● The Ohio State University: Center on Education and Training for Employment, College of Education ●

Vaughan, F. E. (1978) ● *Awakening intuition* ● New York: Doubleday ●

Varela, F. J. (1999) ● *Ethical know-how: action, wisdom and cognition* ● Standford, California: Stanford Univiersity Press ●

Wallace, B. A (2007) ● *Contemplative science: where Buddhism and neuroscience converge* ● New York: Columbia University Press ●

IV

**DESIGNER'S HIGHLY PERSONAL
EXPERIENCES OF INTUITION**

Modeling for Developing Intuition

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Abstract:

Designers and creative artists often have highly personal experiences of intuition in their creative process. Such experiences may feel extraordinary to designers, who have a great difficulty explaining the experiences. These experiences offer useful insights into the workings of personal creative intuition. However, it is common that these experiences are brushed aside as irrelevant. Alternatively, when such experiences are dealt with, they are sometimes over-fitted to various models with the purpose of validation/invalidation. Based on the authors experience in coaching creativity for designers, interviews with designers, and a survey of intuition literature, we propose a way to legitimize highly personal intuition experiences through the use of stories. In addition, we introduce alternative intuition models from the non-scientific literature for helping make sense of extraordinary experiences. We comment on their usefulness in understanding intuitive experience on personal level. We propose that design educators should appreciate the importance of personal intuition experiences of students and their sense-making for their development of intuition. Last, we propose that educators should consider the utility of models of intuition in addition to validity for the purposes of intuitive skill development.

1 Introduction

Intuition is considered to be an essential part of the creative process [1, 2, 3]. However, there is no general agreement as to how the process of intuition exactly works or how intuition can be accurately defined [2, 3, 4]. This confusion extends from conceptual modeling of intuition to actual development of intuitive capacity; yet, if we do not know what intuition is, how can we develop it? If we cannot accurately recognize it when it happens, how can we practice it? These issues pose challenges for educators attempting to develop intuition.

The lack of knowledge about the exact nature of intuition has earlier led to mystification of intuition [5]. This approach was detrimental to any attempts at modeling or developing intuition, as by definition mystical experiences are beyond human capacity to understand. However, recent research has shown that intuition is a valid phenomenon and can be studied at least at the periphery – that is right before and after moments of intuitive thought [3, 4, 6, 7].

Intuitive experiences are highly personal, and can be multi-sensory, and appear as extra-sensory in their character [6, 7, 8]. Due to their character and difficulty in verbalizing them, such experiences are often not researched at a more general level [6]. However, literature and the authors own experience suggests that by being aware of our intuitive experience we can manage its development [9, 10]. Further, according to student centered and constructivist approach to learning, understanding and integrating the student's perspective is essential for any meaningful learning experience [11, 12, 13, 14, 15]. Thus it is important to accept and legitimize the students' personal experience of intuition in order to facilitate the development of their intuitive skill.

This paper concentrates specifically on the intuitions that designers and creative artists have experienced in their creative work. These experiences have been collected both during ten 'Coaching Creativity' semester long classes taught by the authors at the Media Lab of the University of Art and Design in Helsinki, and through semi structured interviews of a dozen designers of various levels of expertise conducted in Finland in 2008 and 2009. By giving examples of personal intuitive experiences we illustrate how different they are. Further, we argue the usefulness of letting the students to embrace these experiences, no matter how unusual they may be. We look at different models of intuition, scientific and alternative, and discuss their utilitarian value in the students' understanding of their own intuitions. The validity of the models is not of interest here, as we are mostly interested in the usefulness of various models for the purpose of development of intuition.

2 Legitimacy of personal intuitive experiences

Intuitive thinking appears to be both a personality trait [2] and a developmental skill or ability [2, 5, 9]. Personality can further influence an individual's preferred decision strategy towards that of more deliberate and rational or towards more intuitive and non-conscious [16]. As a skill, intuition appears to have a developmental continuum that changes according to practice and experience [17, 18]. Designer's domain intuition can develop through implicit learning of expert knowledge [19]. The development of intuitive skill may also benefit from directed practice, which is dependent on the quality of corrective feedback [19].

The authors' experience is that designers in general lack access to more intentional training of intuition. This is due to many factors, some stemming from cultural-historical reason such as changing trends in design education [20] and others from difficulty of consciously training non-conscious processes [21]. However, all this does not mean that intuitive skill cannot or should not be educated.

The highly personal intuitive experiences are usually ignored in the education and in the design literature. A novice designer reflects himself with a public image of the designer – which these days usually excludes the such an experiences.

While it used to be that the design intuition was mystified, now it's more common to deny the existence of the extraordinary due to a fear of looking unprofessional [22, 23].

Most novice students interviewed are in the beginning of their journey as designers, just getting to deepen their knowledge about their creative process, and usually very unsure of their personal competence. It is not easy to talk about the highly personal experiences, partly due to the fact that our vocabulary is too limited to adequately describe the moments, which are experienced personally as you go through creative process [24]. The students find it demanding to admit the existence of such experiences or to talk about them to other designers.

Lloyd-Mayer states that we suffer from an underlying cultural disinclination for publicly acknowledging certain highly subjective, highly personal experiences. We're especially reluctant to credit personal and subjective factors when it comes to things we prefer to be dictated by rational and objective thinking [22]. The fear of appearing credulous leads many people to deny their personal reality, which can paralyze their creativity [ibid]. Highly personal intuitive experiences are true for the person experiencing them. They can also become more useful, if they are accepted as legitimate, which in turns enables reflecting on them.

Due to the essentiality of intuition in the creative process, it appears obvious that intuition should be acknowledged and promoted in the development of design creativity. This includes legitimization of intuitive experiences and acceptance of their sometimes unusual appearance. As intuition is a very personal experience, it is important to remain open-minded towards all kinds of feelings and perceptions, and consider them valid in the sense of first person lived experience, which is what we attempt to do in this paper [22].

3 Models of intuition

Current cognitive science is possibly the most successful in modeling particular facets of intuition, due to the systematic application of the scientific method. Such models are testable, falsifiable and offer practical utility. However, the utility offered is still limited. The authors have found in their own tutoring work with designers and creative artists for the past decade that using aforementioned models makes it is easy for students to dismiss intuition, or assume that intuition should be submitted to strict control of the rational deliberation. Cognitive research on the other hand suggests that too much of this type of deliberation may hinder intuitive judgment, and that judgments can feel less satisfactory [25]. Further, cognitive models do not necessary make it easy for the practitioner or educator to bring intuition forth, or help to develop intuition. Also, as stated earlier, due to the complexity of such models and how they are commonly applied to normatively grade people's experience, they do not always make sense out of the personal experience of intuition. To get around these limits, practitioners and educators have often turned to alternative models of intuition (see ch. 3.2). Alternative explanatory models explain intuitive experiences differently to many of the cognitive models. These models have several challenges. The field of these alternative theories is often incoherent: the models agree neither with the field of scientific research nor with each other. In addition, the terminology may be difficult to understand and information may be presented in an ambiguous way. In short, the models are neither scientific nor models that can be used to assess the objective validity of intuitive experiences. Regardless, the authors feel that the utility of these models is weighed in practice by how much they help students' intuitive thinking. While the scientific validity of these models is suspect, for the purposes of development of intuitive skill we are only interested in their developmental utility. Thus, comparison of models presented herein is not about what is scientifically true, but how each model may help students in their development of intuitive skill.

3.1 Cognitive Models of intuitive judgment

Cognitive theories model intuition either very loosely as thinking processes that fall into the system 1 of two-system-model of thinking [26], or more specifically as a heuristic short-cut for making rapid non-conscious judgments [4]. The first definition potentially includes all types of rapid non-conscious thinking types including, but not necessarily limited to instincts, reflexes, emotional habitual patterns, over-learned skill automations, imaginary ideation, moral judgments and even insights. This broad definition is problematic, as it functions as an aggregating category and not as a focusing definition. In other words, it is unlikely that educators of intuition can come up with common exercises that cover reflexes and instinct, learned emotion patterns and tacit knowledge, automatic context recognition and narrative implicit reasoning, and so on. Thus, we need a more focused definition of intuition, even if only of particular type. The definition of intuition as a learned heuristic on the other hand limits intuition to experientially acquired non-conscious models and mostly knowledge domain specific short-cuts [27]. These heuristics are often defined as being highly prone to errors and as such must be exposed to rational analysis (i.e. system 2) [26]. This definition excludes the possibility of domain-independent global intuition since it relies exclusively on learning from direct experience [28].

Further, heuristic models mostly note that this mode of thought is so prone to systematic bias that intuitions derived from it should be rationally analyzed [4]. While biases of heuristics are certainly undeniable, the exposing of intuition to constant rational judgment poses a paradox. Over-analyzing intuitions rationally has been shown to reduce the accuracy of intuitive judgments [29]. In practice this paradox becomes a problem, when we do not know what a sufficient analysis is and what an over-analysis is.

Regardless, the heuristics and biases tradition of cognitive sciences offers useful reminders for the development of intuition: if intuition is seen as a holistic non-conscious representation matching process of past experiences [4], then critical to the development on intuition accuracy is proper feedback. That is, intuitive judgments should be evaluated for their accuracy. Naturally this evaluation cannot be carried out for all types of intuitions, for which no practically easy test of accuracy can be devised [30].

Other dual-process intuition-analysis experiments suggest that people believe in intuitions, because of the ease at which they arise, even when these intuitions are clearly incorrect [31]. Another finding suggests that the more rational counter-evidence is presented, the less people trust their intuitions, even when the evidence is incorrect. Further, not following one's intuition leads to a lower confidence in the judgment made [ibid.].

These additional findings, while not full models, are helpful for intuition development. First they remind that the feelings of correctness accompanying intuitions are not necessarily a good measure of accuracy of intuitions. Second, they remind students of the detrimental power of doubt: any intuition, regardless of how strongly experienced and whether it is correct or not, can be swept aside with enough of doubt. Here it is useful to remember that doubt and post-intuition rational analysis are not the same, even though it is common for doubt to follow prolonged critical analysis of intuitions. From the point of view of development, the goal would be to be able to have enough trust for intuitive experiences to arise and to be attentively sensed. Afterwards it is critical to analyze accuracy of intuitions to a sufficient degree, yet retaining an emotional belief in the meaningfulness of such experiences (i.e. resist doubt).

3.2 Alternative explanatory models of intuition

In alternative explanatory models unusual intuitive experiences are commonly seen natural and understandable. A common theme in these theories is describing structure of consciousness as

fields or developmental layers [32]. In some yoga traditions for example, the consciousness has been divided into several layers, which become more subtle as one moves outside the layer of the physical body [33]. One of these layers is called the layer of intuition, which is separate from the logic and rationality of the conscious mind. The layer models remind students that there is information beyond rational thinking, and that access to some types of intuition may require contemplative calming of thoughts.

Some layer models make a distinction between mental layer, emotional layer, physical layer and intuitive layer [33]. Students have found this useful as it separates bodily sensations, intuitive appearance of information, and potential emotional reactions from each other. While the three are often causally linked, it helps to understand that the body may feel sensations due to many other things than intuition, and that not all intuitions are accompanied by intense emotions [17]. While these processes are often temporally linked, they are not the same. Understanding this helps student to develop the accuracy of their recognition, e.g. what is an intuition and what is an emotional conditioned response.

Layer models of consciousness are further extended in field models that also model intuition at a very high level. Barbara A. Brennan presents a model of anthropogenic energetic fields in the book Hands of Light [10]. She extends the layer model to visual observations of the energetic field around humans. The field 'vibrates and can be sensed by touch, taste, smell, and with sound and luminosity perceivable to 'higher senses' [10]. This and other fields can act as a source of knowing for people, even if they are unaware of this. If a person has highly developed consciousness, she may sense different type of vibrations and energy levels [10]. That kind of person may 'know' things, but doesn't always know how she knows.

The field model along with its descriptions of vibrations for various information types coincides with student's experiences of weird bodily sensations. The model suggests that other entities can influence us and this vibration can be sensed through various senses, and that each different type of vibration is felt differently. It then remains the task of the student to become attuned to these vibrations and give meaning to each of them.

The alternative theories presented add to the students' and designers' understanding of their personal intuition. Feeling of being connected to information outside one's physical body, events of synchronicity and acts of apparent mind-reading roughly match with the theories layers, fields and mind-matter interactions. In these models, consciousness is seen as a part of bigger fields that link us to other people and to things [8].

Next we give examples of the designers' personal experiences of intuition to illustrate further how the different approaches/models fit into the experiences of students.

4 Stories of personal experiences of intuition
The authors have interviewed a dozen of creative artists and designers about their experience and use of intuition [17]. In addition, the authors have coached several dozen MA level design students during several semester long courses on intuition and creativity (since 2004; 20-25 students a year). Approaches used to gather experiences of intuition during the course are story elicitation [34], sharing and telling stories and personal sensemaking through the use of stories [35]. The small sampling of anonymous quotes included here are from the interviews or from the several instances of courses on coaching creativity, unless otherwise stated.

We have divided the stories of personal intuition experiences to two broad categories, based on what they refer to. First group of stories deal with the unusual sensory experiences felt during intuition, and people's reactions. Second are stories about sources of intuition, in which people experience a source of their intuitions emanating from outside the physical self. This includes stories about interpersonal intuitions between people.

4.1 Sensory experiences and intuition

Designers describe sensing intuition via various sensory modalities. Some designers describe that their personal intuitive experience is supported by 'seeing shiny stars', 'hearing voices' or 'feeling outer body sensations'. Some have mentioned seeing bright twinkling stars when getting ideas worth continuing, while others take guidance from voices. These sensations work as guiding signals to the designer.

> "Even as a child I saw bright stars. When thinking of possible answers to a question on a historical date for an exam on history a small star would twinkle alongside with the correct year. I knew then that was the correct answer. I told nobody of my method – I thought it was cheating. Later I have used this countless of times in various situations when looking for the right answer."
> **– arts teacher**

A typical normative explanation for this would be some sort of a visual hallucination and at its most diagnostic manner a strong prompt to seek medical care. However, alternative models make even these types of odd experiences legitimate: fields can vibrate into senses and information that is valid can be thus sensed.

Bodily sensations are also implied by layer models, which suggest that informational layers of external intuition can influence a person's physical body layer. Perhaps the most common experiences are bodily sensations: shivers, vibes or feeling of energy. When these sensations are explained with everyday words, like goose bumps, they are commonly accepted. However, if they have a different kind of nature, like outer body sensations, they appear as peculiar. Commonly terms like 'good vibes', 'sixth sense' or 'gut feel' are often used.

> "Every time I get a good idea, I feel as if my body is pricked with very thin needles all over. It doesn't hurt at all. They are not like cold shivers, but different. If I get a particularly great idea, I feel these pricks on my scalp too. Using these sensations I can recognize particularly good ideas." **–designer**

Somatic sensations are natural in field models. Different fields can carry information and vibrations from these fields can cause subtle body sensations that can be noticed if tuned into. Often the sensations are more subtle than those accompanying strong emotional reactions.

4.2 Experiences of external sources of intuition

Some designers interviewed describe a source they are able to connect themselves to through intuition when at their most creative. There is a strong feeling of 'receiving' ideas, being energized, and getting empowered. Many report a qualitatively different experience between 'receiving ideas' and the experience of ideas rising from the sub-conscious mind.

> 'Sometimes when designing, I use a method where I lift my consciousness above my head. Once I had to invent a good name in a very limited time and my head was totally empty. I used this method and instantly the name dropped into my head. After that all the other name choices felt lame. I strongly felt the name was given to me. I could never have invented such a good name myself.'
> **– arts teacher**

Again, a normative explanation for this might be an intuition rising from the unconscious and not merely sub-conscious thought and merely feeling as if coming from 'outside'. However, this does not seem to help some students who feel that these intuitions from 'an external source'

feel qualitatively different from those rising from inside one's non-conscious mind. Field models accept that intuitions may come from outside of one's physical body and may also be sensed differently. In fact, they imply that the non-conscious intuitions and so called 'external intuitions' are of different kind – both experientially and in the type of knowledge gained. As such, students of intuition may consider developing them differently. Overall the model suggests that there are different types of intuitions. One should pay attention to the differences in the quality of sensations within an intuition and try and find meaning in the differences, instead of putting all intuitions into one big messy category.

Some designers feel anxious, lost, and not skilled enough without the empowering feeling of this connection to 'an external' source of intuition. Some of them report a strong dependency on that source, yet they do not know how to intentionally connect to that source. Some of the expert designers have learned to handle the intuitive connection to this source through experience, even though they are not fully aware how this connection is working, or how they can describe it verbally. Elizabeth Lloyd-Mayer states in her study of highly unusual experiences that people typically cannot report why they carry out much of the behavior that stems from workings of the unconscious mind, even though the behavior appears formed in the full consciousness.

To encourage intuitive ideas to arise, creative people try to recreate environments in which they have previously experienced such intuitions [2].

> "To be able to reach the essential mode for designing, I always need a nice cup of tea beside me. But, you know, I hardly ever drink it! After the course [coaching creativity] I am not dependant on it any more. I can reach the mental state without it.' **– design student**

This may involve props to act as stimuli (cigarettes, drinks), an idiosyncratic ritual (bath, careful preparations), or physical activity (jogging, vacuum cleaning). Still, the connection may not work. Designers describe that without a working connection they are forced work more with 'copy-paste – trial & error' kind of routines without the empowering faculties reached through intuition. The resulting outcome is usually something they do not rate very highly. Many report that the unpredictability of this intuition connection causes a crisis of self-confidence in their domain expertise.

Alternative models again suggest that while it is perfectly possible to be creative and intuitive without feeling an access 'to an external source of intuition', the external source does exist, is qualitatively different and does require different methods of access. While the actual methods may vary from person to person, just the act of accepting that such a source may exists and that it can be reached differently, can further help the intuition development efforts of students.

Some designers report interpersonal intuitions. Transferring pictures 'telepathically' is not among the common methods taught in design – yet many visual designers tell how they are able to 'visualize ideas from inside others' minds'. Others puzzle at the simultaneous emergence of almost identical ideas.

> "Sometimes I wonder how is it possible that in the same design competition somebody has submitted the same idea as mine even executed similarly, but from another side of the planet. I thought this was odd, because I had not seen or heard similar kind of idea anywhere before, and I knew I had surely developed it myself from the beginning to the finish."
> **–design student**

Experiences like above are made sense of by viewing them from the point of view of thought

fields. The normative way is to say they were random coincidences due to cultural trends and think nothing more of them. In the field model thoughts extend beyond the physical body and can be sensed by other people on a crude level. According to the model it is also possible to become more attuned to these fields and thus develop an intuitive sense in designing, something which the beginning designers most strongly express yearning for.

The above is but a very small sampling of descriptions of the kinds of experiences designers often go through. However, before they were shared and accepted, for many a student these experiences practically did not exist. In the authors' experience, stories of personal experience require situation of strong trust, before they can be freely shared. The methods we used were accentuating confidentiality, re-telling of personal stories of well-known artists and scientists, and emphasizing that each person's own experience is valid for them (e.g. non-normative nature of intuition). We found that the sheer act of sharing stories in a small trusted group of peers and finding out that the experiences are not frowned upon or quite as crazy or as one thinks, already relieved many a student in immensely. It also encouraged students to further observe and reflect on such experiences.

5 Truthfulness over usefulness can hinder intuition development

Heuristic tradition has shown that intuitive thoughts can also be highly useful, accurate and in some situations superior to rational reasoning [7, 27]. Approaches that explain away all intuitions as useless noise create false negative errors of classification: real and useful intuitions are discarded as 'not real'. This is often done by over-fitting the experiences to too crude versions of intuition models, and as a result classifying experiences not described by the model as irrelevant or superfluous by-products of human thought.

The normative over-fitting of cognitive mod-

els of thought to experiences poses problems for the development of intuition. The authors have found that especially the scientifically educated designers can often err on the side of over-rationalization when thinking about their own intuitive experiences. For example, all instances of synchronicity are explained as mere random probabilities. Bodily sensations are attributed to simple physical causes (e.g. "something I ate") or random affective changes (e.g. "sometimes I just feel this way") instead of thinking of the potential emotional connections or underlying reasons behind the physical sensations.

Second problem with the strict normative use of models of validity (i.e. 'what is true') is discarding developmental potential (i.e. 'what is useful'). In an educational situation, stories like fables can be utter nonsense for their content validity, but help students to make sense of their own experiences, thus offering developmental utility. The authors have experienced this type of "validity over utility" attitude in their own and in their students' as well as peers' thinking. Often the suspension of validation judgment requires considerable effort and reasoning on the part of the student. Without actually trying to use intuition and suspending one's disbelief, there cannot be success in intuitive development through such experiences.

Indeed, in our experience, in order to help students to develop their intuition, the use of cognitive models alone does not appear to be enough. While cognitive theories do often help students to understand many of the pitfalls of intuitive thinking, the theories do not necessarily make sense of personal experiences for those experiencing them. The authors argue that students benefit from personal acceptance and sense-making of their own intuitive experiences, which in turn can empower them to further use their intuitive capabilities through a process of transformative learning [36, 24].

Students frame their intuitive experiences as meaningful events to themselves and become encouraged to use them in their creative

work. Through a transformative process students understand that is it is perfectly acceptable to have these experiences. Further, such experiences cannot be always put into words properly, or such experiences might appear as quite unusual when verbalized. Most importantly, students feel that intuitive experiences can be used as signals to guide their own design decisions – alongside with their rational faculties.

The authors argue that offering stories and alternative conceptual models can help students to construct meaning out of their own intuitive experiences, and thus learn towards more intentional development of their intuition. Based on the experience of authors, this meaning-making can lead to student transformation that becomes evident as marked qualitative leaps in student's creative process. Merely describing these models to some students produces instant 'aha' moments and an accompanying sense of relief. To most it doesn't matter if a model is scientifically valid or not. The student may express that she doesn't believe in the validity of the model, but because it helps to model the personal intuitive experience it is useful. The resulting qualitative change in the students' behavior towards their own experiences of intuition can in our opinion be marked. It is characterized by increased trust in and reduction of doubt towards personal intuitive experiences.

6 Summary and conclusion

We have attempted to show that using cognitive models normatively for assessing intuitive experiences can have pitfalls for developing intuitive capability: experiences can be denied altogether, they can be over-fitted to non-descriptive models, or explanations given make no sense to the students, thus not advancing their understanding of their own intuitive experiences. We have further tried to show that supplementing these models with alternative models can in practice enhance the utility of both groups of models. In effect, we are arguing that for the purposes of modeling intuition with the intent of developing it, practitioners should choose widely amongst the models they apply in their education practice. Designers' have the luxury of not being limited by validity alone and should consider the utility alongside with scientific validity.

Regardless of the models chosen, another important fact is to legitimize even the unusual personal experiences of intuition that people have: enable sharing them, accept them as is and help bring out the personal meaning in them. This actively manages the process of intuitive experiences, which in our experience fosters transformative learning of intuition and can lead to significant leaps in the use of intuition in the design process.

REFERENCES AND CITATIONS

[1] **Boden, Margaret** (1994) ● What is Creativity? In *Dimensions of Creativity* ● Cambridge: MIT Press ●

[2] **Bastick, T.** (2003) ● *Intuition: Evaluating the Construct and Its Impact on Creative Thinking* ● Kinsgton, Jamaica: Stoneman & Lang ●

[3] **Policastro, E.** (1999) ● Intuition ● In Runco, M. Pritzker, S.R. (eds), *Encyclopedia of Creativity* (Vol. 2., pp. 89–93) ● San Diego, CA: Academic Press ●

[4] **Plessner, H., Betsch, C., Betsch, T.**, eds (2008) ● *Intuition in Judgement and Decision Making* ● New York: Lawrence Erlbaum Associates ●

[5] **Atkinson, T. & Claxton, G.** (2003) ● *The Intuitive Practitioner* ● Berkshire, UK: Open University Press.

[6] **Petitmengin-Peugeot, C.** (1999) ● The Intuitive Experience, in *The View from Within – First-person approaches to the study of consciousness,* (pp. 43–77) ● London: Imprint Academic ●

[7] **Klein, G.** (1999) ● *Sources of Power* ● Cambridge, MA: MIT Press ●

[8] **Guiley, R. E.** (2001) ● *Breakthrough Intuition: How to Achieve a Life of Abundance by Listening to the Voice Within* ● New York: Berkeley Book ●

[9] **Hogarth, R. M.** (2001) ● *Educating Intuition* ● Chicago: University of Chicago Press ●

[10] **Brennan, B. A.** (1988) ● *Hands of Light – A Guide to Healing Through the Human Energy Field* ● U.S.A: Bantam Books ●

[11] **Bruner, J.** (1986) ● *Actual minds, possible worlds* ● Cambridge, MA: Harvard University Press ●

[12] **Gardner, H.** (1995) ● *The Unschooled Mind: How Children Think And How Schools Should Teach* ● New York: Basic Book ●

[13] **Rogers, C., R.** (1980) ● *A Way of Being.* Boston: Houghton Mifflin Co ●

[14] **Rogers, C. R.** (1983) ● *Freedom to Learn for the 80's* ● New York: Charles E. Merrill Publishing Company, A Bell & Howell Company ●

[15] **Rogers, C. R. & Freiberg, H. J.** (1994) ● *Freedom to Learn*, 3rd edition, Columbus: Charles E. Merrill Publishing Co ●

[16] **Betsch, C. & Kunz, J.** (2007) ● Individual strategy preferences for intuition and deliberation and decisional fit ● *Poster presented at the 2007 meeting of the Society for Judgment and Decision Making* ● Long Beach, CA ●

[17] **Mielonen, M., Keinänen, M., Raami, A., Rouhiainen, L.** (2009) ● Intuitive knowledge processes among design students, professional designers and expert intuitive practitioners ● In *Proceedings of the Communicating (by) Design 2009 conference* ● Brussels, Belgium ●

[18] **Baylor, A.** (2001) ● A U-Shaped Model for the Development of Intuition by Expertise ● *New Ideas in Psychology,* 19(3), (pp. 237–244) ●

[19] **Hogarth, R.** (2008) ● On the Learning of Intuition ● In Plessner, H., Betsch, C., Betsch, T., eds *Intuition in Judgement and Decision Making* (pp.91-105) ● New York: Lawrence Erlbaum Associates ●

[20] **McCoy, K.** (2005) ● Education in an Adolescent Profession, in Heller, S., *The Education of a Graphic Designer, 2nd ed* ● New York, N.Y: Allworth Press ●

[21] **Varela, F. J.** (1999) ● *Ethical Know-How: Action, Wisdom and Cognition* ● Stanford, California: Stanford University Press ●

[22] **Lloyd-Mayer, E.** (2007) ● *Extraordinary Knowing: Science Skepticism, and The Inexplicable Powers of The Human Mind* ● New York: Bantam Books ●

[23] **Goldschmidt, G.** (2001) ● Visual Analogy – A Strategy for Design Reasoning and Learning ● In Eastman, C., McCracker, M., Newstetter, W., *Design Knowing and Learning: Cognition in Design Education* ● Oxford, UK: Elsevier ●

[24] **Brennan, B. A.** (1993) ● *Light Emerging – The Journey of Personal Healing* ● U.S.A: Bantam Books.

[25] **Dijksterhuis, A., Bos, M. W., Nordgren, L. F., van Baaren, R. B.** (2006) ● On Making the Right Choice : The Deliberation-Without-Attention Effect ● In *Science,* vol. 311, no. 5763 (pp. 1005–1007) ●

[26] **Kahneman, D.** (2003) ● A Perspective on Judgment and Choice ● In *American Psychologist,* 9, (pp. 697–720) ●

[27] **Gigerenzer, G.** (2007) ● Gut Feelings: The Intelligence of the Unconscious ● London: Penguin Books ●

[28] **Harbort, B.** (1997) ● Thought, Action, and Intuition in Practice-Oriented Disciplines ● In Davis-Floyd, R., Arvidson, P.S. (eds), *Intuition: The Inside Story* (pp. 140-141) ● London: Routledge ●

[29] **Nordgren, L. F. & Dijksterhuis, A.** (2009) ● The Devil Is in the Deliberation: Thinking too Much Reduces Preference Consistency, in *Journal of Consumer Research* Vol. 36, June 2009 (pp. 39–46) ●

[30] **Piatelli-Palmarini, M.** (1994) ● *Inevitable Illusions: How Mistakes of Reason Rule Our Minds* ● New York, N.Y: John Wiley & Sons ●

[31] **Hardman, D.** (2009) ● *Judgment and Decision Making: Psychological Perspectives* ● Chichester: Blackwell Publishing ●

[32] **Wilber, K.** (2007) ● *The Integral Vision* ● Boston, MA: Shambala ●

[33] **Acarya, A. A.** (1982) ● *Beyond the Superconscious Mind* ● Manila: Ananda Marga Publ ●

[34] **Hollway, W. & Jefferson, T.** (2004) ● Narrative, discourse and the unconscious ● In Andrews, M., Squire, C. (eds) *The Uses of Narrative: Explorations in Sociology, Psychology and Cultural Studies* ● London, UK: Transaction Publishers ●

[35] **Lawler, S.** (2008) ● Stories and the Social World ● In Pickering, M. (ed), *Research Methods for Cultural Studies, Edinburgh* ● UK: Edinburgh University Press ●

[36] **Taylor, E. W.** (1998) ● *The Theory and Practice of Transformative Learning: A Critical Review* ● Information Series no. 374. Columbus: ERIC Clearinghouse on Adult, Career, and Vocational Education ● The Ohio State University: Center on Education and Training for Employment, College of Education ●

V

**A CASE STUDY OF INTUITION
AND DESIGN:
BUILDING A TOOL FOR PARENTS
OF PREMATURE BABIES AND
THE NURSING STAFF WHO CARE
FOR THEM**

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Abstract

The paper presents a research-based study project conveyed by Media Lab Helsinki in 2007–2008. During the process, the design team constructed a unique audiovisual tool that provides emotional support in coping with the challenges of a premature birth. The purpose of the two-hour DVD, with its three separate parts, is to help family, intensive care staff, and other associated health care personnel to better connect with each other and the tiny babies. As the first audiovisual material, which aims to explain premature babies' communication and interaction, the end product has proven to be of significant value to Finnish neonatal care and other associated fields. The project was realized in cooperation with the Neonatal Intensive Care Unit in Children's Hospital, HUCH (Helsinki University Central Hospital), and the design team worked in a network of shared expertise.

In the case study the authors used co-design and self-reflection methods to monitor graduate students working with a society-level challenge. The focus was upon the utilisation of intuition in innovations, problem solving, and project management. During the design process, the authors observed the working theory: intuition is the basis of successful decision-making, which leads to innovative solutions. Throughout the design process, the team collected systematically feedback, which was later utilised as a corner stone in the case study.

The authors believe that relying on intuition, the design team ended up addressing many hidden issues of the clinic and parenthood of premature babies'. This paper tries to unfold the evolutionary working approach used during the design process, presents highlights of the case study research as well as illuminates the intuitive way of working from designers' point of view.

Background of the project

This case study presents a research-based study project created by MA in New Media students. As a result of the design process, an audiovisual tool in a DVD format, called *A Different Journey* was published as well as two Master theses were produced. The project was realized with the Neonatal Intensive Care Unit (NICU) in Children's Hospital, HUCH, where 150 premature babies were treated during year 2005. Fifty of them weighed less than 1000 g. In Finland more than 500 babies are born prematurely every year. In this case study, fifteen preemies observed and filmed were born during pregnancy weeks 23–27 and weighed under 1500 g.

The audiovisual tool focuses on helping to understand the world of a premature birth by combining learning material as well as a touching description of the emotional journey of affected families. By combining art, science and digital media, the students were able to invent innovative solutions to the discovered problems. The communication of premature babies differs from that of full term babies', since their nerve system is very premature. It is a hard-to-decipher and a unique form of communication, which needs to be studied and understood in order to help the child.

The design team consisted of nine designers: a pre-production designer, a director, a cameraman, an editor, a creative producer, a visual designer, a sound designer, a DVD designer, and a project manager. For all of them this was the first time in a large audiovisual production. Due to a lack of specific technical expertise to carry out an audiovisual production of professional quality, the team had to learn many abilities and invent various solutions on the way. The designers had to work at the edge of their expertise. In such circumstances, they had to rely their insights and weak signals. This created an optimal circumstance to observe the use of intuition. During the process the design team was working based on shared expertise with a wide network of various specialists: doctors, nurses, parents, therapists, a hospital priest, social worker, and other professionals such as technical experts in the area of digital design. Four experts from NICU worked closely with the designers throughout the design process.

In the NICU, there is a growing focus on the deeper, psychological concerns of the crisis. In order to truly help the entire family, the staff's mission now includes easing the parental psychological barriers in getting attached to a baby that might die. Bringing parents to interact more with their prematurely born baby will advance the emotional birth of a state of parenthood and, in turn, tremendously help the development of the child. Closeness of the parent can even bring about positive physiological changes. For example, in 'kangaroo' treatment, the baby is held under the shirt of a parent, on bare skin. During the treatment, some parents reported that the baby did not need any extra oxygen. Because of its positive effects, the primary goal defined by the hospital staff was to strengthen the bond between parents and their preemies through the video.

The design brief defined by the hospital was to make a 20-minute video about the specific nature of premature babies' communication. This was to be used initially as an informative training material for parents and staff. The design goal was then redefined, and the design team created an audiovisual tool containing 118 minutes of material. It was divided into three separate sections, each having a different function, and produced under the Creative Commons licence. The non-commercial DVD has now been used for three months also among other professional and educational institutions specialized in parenthood, therapies, childbirth, and children's early development.

Theoretical background

Design is usually defined as one of the most challenging cognitive tasks, since it always demands the highest level of problem solving skills (Goel 1995; Simon 1969). Digital media design is strongly based on problem solving with an emphasis on

Pictures 1 & 2.
Bringing parents to interact more with their preemie will tremendously help the development of the child.

inventing communal solutions that support future socio- techno-cultural processes. Designers are expected to create original and unexpected outcomes and through design they formulate solutions to challenging problems and even have a responsibility to design the future (Nelson & Stolterman, 2003).

Creativity can be defined as producing previously unforeseen solutions that are incorporated into larger society (Csikszentmihalyi, 1996; Garder, 1993). It often involves exploring new ways of dealing with things and exploiting or adapting known approaches in new contexts. More specifically then, creativity appears to require a conscious effort to cross boundaries between individual know-how and visions as well as social knowledge and communities of practice (Csikszentmihàlyi, 1996; Boden, 1994).

Design processes are usually examined through iterative and cyclic process models; distributed cognition and shared expertise (Lawson, 1997; Bereiter & Scardamalia, 1993; Goel & Pirolli, 1992). In this case study, the authors found great advantage also from management theories, especially theories of evolutionary developing processes, which helped to understand the structure of the design process. Linear or deterministic processes aim to proceed along predefined plans,

calculations, and schedule with specified goals, while non-linear or so-called evolutionary processes are constantly developing, and goals often change during the process (Sahlin-Andersson & Söderholm, 2006).

Intuition is considered to be an insightful solution for a problem that pops, seemingly unhidden, into consciousness. The meaning of creativity can be described an analytical secondary process verification motivated by, and based on, the intuition (Bastick, 2003). Intuition is connected with preverbal and preconscious processes as well as emotions (Bastick, 2003; Norman, 2005). Along our understanding tacit knowledge, weak signals, and insights work as components, which can be utilised by intuition. Weak signals are trends, ideas or warnings that affect our living environment but that are difficult to identify or too incomplete in order to determine their actual effect (Day & Schoemaker, 2006). However, once

weak signals are recognized, a host of other signals become clearer or more apparent.

In this design challenge of multiple possibilities beyond understanding, the power of creativity and intuition was essential to the designers. For the authors who also worked as designers in the team, intuition was not only a valid tool – it turned out to be the foremost tool in the design problem. Policastro (1999), Norman (1993), and Boden (1994 & 1992) have stated that intuition helps the individual to shift through the endless possibilities of idea development by setting preliminary boundaries for exploration. Mathematician Henri Poincaré has stressed that with logic we prove, but with intuition we discover (Bastick, 2003). The authors believe that discoveries form the most essential component in intuitive processes. Furthermore, we agree with the definition used in the tradition of philosophy, where intuition is considered to be the highest form of intelligence in the area of strategic thinking and decision-making (Henden, 2004).

One of the most relevant questions in this case study was the validity of intuition as an important aspect of a model for design research. How to e.g. separate intuition from other feelings like wishful thinking or fears? Author 1 has been using a self-reflection model (Figure 1.), which presents three parameters, through which interpersonal dialogue can help designer to utilize intuition.

When a designer gets an intuitive idea, the character of it can be evaluated though perceptions, such as emotions or other form of weak signals. If perceptions include emotions like fear or strong wishes, intuition needs to be observed further. To evaluate the importance of these perceptions, ability to distinguish is required. Designer needs to recognise the perceptions of significant value, e.g. the weak signals that are relevant. Through this dialogue, designer is able to evaluate also the quality of intuition and to tune his or her intuition into more sensitive direction. Through intuition, the designer can become aware of new perceptions and distinguish even weaker signals.

Furthermore, a possible design solution can be evaluated through these three components: information gained through intuition and perceptions, as well as the significance and quality of them. This dialogue is closely connected with development of expertise. Professional expertise supports recognition of meaningful observations as well as helps to invent valid possible solutions (Bastick, 2003; Lawson, 1997; Bereiter & Scardamalia, 1993; Norman, 2005). As a conclusion, the quality of intuition can be evaluat-

Intuition

Perception

Ability to distinguish
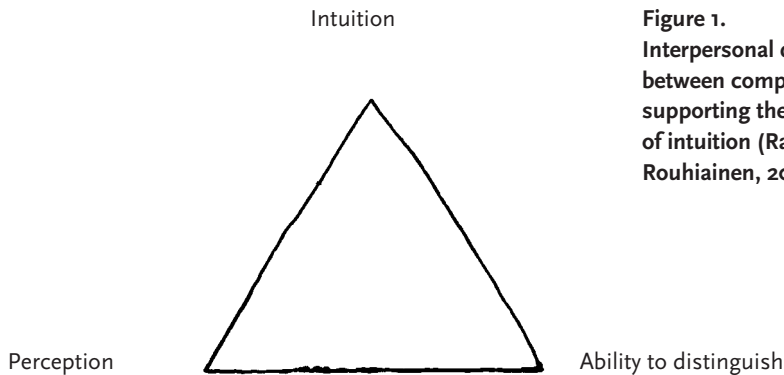
**Figure 1.
Interpersonal dialogue between components supporting the use of intuition (Raami & Rouhiainen, 2006)**

ed through perceptions and the significance of them, as well as these two other components can feed intuition.

Research questions and methods used
In the beginning of the project, the authors started to observe the case from three different angles due to their personal interests and different roles in the project: How to find the core of the design problem and a specific solution to it; how to handle and manage a real-life evolutionary project; and how to encourage students to utilize their intuitive knowledge when working in a real life study project. During the process, all the different angles fused into one working theory: intuition forms the basis for successful decision-making, which led to innovative solutions. This paper will focus on this statement.

The methodologies used were co-design, self-reflection, observation, and discussions. Throughout the process the design team had constant discussions where ideas, gut-feelings and preliminary solutions were thought over. The team also organized 12 test showings and used systematically collected feedback as an evaluation tool for their design solutions. Through this feedback the authors found out that the most successful design solutions had been made strongly based on intuition. As mentioned above, one of the most interesting questions for the authors was the validity of intuition. Feedback was considered to be crucial also due to the specific nature of the subject: the design team did not have any professional expertise in the area of prematurity. Among the audience was a varying number of psychotherapists, nurses, doctors, social workers, priests, physiotherapists, preemie's parents, and professionals of audiovisual productions. Each aspect was discussed over many times and also written anonymous feedback was collected often.

After publishing the DVD, the feedback was gathered systematically through the Internet. Each DVD included a request for feedback. This proved to be a good way to gather feedback from

multiple perspectives. There have been comments from ex-preemies (nowadays teens), from mothers having a preemie 3–17 years earlier, and from teachers, just to mention some. In total twenty-four persons have been used as informants in the case study. The authors also joined a private movie evening organized by the association of premature babies' parents to get direct feedback from mothers. With the help of a mother, feedback was also gathered from a closed discussion forum accessible only for preemies' parents. Furthermore, nursing staff in the hospital collected the feedback given at the NICU or through their networks.

Tuning into intuitive ways of working
Unexpected design constraints
The team had a detailed production plan to start with. However, the designers discovered it was based on a vague problem definition and an idealistic working method. At NICU, hardly any filming can be planned in advance. Where ordinary audiovisual productions operate with pre-planned script in a fixed management schedule, the team had to allow maximum flexibility. The director, the creative producer, and the cameraman have described this challenging, due to the fact that the models used in the field of digital design are mostly based on traditional filmmaking (Kriwaczek, 1997).

Despite the fact that the team had to work without a script and a detailed schedule, there was a certain tendency towards determinism. It is interesting that whilst the team felt the iterative and evolutionary process was a better fit for the design process, at the same time they stressed the chaos in the content and worry about its constant 'self-organising'. The cameraman asked for the story boards several times and the director and the creative producer even produced some, until story boards turned out to be impossible to follow. Everything had to happen in the terms of the emergency nature of the hospital. During the process we understood that completing a project

was not a task of execution, instead it was a journey of knowledge creation (Sahlin-Andersson & Söderholm, 2006).

During the editing phase of material the design team had to constantly bear in minds the issues of ethics and privacy. Although it was on our agenda to film the smallest babies, only one happened to be born before pregnancy week 25. Afterwards the baby passed away and the team was unsure if the material could be used. Also, almost in every interview session, it was difficult to get parents to relax in the front of the camera in the beginning, so that they would tell about their inner feelings and thoughts. Through sensitive personal approach, the director was able to create a trustful atmosphere. After they relaxed to talk, especially mothers tended to be even too open and told many personal and intimate issues.

Personal insights guiding the way
During the design process intuition was used several times, but here we will describe just one example in a more detailed level due to its importance to the whole project. During parents' interviews carried out by the director, a major issue was revealed. In our society all the stories told are about having full term babies. In these stories premature baby's parents become dropouts, and they find themselves in a narrative vacuum. Before being able to handle issues dealing with the communication, which was the design brief, parents needed help to encounter their child through feelings of fear of death and guilt. The director understood that the information of a great interest to the nurses did not really meet the parents' needs. What was thought to be the parents' problem was actually that of the nursing staff. The parents had such huge issues in their life at the time of being at the NICU that it was hard for them to concentrate on what the baby was trying to tell them. They did not primarily interest themselves what it meant if their baby did this or that, they wanted to see something that would make sense of this crisis. They needed un-

derstanding, not mere fact based information. What they actually needed was something, which would help them to look at the small children as their children, with less trauma, guilt, shame, and fear. The director figured out that parents needed to know there is a story and this story has hope in its ending. In order to get to the detailed level of a baby's communication, the parents had to get out of the narrative vacuum.

The director described:

> "Even if all the rest of the team seemed to be sure about the concept, I could not make myself get rid off the odd feeling that kept bugging me like a small pebble of rock in the shoe. There was something so evasive about our mission that even at the risk of appearing thick-headed, I could not to let go off this strange, undefined concern. I weighed the excuse of being rather new in the team or just not understanding the complex field but still listened to the inner urge to start questioning. It was this intuitive warning of something missing that actually would turn the entire project around in a couple of months, to take us to quite a surprising route.
> I kept asking, and somehow instead of finding clarity, I just found more confusion. This was a good sign – I wasn't the only simple-minded in the team, the one who couldn't grasp it. There really was something still to be uncovered. From being the only one lost, I had stumbled upon a tower with a good view of the entire project and was witnessing how there had been shutdowns of information between the many participants of the convoluted project geography. Nobody knew they actually did not know; they were just assuming.
> After that I was completely sure about

the fact we still did not actually have the full idea, just a ghost of it. Even without knowing it, I had known this. Somewhere within, the marrow and the juice were hiding and I was the one to let intuition take us there." **(Celen, 2008)**

The director observed her emotions and gained valuable information. Weak signal, the pebble in the shoe, was significant, and she was able to recognise that. At this point, her intuition and perception were having a dialogue, while she was able to distinguish these both (Figure 1.). She started to question, searched for uncovered issues. Reflecting her observations and emotions, she was looking for an answer or a solution, which would match her intuition. When she finally was able to formulate an idea from preconscious, she knew that she had known. The weak signal guided the director to listen her intuition.

In the citation below, the director is describing the moment when she experienced kind of 'Eureka moment', which is usually closely connected with intuition (Bastick, 2003).

> *"I had been going around and around, and it seemed like different people knew different sides of the whole thing but no one could point me to one direction. One conversation of significance I had was with one of our most experienced HUCH nurse focused in premature babies' communication. She confirmed that the main target audience would be the parents. This group was even more important than the health care personnel in terms of from whose perspective we should tell the story. As I heard this, there was almost an audible click in my head. This was substantial information, the next clue I needed in getting to the bottom of this all. Then, of course, I asked the nurses how they thought the parents would like to see*

this information, how they would best grasp it. It turned out that the nurses did not really have this first-hand information from the parents even if they worked with them everyday. I was astonished. How was it possible that no one in the team actually knew, no one had thought about asking the parents before, and all we had was actually just a non-factual assumption? And on top of this all, we had built an entire project plan." **(Celen, 2008)**

When the designer reached the information matching her intuition, the solution popped into her consciousness. Perceptions were in line with her intuition, and it was easy to her to recognise the significance of it (Fig.1.). This example described above encouraged the whole design team to advantage and trust intuition. Furthermore, through the director's insight the rest of the design team started to understand that parents' emotions are capturing them totally. It is tremendously difficult to encounter premature child who struggles between life and death. There is more than just the plastic incubator separating parents from their babies. The director's story was an enlightening example of intuition as a guide. On the basis of this, the design goal was redefined (Figure 2.).

Intuition guiding the design team
At this point we were convinced that the complex design challenge could not be solved through linear working. A remarkable element was tacit knowledge of nurses, parents and other experts. Designers had to try to transform this tacit knowledge into design solutions somehow. This did not happen in conscious level but mostly through intuitive processes. The design team worked in a hospital setting of such complex psychological and scientific issues that could not be understood comprehensively by mere digital media students. Through questioning, and recogni-

GOAL IN THE BEGINNING   REAL LIFE   RE-DEFINED GOAL

COMMUNICATION
OF PREEMIES

empty head
panic   depression
shock   FEARS   biases
caos   panic
foggy reality

EMOTIONAL SUPPORT

spirit   creativity
        challenges   learning
                                                full potential
ameba-like progress   intuition   open end
                    new ideas

ECOLUTIONARY PROCESS

– TEAM MEMBERS CAN FULLY UTILIZE
THEIR EXPERTISE AND PASSION

Figure 2.
Redefined design goal and
evolutionary process.

tion of possible weak signals, the designers had to stretch their capacity to the extreme in order to understand some characteristic of the new domain and various specialists' perspectives. In fact, due to parallel processing intuition is shown to be capable of handling a huge amount of information compared to rational decision-making (Plessner 2007).

The design team's role became essential as a testing ground for intuitive ideas and preliminary thoughts. Not only the interpersonal dialogue but also the design team helped in the evaluation of intuition. In fact, all the designers in the team were free to choose areas to work with. Naturally the designers focused on the areas of personal professional expertise but also were eager to widen their expertise to brand new areas of design by learning from others in the team. The designers were welcome to utilize their best ideas – even at the last moment. Everyone got max-

imum freedom concerning their own input in the project, and everyone was encouraged to express even vague ideas to others. Weak signals and intuition were strengthened in the group – or then they just faded away. Along our understanding, this process enabled designers to utilize weak signals and the power of intuition as a basis of innovations. There was no need to force the designers to do certain tasks, because the project became the flexible part of the process – the platform was opened up and left all these issues floating. It was much more important for the authors to take care of this atmosphere in the team
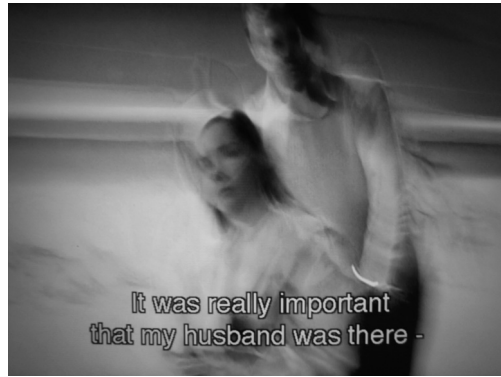
than to try to affect every aspect of the emerging work itself. The authors believe that through this approach the design team itself nurtured also the atmosphere of motivation, encouragement, and trust, which were important components when turning the intuitive ideas into reality.

The design team was living in a constant uncertainty. Upcoming new information could change previous plans totally. All the decisions had to be made as late as possible in order to enable new essential information to be added. In these great challenges, the design solutions were sought through combining artistic expression, medical science, digital media, and shared expertise. During the process, designers started to understand that intuition had been leading them to a very effective way of working. 48 hours of filmed material was edited to an outcome of two hours in the time frame given for editing of 20 min video in the beginning. In fact, adhering to public opinion or being trapped by over-thinking prevent decision-making and action (Norman, 1993). Only as the product was approaching its finish, designers noticed that they had hit many huge and important issues they did not even consciously aim at. The design team had gotten to the

root of some topics that had not even fully surfaced for the professionals working there.

The outcome and discussion
When the project proceeded and solutions became visible, everyone felt that they had surpassed themselves. The design team had constructed a unique audiovisual tool, which has proven to be of significant value to Finnish neonatal care and other associated fields. And all this had happened in the schedule and the budget given. The authors dare to claim that trusting intuition, by making a decision to use intuition as the main working method for the design process, even at the risk of failing, had a significant role enabling this.

The outcome of the production was a multi-dimensional approach fusing together art, documentary, and an information package in unconventional way. It was modern *Pro Arte Utili* where design was used in a non-physical way. The designers understood that design is not only artefacts, it can also be immaterial solutions like emotional support. The designers were able to create an outcome not seen earlier.

As mentioned earlier in the text, the original
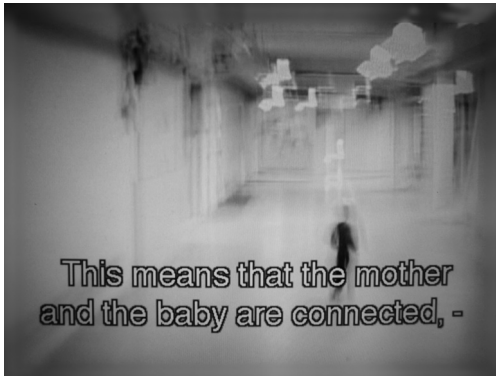
Pictures 3 – 6.
The audiovisual tool helps
the parents to recognize
their feelings, name them,
and through this even
encourages handle them.

goal was set on January 2007:

1. To understand the special nature of premature babies' communication

On the top of this, the design team defined two new goals on March 2007:

2. To relieve parents' fears and to help them to handle their feelings

3. To create a story for parents with which they can identify

In the end of the production process, Nov–Dec 2007, three new ways emerged in how the tool can be used:

4. To give an overall picture of parents' situations and emotional worlds for nursing staff

5. To help nursing staff to handle their feelings and traumas caused by challenging working environment at NICU
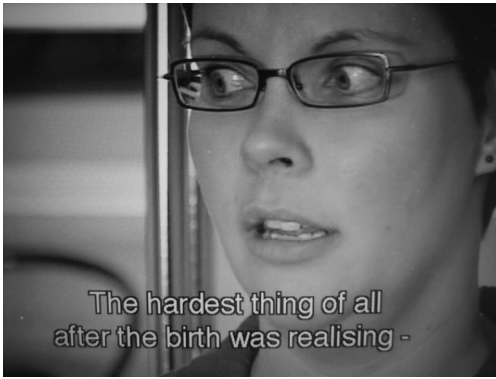
6. To spread information to further treatment units (the locations where these babies will be transferred after leaving NICU)

Along with the information gained through feedback on Jan-Feb 2008, the tool will used in other new ways:

7. To help parents to come in terms with their feelings in a deeper level, even after several years

8. With the tool even the extended family has access to the physical and emotional sceneries of a premature birth.

9. The tool functions as a basis for advanced training in psychotherapy

None of the designers would have dared to take on such a challenge if these results mentioned above had been the project goals in the beginning. Intuition had led to the discovery of 2nd and 3rd goal, while intuition driven design solutions had led to the new ways to utilize the tool mentioned in topics 4,5,7,8, and 9. Guided by intuition and gaining the courage to go beyond expected, the designers had managed to make something truly functional, something that went deeper into the subject matter than anyone would have imagined. Feedback was the most convincing evidence of this, since the decisions

The hardest thing of all after the birth was realising -

I was confused to be sitting between the glass boxes.

**Pictures 7 & 8.
Through the stories of
five families, the world of
prematurity was revealed in
multiple perspectives.**

made based on analysing the ways that intuition works proved to be the best design solutions. For instance, through the outcome the parents' emotional world was revealed to the nursing staff for the first time ever.

Based on the discussions with the designers, the authors state that recognition of weak signals and ability to value them was important part of intuitive process. Weak signals were recognized and strengthened in the group through interpersonal dialogue and group discussions, which helped designers to develop solutions using the intuitive approach.

We also state that in this study case intuition was not dependent on designers' professional expertise. Relying on intuition, the design team ended up addressing many hidden issues of the NICU and to uncover and to address many con-

cealed topics in the chaos and trauma surrounding an unusual parenthood. With the aid of this DVD tool the nursing staff and special care unit are now able to create new and innovative working methods, which can better meet the needs of the parents and the families. This enables better growth and more balanced childhood for the premature baby.

In the end – feedback from parents
One of the most unexpected results gained through the feedback was that the tool was helping a target group, which nobody had thought of: Parents that have had their preemie several years ago.

Informant 7:

> "It felt tremendously good to hear others describe their own feelings so clearly. Partly I understood things just now (after 5 years) when I heard others clothe their thoughts in words. When watching the DVD I cried a lot, but somehow that purified me. I am wondering if there will ever be a day when I do not cry anymore when telling about his prematurity? Can

one ever recover from this or will this shock follow our whole life?"

Informant 21:

"Very touching, personal – opened connection to those feelings and events of the premature birth over eight years ago. I was astonished how powerful the watching experience was, because I thought I had got over it (having a preemie) while participating in peer support, and after delivering two full term babies after him, but the way of handling the subject through such a personal grip – not through fact-based or drama-like – was different from all the others I have seen or read about the subject before!"

Another new form of using the tool was revealed through the feedback as well. These two mothers describing their feelings illustrate the point well.

Informant 12:

"I couldn't even tell to my mom about the feelings I had. I'll send her this so that she can understand the kind of hell we lived in. I did not want that 'you poor baby' -attitude or others feeling pity for me. I even tried to write a letter to my Mom but it felt artificial."

Informant 13:

"This is a good tool for the relatives. Maybe I want them to understand at some point. They kept on asking difficult questions like ´will she become normal and healthy´ and so on. We did not know the answers ourselves either – no one knew – we just tried to live one day at a time."

The whole stock – over 300 DVDs were sold out in one week after publishing. After two months of publishing date, second edition was already sold out, altogether 900 copies.

Conclusions

The authors stress that researching such a complex area, as intuition through one case study is only an interpretation to understand the multidimensional reality. However, this study case strengthened our belief that using a model for design thinking around understanding intuition is the basis of successful decision-making, which leads to innovative solutions. During this design process designers were able to invent innovative solutions to complex problems. The authors found out that in this study case, intuition was not dependent on designers' professional expertise. The recognition of weak signals as well as courage to trust them played a significant role in the design process. Through information revealed in discussions with designers, we believe that trusting intuition, and recognising and evaluating how it works in team situations led to a remarkable outcome compared with the amount of designers' knowledge in the subject area, prematurity. Intuition wasn't only a valid tool – it turned out to be the foremost tool in the design problem. It brought tacit knowledge of NICU, nurses and parents to consciousness through the outcome, which is focusing on emotional support. The multidimensional value of the outcome was revealed to the design team in the very end of the project through user experiences and feedback.

REFERENCES:

Akin, O. (1986) ● *Psychology of Architectural Design* ● London: Pion Limited ●

Bastick, T. (2003) ● *Intuition. Evaluating the construct and its impact on creative thinking* ● West-indies: Stoneman & Lang ●

Bereiter, C. & Scardamalia, M. (1993) ● *Surpassing Ourselves. An inquiry into the nature and implications of expertise* ● Chicago Il: Open Court ●

Bereiter, C. & Scardamalia, M. (2000) ● *Process and product in problem-based learning (PBL) research* ● In D. H. Evenson & C. Hmelo (Eds.) Problem-based learning: A research perspective on learning interactions, (pp. 185–195) ● Mahwah: NJ: Erlbaum ●

Boden, Margaret. (1992) ● *The creative mind* ● London: Sphere Books ●

Boden, M. (1994/1996) ● *Dimensions of Creativity* ● Cambridge, MA: The MIT Press ●

Celen, R. (2008) ● A Different Journey – The puzzle behind the production ● *Mater's Thesis.* Media Lab, Helsinki ●

Csikszentmihàlyi, M. (1993) ● *The Evolving Self: A Psychology for the third millenium* ● Harper Perennial, N.Y ●

Csikszentmihàlyi, M. (1996) ● *Creativity, flow and the psychology of discovery and invention* ● New York, NY: HarperCollins ●

Gardner, H. (1993) ● *Creating Minds: An anatomy of creativity seen through the lives of Freud, Einstein, Picasso, Stravinsky, Eliot, Graham, and Gandhi* ● New York, NY: Basic Books ●

Day, G. & Schoemaker, P. (2006) ● *Peripheral Vision: Detecting the Weak Signals That Will Make or Break Your Company* ● Harvard Business School Publishing ●

Goel, V. (1995) ● *Sketches of Thought* ● Cambridge, MA: MIT Press ●

Goel, V., & Pirolli, P. (1992) ● 'The Structure of Design Problem Space' ● *Cognitive Science,* 16, 395–429 ●

Henden, G. (2004) ● *Intuition and its Role in Strategic Thinking* ● Norway, Sandvika: Nordberg Hurtigtrykk ●

Kriwaczek, P. (1997) ● *Documentary for the Small Screen* ● Focal Press, Oxford ●

Lawson, B. R. (1991) ● *How Designers Think: The design process demystified* (second edition) Cambridge: The University Press ●

Nelson, H. & Stolterman, E. (2003) ● *The Design Way: Intentional Change in an Unpredictable World* ● Foundations and Fundamentals of Design Competence ● Educational Technology Publications, Englawood Cliffs, New Jersey 07632 ●

Norman, D. A. (1993) ● *Things that Make Us Smart. Defending human attributes in the age of the machine* ● New York: Addison-Wesley ●

Norman, D. A. (2005) ● *Emotional Design: Why We Love (or Hate) Everyday Things* ● Basic Books ●

Plessner, H. (ed.) (2007) ● *Intuition in Judgement and Descion Making* ● New York: Lawrence Erlbaum Associates ●

Policastro, E. (1995) ● Creative Intuition: An Integrative Review ● *Creativity Research Journal,* Vol. 8, No. 2, 99–113 ●

Policastro, E. (1999) ● *Intuition* ● Ensyclopedia of Creativity, Vol.2. Academic press ●

Raami & Rouhiainen, L. (2006) ● 'Perceiving with a Difference: Tools and techniques for developing embodied personal creative thinking' ● *Media Lab Research Symposium: Tools 19.5.2006* ●

Sahlin-Andersson, K. & Söderholm, A. (ed.) (2006) ● *Beyond project management, New perspectives on the temporary – permanent dilemma* ● Copenhagen Business School Press ● Daleke Grafiska AB, Malmö ●

Simon, H. A. (1969) ● *The Science of Artificial* (3rd ed. 1990) ● Cambridge, MA: The MIT Press ●

The definitions of the terms below are not comprehensive but define how the terms are used in this study. The aim of this glossary is to elaborate the vague and inconsistent terminology of intuitive experiences and intuition-related research.

Accumulative intuition ● Intuiting is based on the integration of memory traces and currently perceived information. While using accumulative intuition, people select options relying, at least partially, on automatic information sampling processes where information is repeatedly inspected and added up.

Aha! moment ● A moment of sudden **Insight**. A problem usually requires dedicated analysis both before and after the Aha! moment.
See also: **Eureka experience**.

Alternative models of intuition ● Models explaining that intuiting (or some types of intuition) is rooted in processes that currently are partly inexplicable. A variety of alternative models can be found in various fields of cutting-edge science and in eastern and western traditions such as theosophy, anthroposophy, yoga and meditation practices.

Altered state of consciousness, altered state of awareness ● Temporary changes in one's mental state without being considered unconscious. Altered states of consciousness can be created intentionally, or they can happen by accident or due to illness. An altered state of consciousness can occur, for example, during dreams, reveries, extraordinary insights, drug-induced states, or meditation.

Associative intuition ● Intuiting is a learning-retrieval process based on reinforcement and association. It may be rooted in various learning mechanisms, such as feelings of liking or disliking, affective arousals or activation of previously successful behaviour.

Attention (in intuitive processing) ● With attention, a person can attune to a certain target. Attention is soft and gentle, focusing on the present moment, and reveals the essence of the target. Attention keeps intuition open, reveals unity and flow.

Awareness ● Knowledge of a situation or fact; ability to perceive, to feel, or to be conscious of events, objects, or sensory patterns.
See also: **Consciousness**

Behavioural script ● A sequence of expected behaviours for a given situation. People continually follow scripts that are acquired through habit, practice or simple routines.

Clicking-in moment ● A moment of **Insight** when "pieces of a puzzle fit together". A **Eureka experience** is preceded by a period of inattention, whereas a "Clicking-in" experience follows a period of intense concentration.

Cognitive style, "thinking style" ● Describes the way individuals think, perceive and remember information. Cognitive style differs from cognitive ability (or level), the latter being measured by aptitude tests or so-called intelligence tests.

Conscious faculty, conscious mind ● Those parts of the mind that are directly perceptible to and under the control of the person concerned (see also Dual-process model of the mind and **Mode of thinking**).

Conscious mind /consciousness ● **Awareness** of oneself and one's surroundings. Reflective self-consciousness is higher-order cognition.

Conscious reasoning ● A thinking process where the conscious faculties (system 2 – see also Dual-process model of the mind and **Mode of thinking**) are used in mental operations.

Constructive intuition ● Intuiting is based on the integration of currently perceived information and the construction of mental representations, where information is not just added up (as in **Accumulative intuition**), but entire assemblages of information are preserved. Information is not only matched to existing exemplars but mental representations go beyond existing information,

for example the spreading activation of networks, which creatively give rise to new interpretations and combinations. Usually only the result enters the person's **Awareness**.

Core existence ● The inner quality or essence of a person. Alternative terms used are core self, energetic vibration, inner essence or **Home frequency**.

Direct knowing ● Ability to receive or intentionally access intuitive information. This type of intuiting is labelled differently in various sources, for example as remote viewing, naked **Awareness** or intrinsic **Awareness**.

Discernment skill ● The ability to sort out or discriminate between intuitive signals, for example to differentiate between the quality of incoming signals or to recognize the sources of intuitive information.

Domain-independent intuition ● Intuition that is not exclusive to a specific field or domain but can be applicable to several domains or areas of life.

Dual-process model of the mind ● This model divides human thinking into two major faculties with completely different operation modes: intuitive (system 1) and reasoning (system 2). Both are integral and essential components of everyday human thinking and are often integrated.
See also: **Mode of thinking.**

Embodied cognition, embodied knowledge, embodied mind ● A philosophical thesis where all aspects of cognition are seen as being shaped by aspects of the body. In **Embodiment**, the mind, the body and the environment mutually interact and influence one another to promote an adaptive success. In embodied knowledge the body knows how to act, such as when cycling.

Embodiment ● A reflection where the body and mind have been brought together. Embodied (mindful) reflection is open-ended, a form of experience in its own right.

Emotion ● Emotion and **Feeling** are defined inconsistently depending on the source. I use the word to describe a short-term and quick preconscious experience (e.g. being surprised or provoked) in response to a situation perceived to be personally significant. Emotions often include personal interpretations, behavioural reactions and embodied experiences. Mood is a long-term experience. See also: **Feeling**

Emotional attachment ● A state in which a person experiences a desire for or a resistance to things, people or concepts. Opposite to **Non-attachment** or detachment.

Empathic projection ● A state where a person is able to internally create a space wherein to empathetically project a situation, another individual or an object.

Energy field ● The flow of energy that surrounds all living things, and even objects. Currently, it cannot always be measured but at least some forms of it, such as a magnetic field, can be measured with a sensitive physical device.

Eureka experience ● A moment when a person becomes aware of the solution. A Eureka experience is typically preceded by a long incubation period, when the person has "shelved" or forgotten the problem (is unaware that the **Non-conscious** faculties continue to work with the information) until the solution pops into their mind.
See also: **Aha! moment**.

Expert intuitive ● see: highly intuitive individual

Extraordinary experiences of intuition ● Intuitive experiences or perceptions that cannot be explained by current scientific paradigms**.**

Extraordinary knowing / sensing ● A term referring to knowing and/or sensing that cannot be equated to perceptions caused by the normal, or most common, sensory channels or memory.

Extrasensory perception (ESP) ● Communication or perception by means other than the physical senses, for example a Sensation of being stared at. All humans are capable of extrasensory perception, which partly developed through evolution. One form of ESP is telepathy, which Merleau-Ponty labels effective perception.

Feeling ● Feeling and **Emotion** are defined inconsistently depending on the source. I use the word as defining mental experiences of body states. Based on the nervous system, feelings signify physiological need, including injury, optimal function or social interaction (e.g. happiness, hunger, pain, well-being, a feeling of expanding). See also: **Emotion, sensation**

Flow ● An optimal (working) experience of continuous output or outpouring or intuitive state of action. Typically, this includes feelings of excitement, joy and of surpassing oneself as well as losing one's sense of time.

Gut feeling ● An instinctive embodied Sensation or Feeling, as opposed to an opinion based on facts.

Higher senses ● Human Sensation far beyond medically accepted ranges and/or non-physical Sensation (e.g. within the mind's eye) that may sometimes overlay or merge with actual physical sensations (i.e. overlaid on actual ocular vision).

Highly intuitive individual/practitioner, expert intuitive ● Individuals who are able to receive accurate and reliable intuitive information due to long practice or innate skills.

Highly personal intuitive experiences ● Intuitive experiences that are intimate, unique and often ambiguous. Typically, they are hard to verbalize and sometimes may include extraordinary sensations.

Highly sensitive person (HSP) ● A person having an innate trait for high sensory processing sensitivity due to a neurological difference. Carl Jung used the term innate sensitiveness.

Home frequency ● A personal and specific radiation, also called a source of being self, a personal vibration, an inner essence or a core existence.

Hypnogogic reverie ● Chaotic associations of images and ideas that occur during very relaxed states and sleep-like situations.

Ill-defined problem ● An ill-defined problem needs a formulation of the problem in the first place, since it may turn out to be several problems instead of one, or a totally different problem than the one envisaged in the beginning. Solutions may also be many, instead of one. There may be several satisfying alternatives, which are different, yet equally good, and typically professional experience is of great benefit to the outcome.

Incubation ● An unconscious processing of information, which may precede intuition, leading to **Insight**, leading to a **Eureka experience**.

Insight ● The capacity to gain an accurate and deep understanding about someone or something. There are different types of intuitive insights, one of the most common being the **Eureka experience**. Most commonly, insight is defined as seeing the solution to a problem or identifying the required

components and their inter-relations, while intuition may remain a hazy unvalidated hunch.

Instinct ● An innate evolutionary reaction related to survival. An innate, typically fixed, pattern of behaviour in animals in response to certain stimuli.

Integrated intelligence ● see: **Intuitive intelligence**.

Intention (in intuitive processing) ● Can be used to widen one's perceiving and opening up to the new dimensions of intuition. Intention is about using willpower and it targets the future. Intention may intensify and accelerate the use of **Attention**. When a person assigns themself a mental task, not only the conscious faculties but also the **Non-conscious** faculties start processing the information or acting along the intention.

Intentional intuition ● Intuition is not just a random emotional-based coincidence, rather it is a conscious process where a person can intentionally attune to intuitive information.

Intuition ● A phenomenon of complex information integration processes. The term 'intuition' is currently used for varying types of knowledge, processes and outcomes. Typically, the term describes processes that are not conscious and it includes flash-like and immediate knowledge that pops into consciousness.

Intuitive faculties ● Those parts of the human mind that account for intuiting (system 1 – refer to Dual-process model of the mind and **Mode of thinking**) and are outside of **Conscious reasoning**.

Intuitive intelligence, integrated intelligence ● A mental operation where intuitive information is combined with reasoning.

Level of consciousness ● A level of alertness, which has a wide range from lucidness to

drowsiness when tired and even to sleep and a coma.

Matching intuition ● The process of intuiting is rooted in a complex learning-retrieval process based on the storage of multiple exemplars. A matching intuition is rooted in a pattern-recognition process, where a situation creates cues that are compared with memory traces.

Meta-level skill (in designing or thinking) ● An **Awareness** and understanding of the phenomena of thinking, learning and designing, as opposed to subject knowledge. Leads to taking control of one's own design process.

Mode of knowing ● A type or way of knowing, for example through experience, reason, authority or **Noetic knowing**, such as **Intuition**.

Mode of thinking ● Human thinking is divided into two main categories, intuition (system 1) and reasoning (system 2) (refer also to Dual-process model of the mind). Intuiting and reasoning can be considered as the end points of a cognitive continuum, where different points on the continuum use particular forms of cognition.

Morphic resonance ● An idea that through an, as yet unknown, information exchange process an event or act can lead to similar events or acts in the future, or an idea conceived in one mind can then arise in another mind.

Naïve intuition or sensible intuition ● Rooted in sensing and common sense, which often gives rise to errors based on experiences and naïve understanding.

Noetic knowing ● Noetic originates from the Greek word *noēsis / noētikos*, meaning inner wisdom, **Direct knowing**, or subjective understanding.

Non-attachment ● A state in which a person overcomes their (usually emotional) attachment to a desire or a resistance to things, people or concepts. In philosophy, also expressed as detachment.

Non-bodily feeling ● A Feeling that can be sensed but not physically, for example the Sensation of being stared at. A non-bodily feeling may be a requisite condition for certain emotions.

Non-conscious ● Opposite to conscious, including all psychological functioning that one is unaware of, for example the **Subconscious mind**, instincts and automatized processes.

Non-local information ● Information that is not limited by time or place. Non-local information can be accessed through the intuitive faculties.

Non-traditional scientific research ● Research that uses a scientific approach to investigate phenomena that are not accepted, or are strongly questioned, by the current scientific mainstream, for example **Non-local information, ESP** or **Noetic knowing**.

Pathological sceptic / pseudo-sceptic ● A person who tries to appear open-minded and scientific even though they are actually a *believer* of another belief system, for example **Scientism**. These individuals usually believe they are interested in getting at the truth, but without looking at the data and the evidence, have already decided on and become entrenched in their position.

Pattern recognition, see: **Matching intuition** ● An act of comparing and identifying parameters as the constituents of a particular pattern. Pattern recognition does not occur instantly although it happens automatically and spontaneously. In pattern matching, the match usually has to be exact.

Perception skill ● Ability to notice and perceive environmental and internal signals through sensing.

Pre-reflective state ● An implicit, first-order **Awareness** related to the experiential dimension in contrast to the explicit or higher-order form of self-consciousness. Explicit reflective self-consciousness is possible only because there is pre-reflective self-awareness, which is an ongoing and more primary self-consciousness.

Psychokinesis ● Influencing the state of an object by mental impact alone, without any physical intervention.

Random sampling
A method of selecting a sample from a statistical population so that every sample that can be selected has a predetermined probability of being selected.

Reasoning faculties ● Those parts of the brain where **Conscious reasoning** takes place (system 2 – see also Dual-process model of the mind and **Mode of thinking**).

Remote viewing ● A process where a person intentionally contacts a given target through their intuitive faculties. The target is unknown to the reviewer, but labelled with a set of insignificant random numbers. Remote viewing is a good example of accessing so-called **Non-local information** and acquiring the **Direct knowing** type of information, which provably comes outside of oneself.

Sensation ● A perception or physical feeling based on sensory receptions resulting from something that happens to or comes into contact with the body, which results in an experience, or **Awareness**, of conditions inside or outside the body (e.g. physical pain, bright light). See also: **Feeling**

Sensible intuition, naïve intuition ● Rooted in sensing and common sense, which usually gives rise to errors based on experiences and naïve understanding.

Scientism ● A belief system and a degeneration of essential science that is detrimental to many people by dismissing or "explaining away" the spiritual, rather than examining it and trying to understand or even apply it. Scientism never recognizes itself as a limited belief system but always considers itself a true science, or the noble search for truth, the confusion is dangerous. Science itself is a method and a formal system of collecting and refining knowledge.

Sceptic /scepticism ● An elementary scientific tool and approach for a researcher. A questioning attitude towards knowledge, facts, or opinions/ beliefs stated as facts, or doubt regarding claims that are taken for granted. See also **Pathological sceptic / pseudo-sceptic.**

Student-centred and constructivist approach to learning ● Understanding and integrating the student's personal perspective is essential for any meaningful learning experience.

Subconscious mind ● The psychic activity immediately below the level of a person's **Awareness.**

Subtle energy / Subtle sensing ● A form of information transmission, which is often not accompanied by measurable electromagnetic fields. This has been also referred to as: the chi, ki, prana, the force, love, kundalini, orgone, space energy, zero-point energy, aura field energy, energy of thought, energy of consciousness, spiritual energy, life-force energy, ether/aether/eter, vril, energy of intention, and intuition. It is possible that these refer to one or several processes and or phenomena. Currently, we can only observe

the effects of subtle energy rather than the energy transmission itself.

Superconscious mind ● The superconscious is seen as the source of "true" intuition and all knowledge that cannot be acquired by sensing and memory. It is not limited to an individual but shared by everyone and it has various names depending on the domain: the **Transpersonal realm**, Akashic Record or Akashic Chronicle, and Atmic consciousness.

Supernormal experience ● Intuitive experiences that greatly exceed the normal or average but still obey the laws of physics. Sometimes these may lie beyond the normal or natural powers of comprehension and are termed paranormal experiences.

Substitute activity ● An activity that replaces the task to be done. A person fills up their mind with something other than the matter in question and uses their time for relatively unproductive and routine tasks.

Tacit knowledge ● A form of knowing where we know more than we are able to verbalize. Tacit knowledge is difficult, sometimes impossible, to transfer to another person by means of writing it down or verbalizing it. It is not only knowledge that cannot be articulated and transferred by verbal means, but also the knowledge itself is rooted in a tacit dimension.

Thinking modality, see: Mode of thinking

Transpersonal realm, spiritual realm ● The transpersonal realm is beyond the conventional, personal or individual level. In transpersonal experiences, the sense of identity or self extends beyond (trans) the individual or personal to encompass wider aspects of humankind, life, the psyche or the cosmos.

"True" intuition ● Intuition that cannot be derived from expertise or memory but instead stems from the **Superconscious mind**.

Well-defined problem ● In well-defined or tame problems there is often a shared understanding of the problem itself, as well as the optimal outcome. The solution can usually be optimized.

Wicked problem ● In design literature problems are usually divided into three major categories: **Well-defined problems, Ill-defined problems** and wicked problems. A wicked problem cannot be exhaustively formulated, hence there are many explanations for the same problem, and every formulation is a statement of a solution. The design process involving wicked problems is infinite, every problem is a symptom of another problem, and every solution usually leads to a new problem. Wicked problems are unique so the experience neither plays a crucial role nor can the list of operations be fulfilled. Tame and *wicked* problems are not governed by the same logic. The strategies developed in tame problems are not just different in degree, but above all different in kind from wicked problems, which have a complexity, ambiguity and epistemological uniqueness of their own.

Jeroen Carelse

ASTA RAAMI M.A. B.Ed.

The studies and work of Asta Raami have always been guided by her interest towards the human mind and body. Creativity, learning and researching the unknown constitute some of the cornerstones of her extensive studies of intuition.

Raami has an interdisciplinary background and degrees in educational science (University of Helsinki), graphic design and new media (University of Art and Design Helsinki). Raami was one of the first students in Media Lab Helsinki when the unit was founded in 1994. However, instead of technological development, she became more and more interested in the development of the untapped potential of the human mind.

In the late 1990s, Raami worked in the Media Lab as a designer in a research project developing a digital platform which supports inquiry learning and shared expertise through knowledge building. In 2003, she started Coaching Creativity courses for MA-level design students and in 2008, Coaching Intuition courses for teachers and students on all levels. She worked for several years as a lecturer of creativity development in Aalto University ARTS.

Intuition research was conducted in 2008–2013 with the support of the Academy of Finland and Aalto University. Currently, Raami works as an independent intuition researcher, lecturer and educator.

Intuition Unleashed discusses designers' intuitive experiences and the process of intuiting. Intuition is an integral part of human thinking and one of the most important creative tools among designers. In complex cognitive tasks, such as creating and problem solving, the role of intuition is fundamental. This study searches for a shared discussion on intuition between the different fields of design, as well as between design and other scientific domains. Through this, the work aims to build as broad an understanding of intuition and intuiting as possible. The book also introduces some pedagogical applications related to the reliability of intuition and intuition development.

The author and Aalto University are to be commended for addressing and supporting the exploration of a challenging and difficult subject of interdisciplinary and practical value to research, education, and practice in many fields.
– Charles Burnette, PhD, FAIA, Independent Researcher

This path-breaking study demonstrates how intuition is an important mode of knowing, and a necessary part of the creative and the thinking processes. It also shows that intuition is a capacity that can be effectively developed. Previous psychological and medical research has run its course in viewing the human mind as though it were governed by mechanical laws of nature. This work offers new possibilities for the study of the arts, design, education, management and more generally for understanding the human mind.
– Marja-Liisa Honkasalo, MD, PhD, Professor, University of Turku

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