UNVEIL AWARENESS

A Design Education Tool for Revealing the Hidden Curriculum

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COLOFON

Master thesis
Unveil awareness:
a design education tool for revealing the hidden curriculum
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- Fake it until you make it, behave as you already achieved what you want to achieve and you will be already achieving it.
- Get a life man, in Ianus's words means enjoy your life.
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EXECUTIVE SUMMARY

In this project, I research how to unveil the hidden curriculum in Design Education. The hidden curriculum is the curriculum that students develop tacitly during their studies. It is also defined as tacit knowledge developed in education. tacit knowledge is a part of knowledge that everybody takes for granted without being fully aware of its influence on perceptions and actions.

Unveiling tacit knowledge by design students has been considered by several authors a source for students to support awareness in judgments and decision making (Grey, 2018; Vakantesh & Ma, 2019; Wang, 2010; Whelan et al, 2017) because it allows students to become more aware of their perspectives when learning. However, tacit knowledge, as well as the hidden curriculum, are difficult to make explicit (Grey, 2018), because they are hidden in ourselves and our culture (Mareis, 2012).

In the course, IDE Academy, a first-year master course in the Faculty of Industrial Design Engineering of the Technical University of Delft, the hidden curriculum plays an important role for students. The course set up allows students to choose skills to learn in a free-fail environment, thus, the curriculum of the course is highly dependent on the students and their decision making. This means that the hidden curriculum of the students becomes the curriculum of IDE Academy.

The aim of this project was to find ways to make the hidden curriculum more explicit in IDE Academy and to contribute knowledge of how to unveil the hidden curriculum in design education.

This project has employed a Research through Design approach and consisted of 3 main cycles.

The outline of the report is structured in the following chapters.

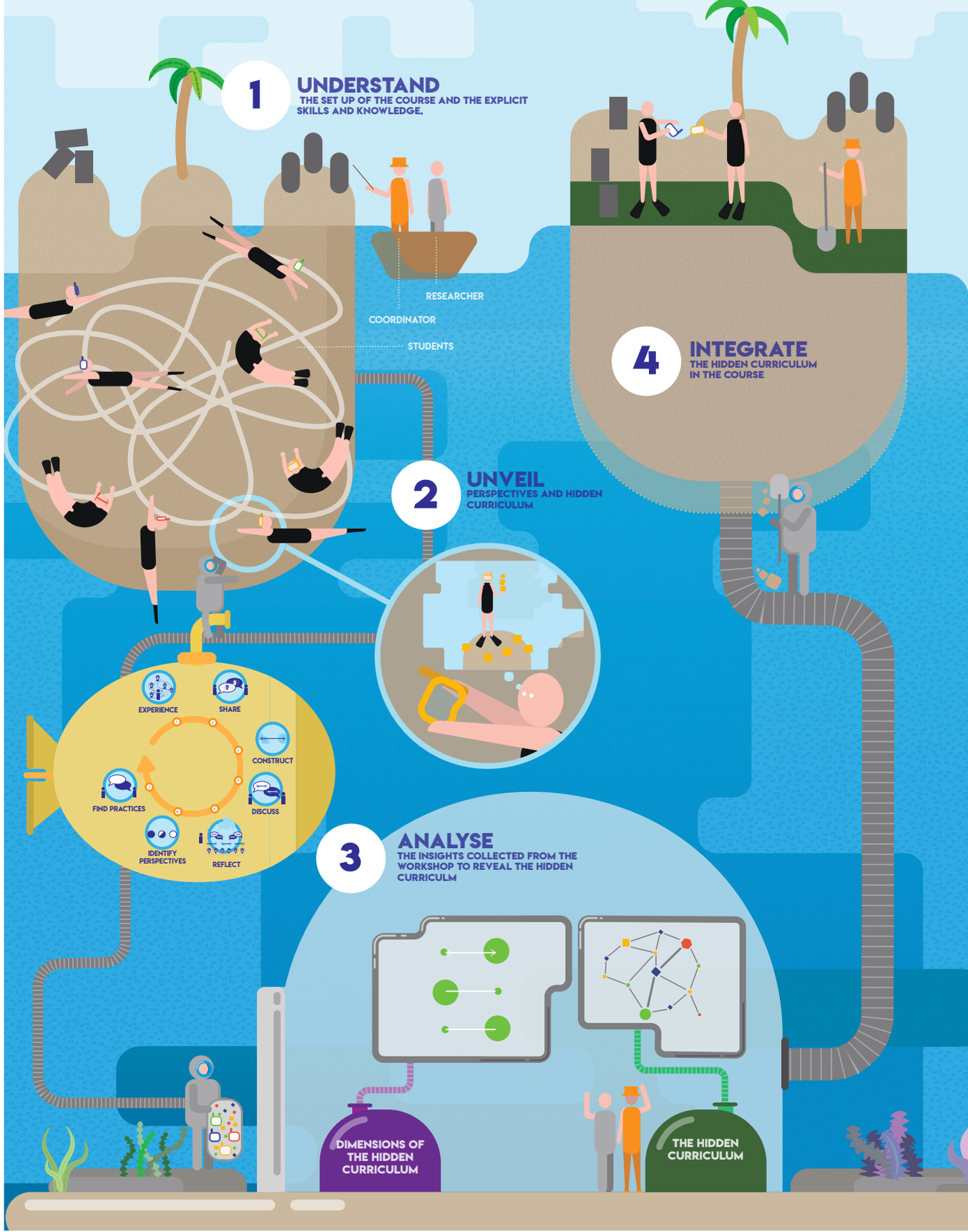
In Chapter 1 - Understand - I present the concept of the hidden curriculum through the lenses of tacit knowledge in Literature and the context of the IDE Academy course.

In Chapter 2 - Unveil - I provide an overview of the current methods to reveal tacit knowledge. I show the design interventions towards the design of a reflective tool that helps students to unveil their personal hidden curriculum.

In Chapter 3 - Analyze - I show the data collected from the tool and the findings. I present the hidden curriculum of IDE Academy and different student perspectives.

In Chapter 4 - Integrate - I discuss the findings and I attempt a first integration of the hidden curriculum in the course IDE Academy.

In Chapter 5 - The unveil awareness toolkit- I present the toolkit developed in the process of this research, I evaluate the tool and conclude the research by reflecting on the tool and related findings. This project has employed a Research Design approach, meaning that in the project design activities played a formative role in the generation of knowledge.



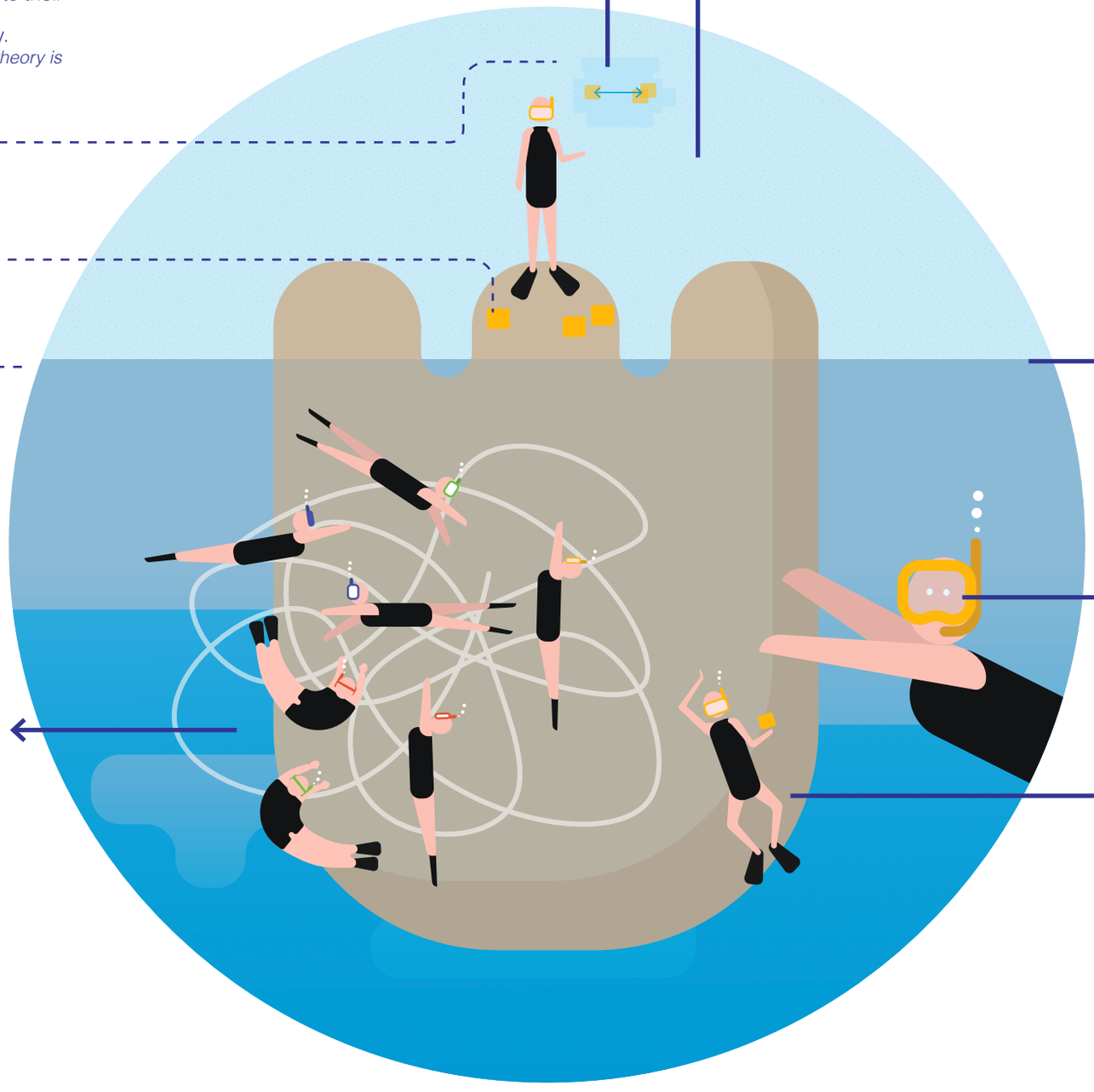
GLOSSARY

PERSONAL CONSTRUCT PSYCOLOGY
Psychological theory by Kelly which claim that people during their upbringing make use of very personal criteria to give meaning to their experiences.
These criteria are defined by bipolarity.
The method developed according to this theory is Repertory Grid Technique:

CONSTRUCTS
Concept based on the relationship of similarity and difference.

ELEMENTS
Examples which are compared to create constructs

Below the sea level or definition of TK we can identify:



EXPLICIT KNOWLEDGE
Communicable knowledge converted into linguistic or numerical form.

TACIT KNOWLEDGE
Non-linguistic non numerical form of knowledge highly personal, context specific and deeply rooted in individual experiences, ideas, values and emotions.

PERSPECTIVES
Feeling, judgments and attitudes influenced by our ingrained schema.

HIDDEN CURRICULUM
Binding of all the hidden or explicit learnings that is learned without being explicitly taught.

HIDDEN LEARNING
Learning outcome which are not learning outcomes of the formal curriculum.

WHY THIS PROJECT STARTED

I have been a student and a design student for a great part of my life. But, I started questioning what learning means in design when I became an assistant for IDE Academy. IDE Academy is a one year master course in IDE, TU Delft, where students choose to learn skills in form of workshops (14) throughout an academic year.

Working in IDE Academy gave me the opportunity to talk to many students weekly. I listened to complaints, compliments and answered many questions. This left me with unsolved questions of my own.

- Why do students have incredibly different perceptions of the workshops?

- Why do students not feel satisfied with themselves at the end of the course?

The majority of the students who finished IDE Academy told me the same thing. “I wish I followed IDE Academy differently.”

At my questions:‘Why?’ and ‘How?’, the answers were the same ‘I don’t really know’.

Therefore, **I chose to look at what was being overlooked.**

SIGNIFICANCE

Higher education programs prepare students to become professionals through the acquisition of necessary knowledge and skills (Dall’Alba, 2009). However, these programs are mainly crafted and based on explicit knowledge, with less attention being given to tacit knowledge (Neuweg, 2002; Wang 2010).

tacit knowledge is a non numerical non verbal type of knowledge highly contextual and deeply rooted in an individual’s experience (Nonaka, 1995). Individual tacit knowledge and collective tacit knowledge influence students’ learnings, which in the field of education is called hidden curriculum (Kentli, 2009). Several authors mention that unveiling tacit knowledge can support awareness of judgment in design learning and design, and can make decision making more explicit. (Grey, 2015, 2018; Whelan et al, 2017, Venkatesh & Ma, 2019).

Overlooking tacit knowledge in education means that students miss out on capitalizing this knowledge. Although, the nature of tacit knowledge is hidden and implicit, it becomes important to create vocabulary, tools, and methods to make more explicit the hidden curriculum in design education (Grey, 2015).

The aim of this project is to develop a way to unveil the hidden curriculum, and discover the benefits for students and teachers.

Therefore the research questions are the following:

RQ1. How can the hidden curriculum be unveiled?

Sub question: What is unveiled?

RQ2. What are the benefits in unveiling the hidden curriculum?

Sub questions: What are the benefits for students when they unveil their hidden curriculum?

Sub questions: What are the benefits for students when teachers unveil to them the hidden curriculum of a course?

The aim of this research is to contribute knowledge to a deeper and concrete understanding of the hidden curriculum and to propose ways to access the hidden curriculum more easily.

APPROACH

This project has employed a Research Design approach, meaning that in the project design activities played a formative role in the generation of knowledge.

Often RtD is associated to “research through practice” which can be seen as a process generated through consequent cycles of designing, making, testing and reflecting upon the experiential prototypes in real-life settings (Stappers & Giaccardi, 2017). The goal of the project was to find a way to unveil the hidden curriculum but also to gather knowledge in how to unveil and what the hidden curriculum was in real context since the hidden curriculum is highly contextual.

The hidden curriculum is difficult to make explicit because hidden in ourselves and our culture, but it reflects our actions. In the process of this project, the interventions triggered in students’ responses which could not have happened without the interventions.

The diverse types of activity vary between interviews, observations, experimental prototypes, evaluation and discussions with different stakeholders.

A series of case studies have been carried out in the Faculty of Industrial Design Engineering of the Technical University of Delft. All of the case studies were focused on the course IDE Academy, a one-year master course in IDE.

The project followed three main cycles (fig 2):

- **Cycle 1** I experimented to find ways to unveil the hidden curriculum. The main research question was: “How can I unveil the hidden curriculum of students in IDE Academy?” in discourse with “What is the hidden curriculum of students in IDE Academy?”
- **Cycle 2** I explored ways to understand the hidden curriculum and the data from prototypes. The main research question was: “How can I unveil the hidden curriculum of IDE Academy?” in discourse with “What is the hidden curriculum of students in IDE Academy?”
- ***Cycle 3*** I explored how to use and integrate the findings of the hidden curriculum of IDE Academy.

Although each cycle had a specific focus, all the findings have been integrated in an iterative a holistic way towards the results of this research.

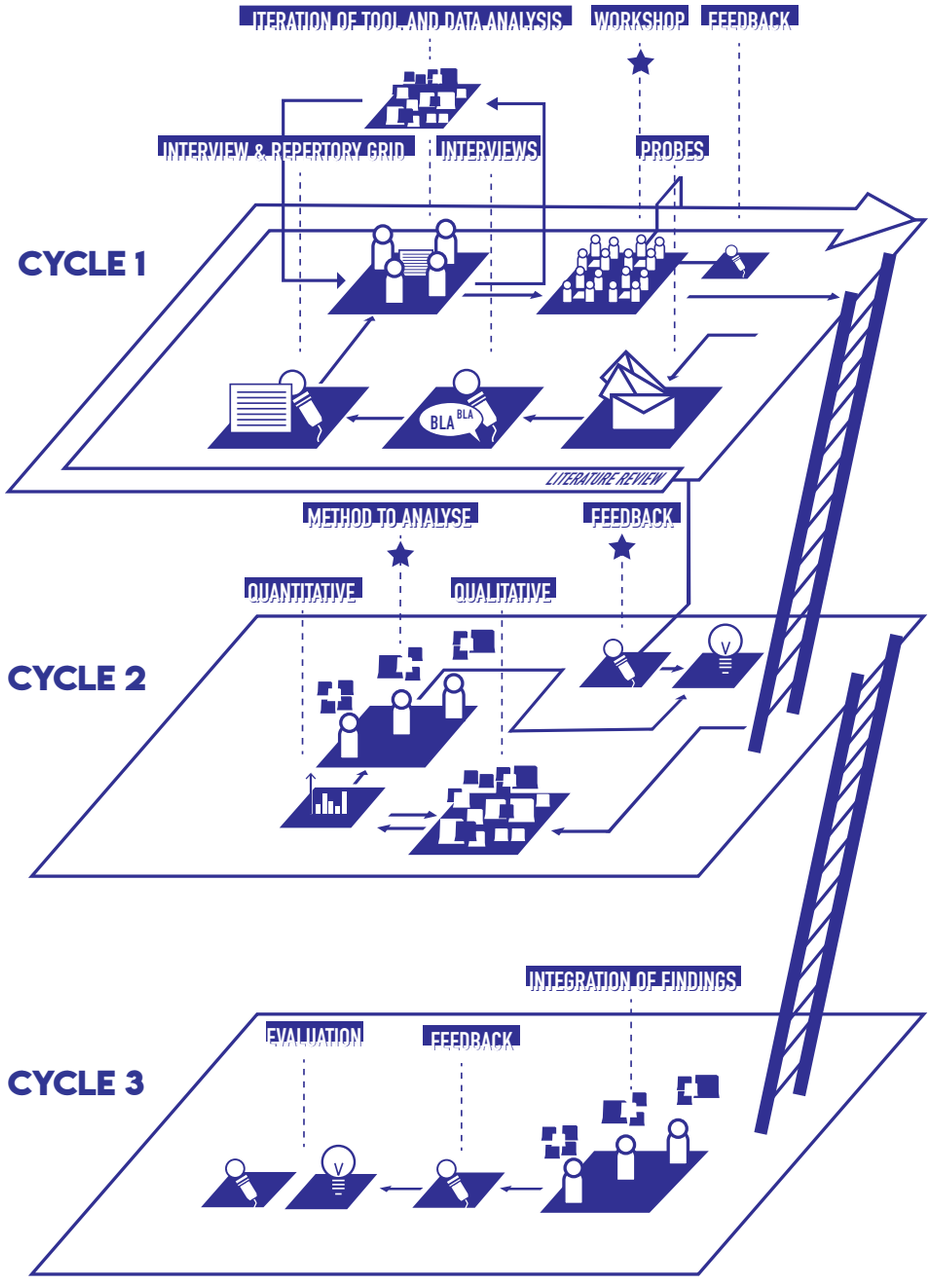


Fig. 2, overview of the project process

CONTENT

Acknowledgments
Executive Summary
Glossary
Significance
Approach

01

UNDERSTAND THE HIDDEN CURRICULUM AND THE CONTEXT

1.1 The context of IDE Academy.....pg 19
1.2 The hidden curriculum as part of tacit knowledge...pg 22
- 1.2.1 Definition of tacit knowledge
- 1.2.2 Polanyi's tacit knowing
- 1.2.3 Characteristics of tacit knowledge
- 1.2.4 Conclusion

1.3 Learning theories and tacit knowledge.....pg 32
- 1.3.1 Experiential learning
- 1.3.2 Transformative learning
- 1.3.3 Reflective practice
- 1.3.4 Conclusion

1.4 Conclusion.....pg 34

02

UNVEIL THE HIDDEN CURRICULUM

2.1 Methods to unveil the hidden curriculum.....pg 42
2.2 Iteration to find a way to unveil the HC.....pg 46
- 2.2.1 Unveiling perspectives
- 2.2.2 Unveiling the Hidden Curriculum

2.3 The Unveil awareness workshop.....pg 55
- 2.3.1 Workshop execution
- 2.3.2 Benefits for students

2.4 Conclusion.....pg 58

03

ANALYZE THE HIDDEN CURRICULUM

3.1 Data collection.....pg 64
3.2 Ways of data analysis .....pg 66
3.3 Analysis of the data collected .....pg 68
- 3.3.1 Data
- 3.3.2 Process Data Analysis
- 3.3.3 Findings

3.4 Conclusion.....pg 74

04

INTEGRATE THE HIDDEN CURRICULUM

4.1 Implications of the finding.....pg 78
4.2 Integration of the hidden curriculum in IDE Academy.....pg 79
- 4.2.1 The introductory workshop of IDE Academy

4.3 Conclusion.....pg 83

05

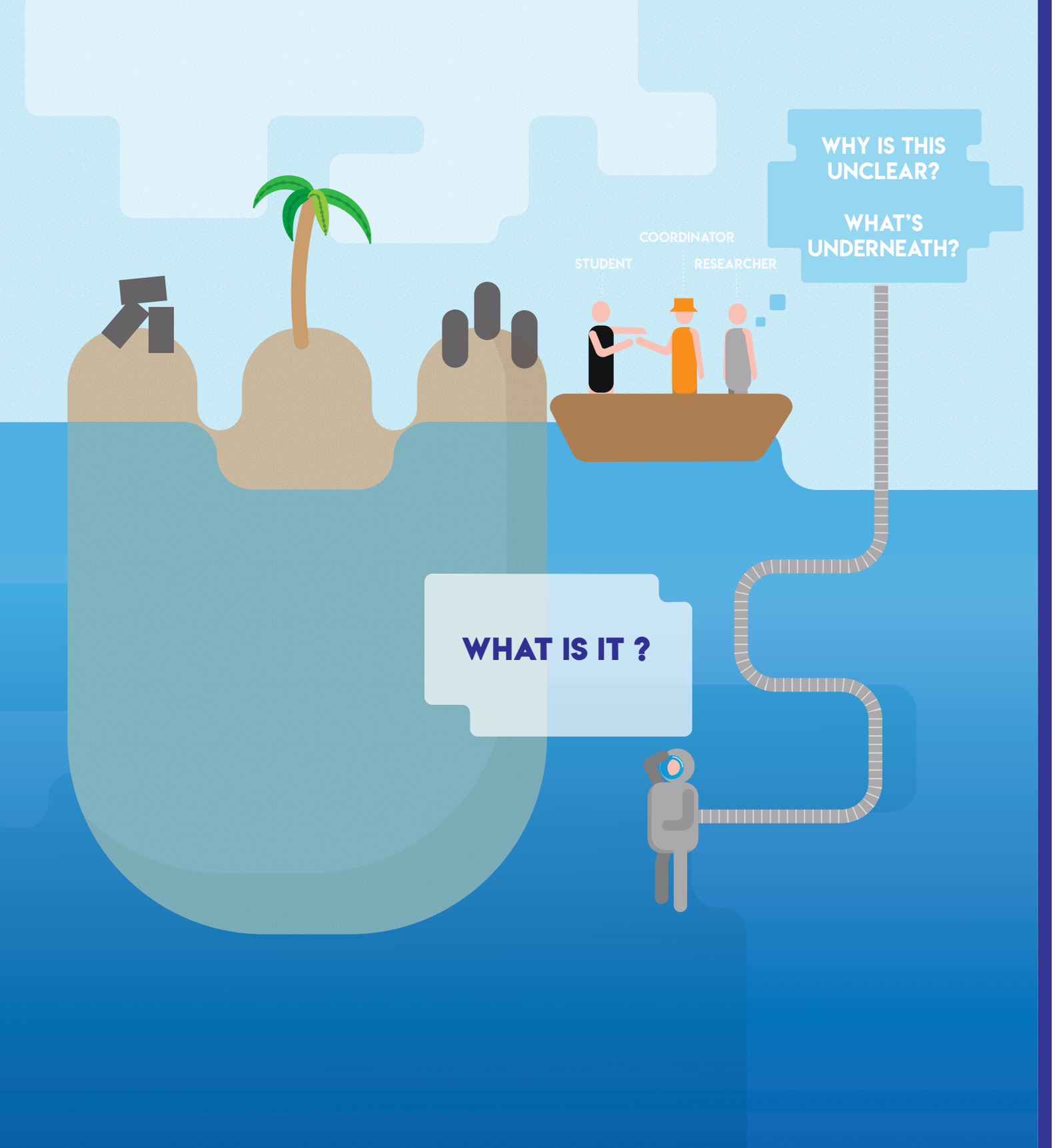
EVALUATION AND CONCLUSION

5.1 Overview of the project.....pg 84
5.2 The Unveil Awareness Toolkit.....pg 86
5.3 Evaluation.....pg 90
5.4 Conclusion.....pg 92
5.5 Reflection.....pg 94

07

BIBLIOGRAPHY

Bibliography..... .pg 96



01

UNDERSTAND THE CONTEXT AND THE HIDDEN CURRICULUM

In this chapter I show the context of the research and then I discuss the literature review on the hidden curriculum, tacit knowledge and learning theories.

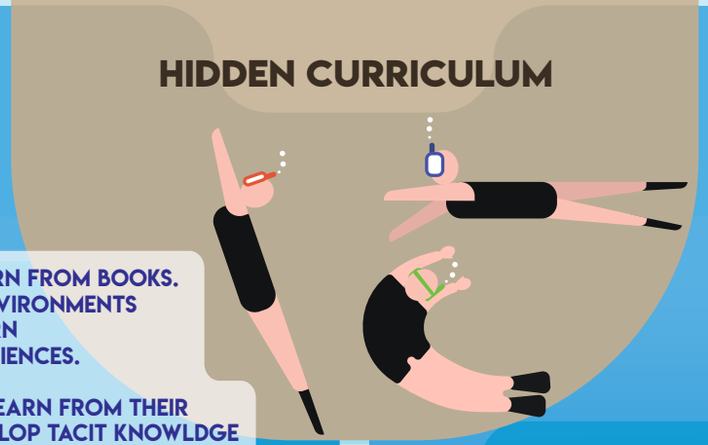
1.1 THE CONTEXT OF IDE ACADEMY

The environmental context of this design research project will be the first year MSc course IDE Academy (IDE A). This course provides Industrial Design Engineering (IDE) students of all three Master programs with basic training to acquire a relevant set of skills. **The course allows students to choose and follow 14 workshops on various skills and topics. At this time the workshop selection and related learning experiences is highly intuitive.** As a result, for both the students and the course organizers it is not clear how students exactly choose workshops and what the learnings for students are, besides the skills aquired in each workshop.

Currently the IDE Academy course presents four key moments. Students at the beginning of the course get to know IDE Academy and the workshop offer, then choose the first workshop and experience it. These two steps are repeated for 13 times during an academic year. At the end, they are asked to reflect on 4 workshops they considered valuable (fig. 1).

Figure 1, The 4 steps in IDE Academy

Figure 4, First day of IDE Academy course

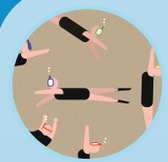


DESIGNERS DON'T LEARN FROM BOOKS. I DESIGN LEARNING ENVIRONMENTS WHERE STUDENTS LEARN THROUGH THEIR EXPERIENCES.

WHEN STUDENTS LEARN FROM THEIR EXPERIENCES DEVELOP TACIT KNOWLDGE ALSO CALLED THE HIDDEN CURRICULUM.

GREY

TACIT KNOWLEDGE



IS IT COLLECTIVE OR HIGLY PERSONAL?

TACIT KNOWLEDGE IS IN:

PERSPECTIVES

ACTIONS

HIGHLY CONTEXTUAL

"TACIT KNOWING IS AN ACT OF INTEGRATION."
IT IS THE *"POWER OF PERCEIVING COHERENCE AMONG THOUSANDS OF CLUES"*

TACIT KNOWLEDGE IS A PROCESS, IT IS TACIT KNOWING.

LEARNING THEORIES

TACIT KNOWING IS SIMILAR TO MY CONCEPT OF LEARNING.

I CONSIDER LEARNING A WAY TO MODIFY PERSPECTIVES OR CREATE NEW ONES THROUGH EXPERIENCES. THAT MEANS CREATING NEW KNOWLEDGE

KOLB

I THINK KOLB AND I CONSIDER CHANGING OR MODIFING PERSPECTIVES THE WAY TO LEARN, THESE PERSPECTIVES CAN BE CONSIDERED TACIT KNOWLDGE.

MEZIROW

IN MY WORK I ARGUE THAT UNVEILING TACIT KNOWLDGE IN A DESIGN PROCESS IS A WAY TO BECOME A MORE AWARE DESIGN PRACTITIONER.

SCHON

VISUAL SUMMARY OF LITERATURE REVIEW

The illlustration shows the main insights of the literature review. The main authors of this literature review are shown as scubadivers, and in the bubble, is explained their main concept. The concepts are linked by the pipes from the **hidden curriculum, to tacit knowledge to Learning Theories**

Figure 2, Summary literature review

1.2 THE HIDDEN CURRICULUM AS PART OF TACIT KNOWLEDGE

In this section, I introduce the concept of the ***hidden curriculum as part of tacit knowledge*** *and show the benefits of unveiling it. I identify two ongoing discussions on tacit knowledge, such as* **belonging and typology***. Then, the concept of the main author Polanyi is provided and* ***l*****inked to three learning theories***: Experiential learning, Transformative learning, and Reflective practice. I conclude showing that the concept of the hidden curriculum is part of the three learning theories and therefore essential to unveil when students learn through experiences.*

The hidden curriculum

In design education, the author Grey (2018) acknowledges the existence of a tacit dimension in learning in design, the hidden curriculum which is identified as the "learning outcomes that are learned without being explicitly taught". He continues by indicating the hidden curriculum as the binding of all the content explicitly and tacitly taught to students. He mentions that the hidden curriculum provides a narrative of his course. This definition is in line with other authors' definition of the hidden curriculum. (Kentli, 2009) Yet, in design education as mentioned by Grey the hidden curriculum needs to be defined.

The only specification that Grey provides is that the hidden curriculum in Design Education appears to be highly personal and context-specific. In Grey (2018) the concept of the hidden curriculum overlaps and becomes the concept of tacit knowledge. Thus the hidden curriculum is tacit knowledge in (design)education.

Although the definition and the understanding of the hidden curriculum in Design Education have not been fully defined, Grey (2018) and Venkatesh & Ma (2019) endorse the development of the hidden curriculum. Identifying it as fundamental to prepare students for the realities of design practices in the present and in the future. According to Gray (2015) unveiling the hidden curriculum can support the quality of learning and can make the role of intuition in design judgment and decision making more explicit. However, due to the nature of tacit knowledge as hidden and implicit, **it becomes important to create vocabulary, tools, and methods to support the hidden curriculum in design education** (Grey, 2018).

In this research, I look at the hidden curriculum as tacit knowledge in design education. Therefore, to understand deeply the concept of the hidden curriculum and how to unveil it, I decided to look into the concept of tacit knowledge.

In the next paragraphs, I defined what tacit knowledge is and how can be characterized.

1.2.1 Definition of tacit knowledge

In this subsection, I review the literature regarding tacit knowledge and clarify what type of tacit knowledge I have considered for this research. The research has been carried out in four fields: design, education, learning theories, and knowledge management.(fig.3)

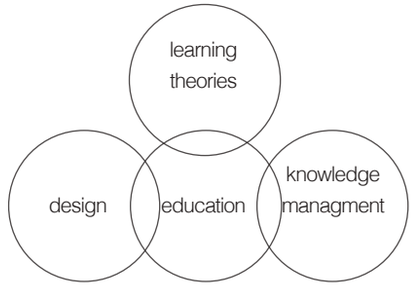


Fig.3 Fields of the research in the literature review

A quick research of the phrase "tacit knowledge" in Google Scholar shows a wide range of fields in which this phrase is used, from knowledge management to adult learning, from psychology to design.
Many authors write about tacit knowledge in different fields, enriching the definition of tacit knowledge but also creating confusion in the understanding of the characteristic of TK.

Polanyi (1962,1966,1976) was the first author to introduce the concept of tacit knowledge: "I shall reconsider human knowledge by starting from the fact that we can know more than we can tell" (1966, p.4). In this sentence, he identifies both that **"we know more"** and that **"we can tell".** Several authors define these two concepts as separate, respectively tacit knowledge and explicit knowledge (Nonaka, 1991).

"WE CAN KNOW MORE THAN WE CAN TELL"

| Polanyi, 1966

The difference between Explicit and tacit is explained by Nonaka & Tateuchi (1995) in which it is argued they differ for communicability. (fig.4)
Explicit knowledge is described as something "formal and systemic" convertible into linguistic or numerical form in contrast to something "not clearly visible and expressible" as tacit knowledge (TK) is. TK is considered highly personal, context-specific and deeply rooted in individual experiences, ideas, values, and emotions. (Nonaka & Tateuchi 1995)

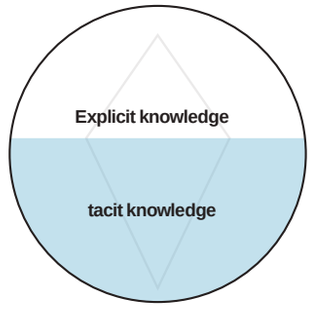


Fig. 4 Definition of tacit and Explicit knowledge by Nonaka & Tateuchi (1995)

An example of TK and EK in everyday life is driving a car.
To learn how to drive people need lessons (EK), beginners think about where the gear shift is, or how to steer while parking. Drivers know that when you learn how to drive the action is implicit and the focus is on the traffic (TK in experience). When we are used to driving in the same context, we know tacitly what the rules of the context are. Driving in Naples is very different from driving in Germany or in Vietnam (TK in context). Drivers have different driving styles, my mother is a very slow driver because she prefers to "better reach the destination safe" compared to my father who drives for passion (TK from values and emotions). If we ask drivers how they drive, they cannot explain further than how to drive from the lessons they had in driving school.

Several authors build upon Polanyi's theories trying to capture what TK is and what types of TK exist. Before describing the different characteristics of TK, in the next section, I argue that TK involves a wide range of fields of study, and therefore the definitions on TK vary among the fields.

“TACIT KNOWING IS AN ACT OF INTEGRATION.” IT IS THE “POWER OF PERCEIVING COHERENCE AMONG THOUSANDS OF CLUES”

| Polanyi, 1966

integration of clues
= making sense

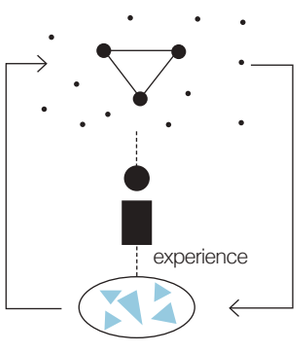


Fig.5 Polanyi’s theory on TK, based on Gestalt theory. Process of knowing.

1.2.2 Polanyi’s tacit Knowing

In this section, I explain Polanyi’s theory showing that the definition is quite intangible, thus many authors build on it to make it more tangible in relation to their field.

The definition of TK by Nonaka & Tateuchi (1995) is the principal reference for organizational management and other fields (Gourlay, 2002). The risk is that the context of organizational management influences the concept of TK as warned by Mareis (2012). To avoid the risk of being influenced by the knowledge management context I take a step back towards Polanyi’s theory.

Tacit knowing

In Polanyi, the concept of tacit knowledge is mostly referred to as the process of tacit knowing (Gill, 2000; Gourlay, 2002). Polanyi wrote, “knowledge is an activity which would be better described as a process of knowing” (Polanyi, 1969, pg 132). (Fig.5)The author argues that we know by means of the environment and ourselves, and we act with the knowledge developed by the relationship of ourselves and the environment.

His approach to tacit knowing refers to the model of perception and cognition of Gestalt psychology, in which we perceive single information but we recognize it as a whole. *An example: an observer sees something long and hairy behind a rock and by experience he identifies that it is a lion tail, therefore behind the rock there is a lion. The observer connects the information through his own experience and identifies the lion.* In other words, tacit knowing is tacitly making sense of an experience based on our experiences.

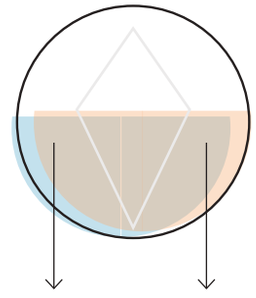
Characteristic of tacit Knowing

Moreover, Polanyi in his work identifies two types of knowledge, practical and theoretical, but he decides to cover both of them with the term knowing (Gourlay, 2002; Polanyi 1966). This means that he makes a distinction of knowledge when we act in the world -practice- and a cognitive knowledge -theoretical- that we use to act in an environment, thus they are a unique process. (Fig. 7)

Conclusion

The concept of tacit knowledge as tacit Knowing results more dynamic and less fixed. Tacit knowing shows that tacit knowledge not only focuses on the “content” knowledge but is a rather dynamic concept of sense-making.
The concept of the hidden curriculum seems in line with this concept of sense-making. Grey’s indicates the hidden curriculum (Grey, 2018) as the students’ binding of all the content explicitly and tacitly taught to them.
Therefore, the Hidden Curriculum is dynamic and influenced by how students make sense of their experience, and the binding is a process that can be changed by experience.

In the next section, I provide an overview of the different characteristics of tacit knowledge to propose a characterization of the hidden curriculum.



Practical **Theoretical**

Fig. 7 Characteristic of TK by Polanyi

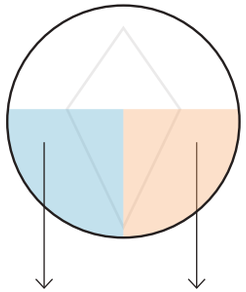


Fig. 8 Definitition of TK by Nonaka & Tateuchi (1995)

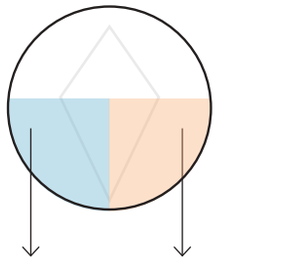


Fig. 9 Definitition of TK by Scharmer (2002)

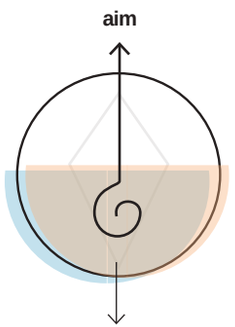


Fig. 10 Definitition of TK by Stenberg (1995)

1.2.3 Characteristic of tacit knowledge

In this subsection, I explained the differences in types of TK, belonging of TK.

Types of tacit knowledge

The most endorsed distinction is in the field of knowledge management by Nonaka and Tateuchi (1996). There are two types of TK: Technical TK and cognitive TK. The former refers to the concrete know-how which is created through individuals' actions. The latter refers to ingrained schema, beliefs, and perspectives which are taken for granted. (Fig.8)
An example of technical TK in design is showed by Wood et al., (2009). The authors use mapping interviews to elicit tacit knowledge to learn how craftsmen craft knives and capture micro-actions which are difficult to express to the learner.
An example of cognitive TK in design is shown by Björklund (2008), who identifies tacit criteria of professional teachers while assessing design projects.

The distinction between Theoretical and Practical knowledge is also made by Polanyi when he discusses the concept of tacit knowing. Although, he does not separate them as two distinct and apart types of knowledge. He distinguishes the two but acknowledges the strong relationship between each other. When analyzed in the field of knowledge management, it is reasonable to identify the two as separate.

Scharmer (2002), whose field is also knowledge management, argues that there is a different type of distinction. In his opinion, there is a TK embodied in everyday practice and there is a self-transcending knowledge that is based on imagination and aesthetic experience of the person. This is in line with Polanyi's view on the "power of integration" as a "mechanism of imagination-cum-intuition" which is the ability to integrate clues. (Polanyi,1969d)
Scharmer addresses the self - transcending knowledge as a source of competitive advantage. (Fig.9)

Stenberg et al. (1995) consider TK an advantage and translates TK into practical intelligence in the field of cognitive psychology. The authors acknowledge the difference between practical and theoretical knowledge but they consider it as overlapping. Their research identified tacit knowledge as " an action-oriented knowledge, acquired without direct help from others, which allows individuals to achieve goals they value". In other words, TK becomes the tacit ability to understand the context and to focus practices towards a (personal) aim. (Fig.10)

Wagner (1987), under the supervision of Stenberg, explores the structure of TK, and defined it as the "practical know-how not openly expresses or stated and which must be acquired in the absence of direct instruction". This means that TK is considered an individual ability to making sense of the unspoken rule of the context, and direct action towards an aim.
If we look back at Schermer (2002) we see that Wagner and Stengber define TK in the context of psychology, in the domain of 'self-transcending knowledge' by Schermer (2002).

Wagner proposes also that TK reflects a local or a global context in individuals. He identifies local context as doing without the consideration of being an individual in the society, for example not considering one's reputation, the career or "the big picture". The "global context" refers to how the present situation can fit a future or bigger picture. In other words, an aim, a practice or an ability to make sense can be different if the individual takes into consideration just himself or himself concerning the bigger picture. (Fig.11)

To summarise, Wagner and Stenberg's work views TK as practical intelligence being only individual and personal. On the other hand, several authors support that tacit knowledge is also collective.

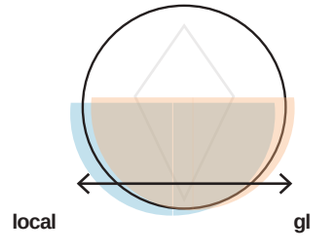


Fig. 11 Definitition of TK by Wagner (1987)

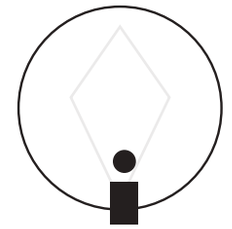
Belonging of tacit knowledge

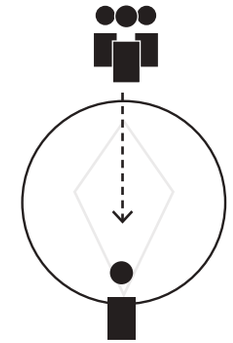
Wagner and Stenberg argue that TK is only individual, although in Wagner's work a social dimension can be found, "the local-global dimension" (Leonard&Insch,2013). It seems there are some unspoken rules among a collective and the individual shifts between making actions according to himself or himself within the society.(Fig.12)

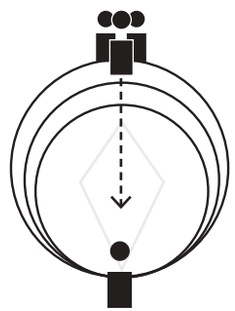
On the other hand, the author Collins, who extensively researched TK in sociology, argues that there is a collective tacit knowledge based on a collective tacit understanding (Collin, 2001). In other words, our society influences our ways of living and we are not aware of it.
In his research, he categorizes three types of TK. One of them is "form of life" explained as hidden social beliefs (or unspoken rules) in which we are entrenched in, therefore invisible to us.
An example can be found in two of his studies on exploring the complexity of successfully repeating scientific experiments, carried out by other scientists. According to the author, the struggle of replicating experiments is caused by scientists' social belief system that influences what things should be acknowledged explicitly. In other words, our society influences what we consider valid or important knowledge to report. Therefore, according to Collins (2001) our social context influences and is in entwined with tacit knowing.

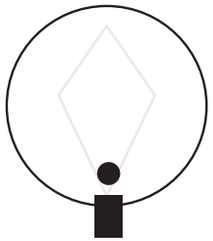
Conversely, in Mareis (2012) the same collective aspect of TK is found in design. The author mentions: "design education, practice, and research are structured through certain implicit, practical and social rules and are transferred to a certain extent via tradition and authority". This means that in design we bring a tacit socio-cultural dimension that should not be ignored when we teach, when we do design research and when we design. (Fig.13)

In Mareis and Collins's work, the acknowledgment of a socio-cultural tacit dimension has different levels.
Specifically, Mareis writes about the first "socio-cultural" tacit dimension that is our "conditio humana", in which we perceive the environment because of being human. This level influences other levels, for example, the society we live in. Again, the society we live in influences education (in Mareis's case design education) and so on. Therefore, there might be different levels of socio-cultural TK. (Fig.14)


individual TK
Fig. 12 Belonging of Tk by Stenberg


collective TK
Fig. 13 Belonging of TK by Collins (2001)


collective TK
Fig. 14 Belonging of TK by Mareis (2012)



hidden curriculum

Fig. 15 Belonging of TK by Grey (2018)

In design education, the author Grey (2018) acknowledges the existence of a tacit dimension in learning in design. Moreover, the hidden curriculum appears highly personal and in relation to personal student's experience, thus individual. (Grey, 2015) Grey's perspective on the hidden curriculum recalls Practical Intelligence and its social dimension by Wagner. The tools to support students developing the hidden curriculum are focused on the individual students. The tools used vary between personal reflections and dialogic reflections among students and teachers. (Fig.15)

Conclusion

The authors in this subsections identify similar distinctions of types of tacit knowledge: one practical/behavioral and one more theoretical/cognitive. It is possible to consider that **the hidden curriculum could be characterized by a similar distinction.**

The belonging of TK, it is an ongoing discussion among several authors. According to Grey (2018, 2015) the hidden curriculum is **highly personal**, but Mareis (2012) argues that tacit knowledge has **a social-cultural dimension**. Both authors are considering tacit knowledge in design education, therefore I will leave this question still open. In the data analysis, I will provide an answer based on the research I will conduct.

1.2.4 Conclusion

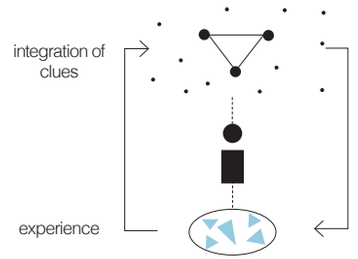
The hidden curriculum is similar to the concept of tacit knowing by Polanyi, and it can be categorized similarly to as tacit knowledge.

The concept of the hidden curriculum by Grey (2018) is in line with the concept of tacit knowing, seen as a process of sense-making. To understand the hidden curriculum, I identified **two types of characterization, the categories of TK (theoretical/procedural) and the belonging of TK (individual/collective).** The former provides interesting insights on how to identify the hidden curriculum during the research, the latter **opens a discussion on whether the hidden curriculum is only personal, or can also be found as the collective hidden curriculum.** (Fig.16)

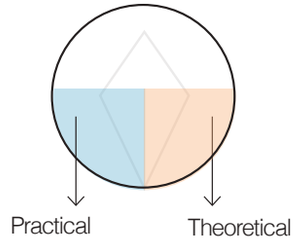
In the next section, I will compare the concept of tacit knowing to three learning theories that relate to tacit knowledge and I will discuss the tension between theoretical/cognitive and procedural/technical of TK in the three learning theories.

SECTION 1.2 | VISUAL SUMMARY OF THE KEY POINTS

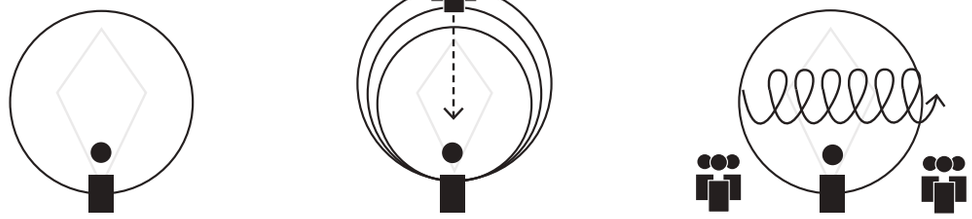
Tacit Knowldege is a process of tacit knowing.



Distinction of tacit knowledge



Belonging of tacit knowledge



TK belongs to individuals

Field:
knowledge management

TK belongs to individuals and collectivity

Fields:
design and sociology

TK belongs to the individual and elicited by collectivity

Fields:
design education

Fig. 16 Summary of definition of tacit knowledge

1.3 LEARNING THEORIES AND TACIT KNOWING

In this section, I compare tacit knowing and three learning theories: Experiential Learning, Transformative Learning, and Reflective Practice.

1.3.1 Experiential Learning

Kolb (1984) defines learning as "the process whereby knowledge is created through the transformation of experience". The author indicates learning as a continuous process grounded in experience, in which ideas (or elements) are formed and re-formed. Although Polanyi does not describe a learning process (a process aimed to create new knowledge), there is a clear similarity with the process of tacit Knowing. In the visual below I show the difference between the two theories.

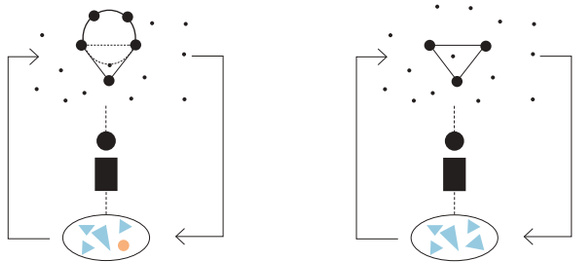


Fig.17 Experiential learning and tacit knowing

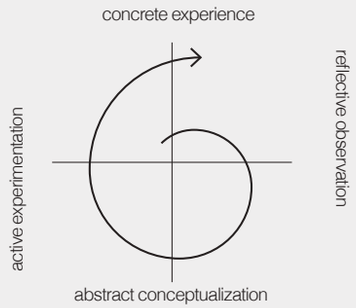
Comparison between: Experiential learning and tacit knowing.
In experiential learning, the person integrates the new experience based on past experience. The person identifies the experience through reflection and integrates the new idea for the next experience. In tacit knowing, the person utilizes the experience to make sense (integrating clues) of the new experience. In tacit knowing the process is tacit, while in experiential learning the key of learning is unveiling and embodying the new idea.

Comparison between: Experiential learning model and SECI Model
Polanyi does not provide a model to unveil tacit knowledge, but Nonaka (1991) provides the SECI model, a model of knowledge conversion (or knowledge-creation), which is very similar to experiential learning by Kolb. (Fig.18)

The two processes have a common structure, although in Nonaka (1991) the aim is to share knowledge for the collectivity (the company), while in Kolb (1984) it is described as a learning process within and for the individual.

Experiential learning is described as a personal process. The process has four "modes" (or stages): an individual experiences something, reflects upon it (looking at it from different perspectives), combines the reflections in a sort of new theory and then acts with that theory in mind. Kolb identifies in finding and solving conflicts with the four "modes" the way for growth and creativity in the individual.

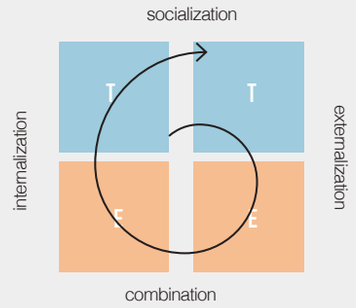
KOLB'S MODEL



Kolb's model follows these modes:
1. **Concrete experience:**
an individual gets involved in an experience
2. **Reflective observation:**
the individual reflects and observes the experience from different perspectives
3. **Abstract conceptualization:** the individual combines the observation to create a theory
4. **Active experimentation:** the theory is used to act in new situations.

Aim of knowledge creation

NONAKA'S MODEL



The SECI model follows these steps:
1. **Socialization:** an individual engages in a experiential apprenticeship
3. **Externalization:** the person make explicit the tacit learning, in a "process of articulating one's vision to the world" individually or socially.
3. **Combination:** the explicit knowledge is combined together in a explicit whole.
4. **Internalization:** individuals use explicit whole to broaden, extend and re-frame their own TK to act.

Aim of knowledge creation

Fig.18 Experiential learning Model and SECI Model

On the contrary, the SECI model aims to create sharable TK for the collectivity. An individual engages with and through experience, analyses extensively the experience individually or socially, combines the explicit knowledge to share with others, then the explicit knowledge can influence others in their own TK. In Nonaka, the way to innovate is to unveil the TK in individuals and make it shareable for the community.
To summarise both the models aim to create new knowledge and both show that discovering perspectives creates the content to do so.

Role of the societal context in tacit knowledge and Experiential Learning
Although Kolb's perspective on learning focuses on the individual, the author acknowledges the environmental and cultural context in which the individual is placed. He argues that an individual and the context do not just interact with each other, but they are "interlocked" influencing each other. In other words, a

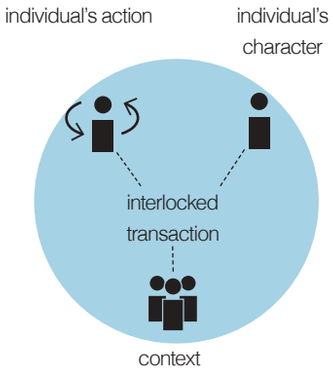


Fig. 19 Context and individual interlocked in the larning process by Kolb (1985)

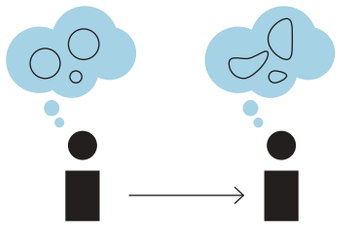


Fig. 20 Tranformative learning by Mezirow (1997)

socio-cultural TK not only influences the individual but also the individual creates or changes the socio-cultural TK while taking action in the context.
Kolb's identifies in the "interlocked transaction" three elements. He defines from one side the context, and on the other, the character and the action of an individual as separates elements.
Again, another similarity can be found, the distinction between the action and the character of the individual is relatable to the distinction between Practical and Theoretical TK.

1.3.2 Transformative Learning

The aim of transformative learning, according to the author Mezirow, is to develop autonomous thinking. In Mezirow (1997), it is endorsed the importance of the individual giving meaning to experience to form and re-form new meaning according to own purposes, beliefs, judgments, and feelings.

The author indicates as transformative learning the process of effecting change in a frame of reference. The frame of reference is defined as "associations, concepts, values, feeling and condition responses". Thus, the frame of reference is a structure of assumption through which we understand our experience. Imagine the frame of reference as a pair of sunglasses, if the lenses are pink or blue we will perceive the world slightly pinkish or blueish. (Fig.20)

Comparison between Frame of Reference and Theoretical TK
The definition of frame of reference reminds of the Theoretical/Cognitive which is described as the ingrained schema. The author not only describes deeply what frame of reference is, but also proposes methods to recognize the frame of reference.

The frame of reference encompasses cognitive, conative and emotional components and is composed of two dimensions: habits of mind and points of view.
Habits of mind: broad abstract orienting habitual ways of thinking, feeling and acting. These belong to cultural, educational, social, economic, political and psychological aspects. Habits of mind belong mostly to collective dimensions.
Points of view are the result of habits of mind shown under the form of feeling, judgments, and attitudes.

An example: if I place career status as the most important aspect of life (habit of mind) when I interact with people who rather focus their attention on hobbies or families, I might judge them as lazy.

Ways of learning = Ways of discovering Theoretical TK
The authors establish a point of view as key for changing a frame of reference of an individual. The change happens whenever we try to understand a situation that does not work the way we expect, therefore the point of view is modified. The author identifies four ways to modify points of views:
Critically explore in our autobiographical context of beliefs (of the individual or the collectivity)

Establishing new points of views with other individuals (similar to Kolb)
Transform our points of view by being in another collectivity.
Critically reflect on our biases Mezirow (1998) (he identifies this way as the most difficult)

1.3.3 Reflective Practice

Reflective practice is a way to train young designers and architects during their education towards a closer reality of practice. The author Schön (1983) brings tacit knowledge in architecture and design education. The main message of Schön is that practitioners reflect in action and students should be introduced to reflect while designing to identify hidden decisions.

From Schön words:
"Competent practitioners usually know more than they can say. They exhibit a kind of knowing in practice, most of which is tacit. […] Indeed, practitioners themselves often reveal a capacity for reflection on their intuitive knowing in the midst of the action and sometimes use this capacity to cope with the unique, uncertain, and conflicted situations of practice."

Reflection-in-action seems a way to unveil TK and to frame and reframe a problem. Being able to change ways of how we make sense seems central to become a practitioner. Besides, Schön identifies in reflection-in-action when solving conflicted situations the way to unveil TK.
Similarly, Polanyi identifies in reflecting on our actions a way to identify the Theoretical TK (Neuweg 2002).

1.3.4 Conclusion

In all the three learning theories learning involves unveiling tacit knowledge.

1. Comparing the SECI model and the experiential learning model, I show that both models share the same aim - creating knowledge-, the same process -unveiling perspectives and use that content to create explicit knowledge- and the same content - experiences-.
By comparing Kolb's and Nonaka models, learning is a process of making the tacit learning explicit.

2. Mezirow separates action and frame of reference, arguing that due to the frame of reference we "act" accordingly. The frame of reference is identified by two dimensions: points of views which are similar to the "perspectives" used by Kolb in his experiential learning process and the Habits of mind which are habitual ways of thinking. The concept of sharing perspectives to critically reflect (to understand owns perspective) is previously found in SECI model and Experiential Model.

3. Schön emphasizes the ability to change the sense-making when designing. He identifies in a conflicted situation the trigger to learn how to make sense.

1.4 CONCLUSION

The hidden curriculum is a process of sense-making of all the learnings. If the explicit learnings are quite clear, the "hidden learnings" and the "sense-making" are undiscovered.

The three learning theories presented show a strong relationship with the concept of tacit knowing. All three theories consider learning as a process of knowledge creation or modification from unveiling tacit knowledge.

"Sense-making" which is tacit knowing is influenced by students' theoretical tacit knowledge, which from now I will call perspectives. According to Mezirow (1997,1998), Polanyi (1969) and Kolb (1984) these perspectives affect the sense-making of individuals' experiences. Therefore, to understand the "sense-making" of the hidden curriculum I will research ways to unveil students' perspectives.

This is the research question:

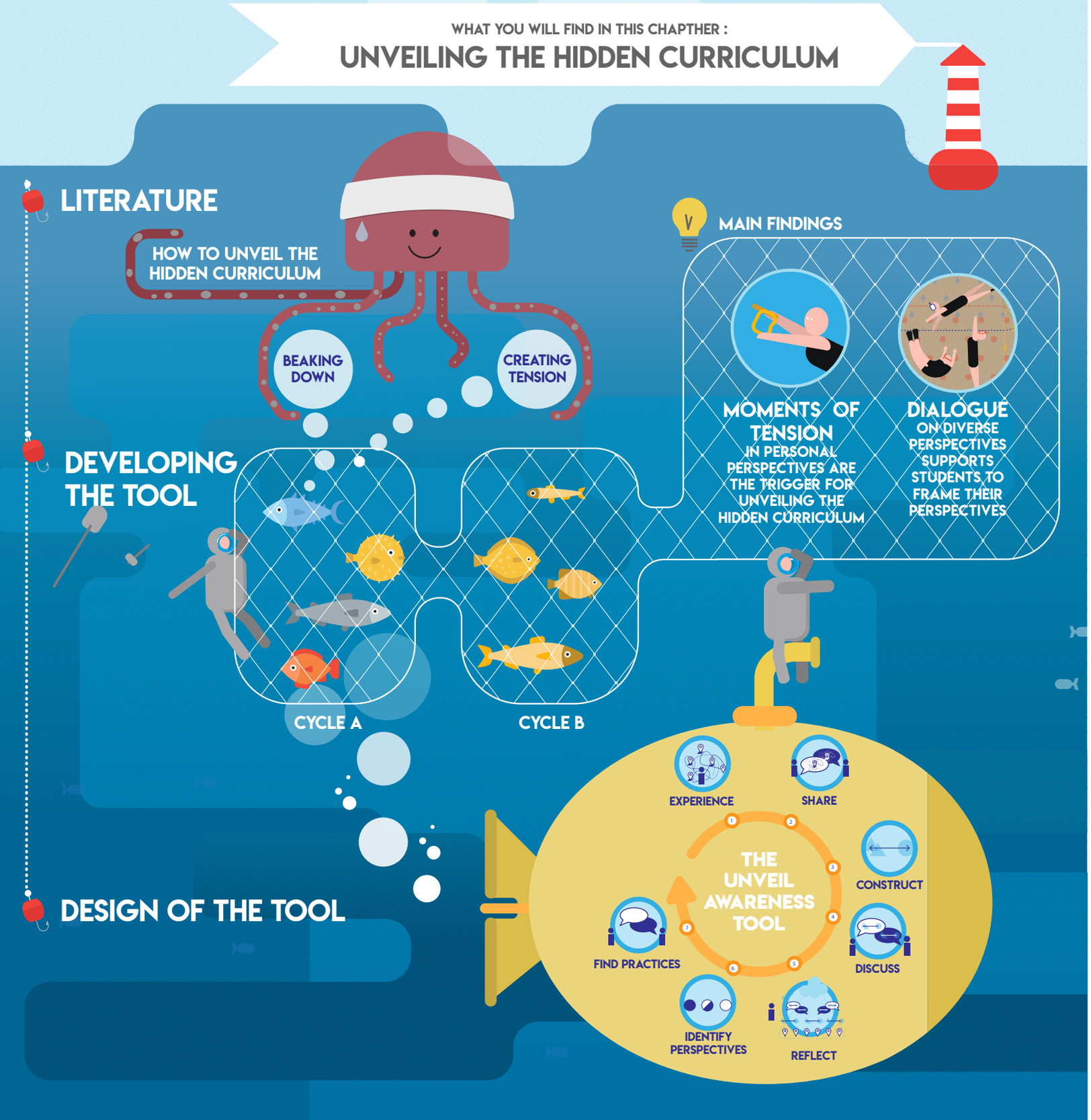
How to unveil students' perspectives?

By unveiling students' perspectives the hidden curriculum can be more explicit. According to Kolb (1984) and Nonaka (1995) by understanding different perspectives, individuals can reflect on their experiences and convert them into concepts of new knowledge.

This is the following research question:

How to support the process of combination of the perspectives into the hidden curriculum?

In the next chapter, I show how I unveiled students' perspectives and the hidden curriculum.



02

UNVEIL THE HIDDEN CURRICULUM

In this chapter, I described the process of understanding ways to unveil perspectives towards the development of a tool to unveil student's hidden curriculum in a workshop in IDE Academy.
I show ways to unveil perspectives in literature, a summary of the iterations and the main insights, and the design of the tool in a workshop.

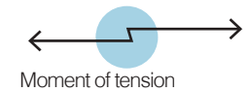
2.1 WAYS TO UNVEIL TACIT KNOWLEDGE

In this section, I introduce ways to unveil the tacit knowledge found in the literature. I present the methods to unveil tacit knowledge with examples, and I conclude with two main characteristics of unveiling tacit knowledge.

In this section I explain:
Reflection: Ways to unveil TK by individuals.
The mapping process: Breaking down TK by the interviewer.
Metaphors: Way to communicate and unveil TK to the interviewer.
Rep Grid: Technique to unveil TK used by the interviewer.

Reflection

In the previous section, I explained that reflection plays an important role in unveiling TK. The authors Kolb, Schön, and Mezirow identify in situations of tension the key to creating a reflection. Below, I show examples of the creation of moments of tension created in the literature to discover tacit knowledge.



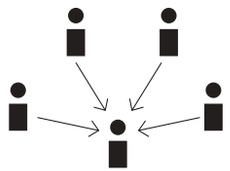


Fig.21 Different points of view

1. Different points of view: The author Colin Grey (2018) uses a mix of individual reflection, reflection with peers and feedback from coaches to create moments of tension in studio-based learning. In this way, the students reflect on the tensions created and can unveil their own TK.

2. Sharing experiences: The author Venkatesh and Ma (2019) focus their research on creating a framework that unveils tacit knowledge in studio-based-learning. They identify in the act of doing, thus the internalization of the experience, and in the act of sharing, thus externalize the perception of the experience, the way to unlock TK to the student themselves. They argue that the same experience can be perceived by the diverse way of students, and in creating tension among various perceptions their TK can be revealed.

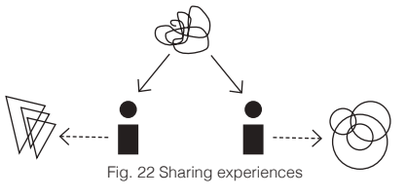


Fig. 22 Sharing experiences

The mapping process

The mapping process is a way to structure interviews in which the interviewer follows a process similar to digging. The interview starts with a general topic, for example, “success”. Then a list of contextual questions is used to elicit stories or experiences regarding the topic. For example: What causes that? How does it happen? Who is involved? What influences that?. When these questions are answered, the interviewer identifies one important “part of the story” and asks the same set of questions. This process creates different layers of understanding through the participants’ stories.

This process has been used in a design company to identify the knowledge present in the company to transform it into potential innovation (Wong & Radcliff, 2000).

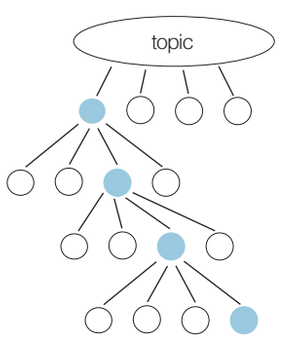


Fig. 23 Mapping process

Metaphors or storytelling

Martin (1982) argues that metaphors and stories can elicit tacit knowledge. Ambrosini & Bowman (2001) argue that metaphorical language can be employed to give tacit knowledge a voice because they can communicate meaning when no explicit language is available. Specifically, they can capture the process of experience and communicate it without words.

Metaphors and stories have been used by Whyte & Classen (2012) to create a taxonomy of stories enclosing tacit knowledge to increase knowledge sharing among companies.

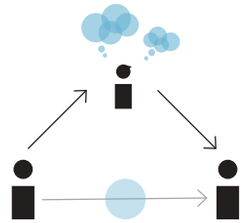


Fig. 24 Using metaphors

Repertory Grid Technique

The RGT is based on Kelly’s Theory in which he claimed that people make use of very personal criteria, called “a construct” to construe a meaningful world.
A construct is defined as “at the same time a similarity and a difference” (Bjorklund, 2008, pg.5) In other words, a construct is how we make sense through dichotomy.

The RGT has been used by Bjorklund (2008) to identify which tacit criteria design teachers applied when evaluating student work.

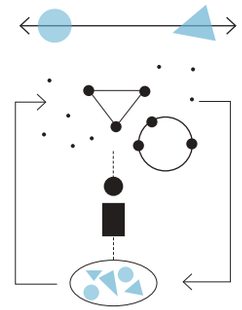


Fig. 25 Repertory Grid

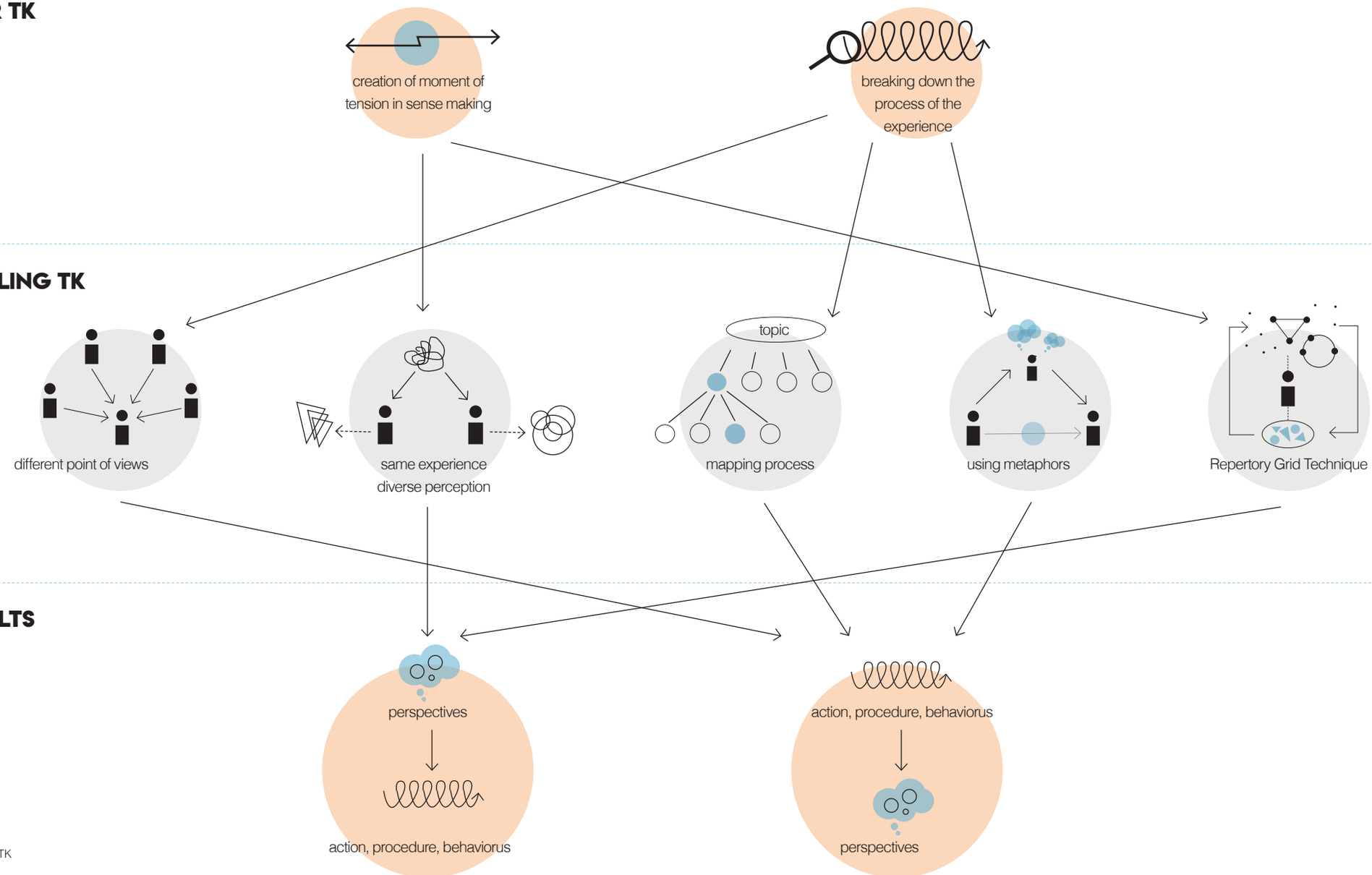
Conclusion

These four ways of unveiling TK focus on two “keys” to unlock TK. The first one is creating a moment of tension in the sense-making phase to identify perspectives, and the second one is to break down processes of behavior to then reach the perspectives.
I will explore the ways indicated in this section to unlock the hidden curriculum.

2.1 | VISUAL SUMMARY OF WAYS TO UNVEIL TK

In this visual summary I show the keys to trigger TK (thus, the hidden curriculum) , the most promising ways to unveil TK and the expected results.

1. KEY TO TRIGGER TK



2. WAYS OF UNVEILING TK

3. EXPECTED RESULTS

Fig. 26 Summary of methods to unveil TK

2.2 ITERATIONS TO FIND A WAY TO UNVEIL THE HIDDEN CURRICULUM

In this section I show the two cycles of exploration of ways to unveil the hidden curriculum. The first cycle A explores the ways to unveil TK found in literature. The second cycle explores ways to make Repertory Grid into a tool to unveil students hidden curriculum.

The main research question for this chapter is:

How to unveil the hidden curriculum?

In the works of many authors there are two factors which play an important role when unveiling tacit knowledge (in my case the hidden curriculum), which are:

- **The quality of the data,** for examplesome are stories, others are metaphors and others can be concepts and perspectives.
- **The efficiency of the research**, most of the research on TK took extensive time and or/ involved very few individuals.

These two factors led to three sub-research questions:

- **What kind of data can I collect?**
- **How does the way to unveil influence the results?**
- **How can I collect data efficiently?**

2.2.1 Unveiling perspectives

In cycle A, I explored 4 ways to unveil the hidden curriculum: interviews with the mapping process, probes with the mapping process, probes with metaphors and interview with repertory grid. (Fig. 27)

The iterations aimed to explore how to unveil the hidden curriculum and what the hidden curriculum.
In the first cycle of iterations, I translated the above questions in the following:
1. Can the results be used to understand the hidden curriculum of a course?
2. Can I collect the data efficiently?

The **main insight of this cycle** was that unveiling students' perspectives and comparing the results created tensions and pushed the participants to identify their owns perspectives.

Detail of the cycle: selection of the participants, procedure, findings etc. go to Appendix A.

Summary of cycle A: Exploration of ways to unveil the hidden curriculum
Details of each iteration in appendix A

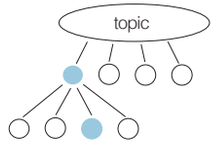
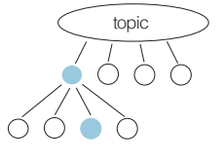
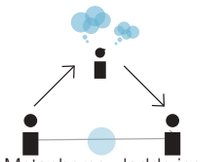
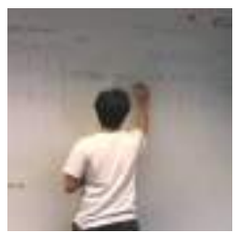
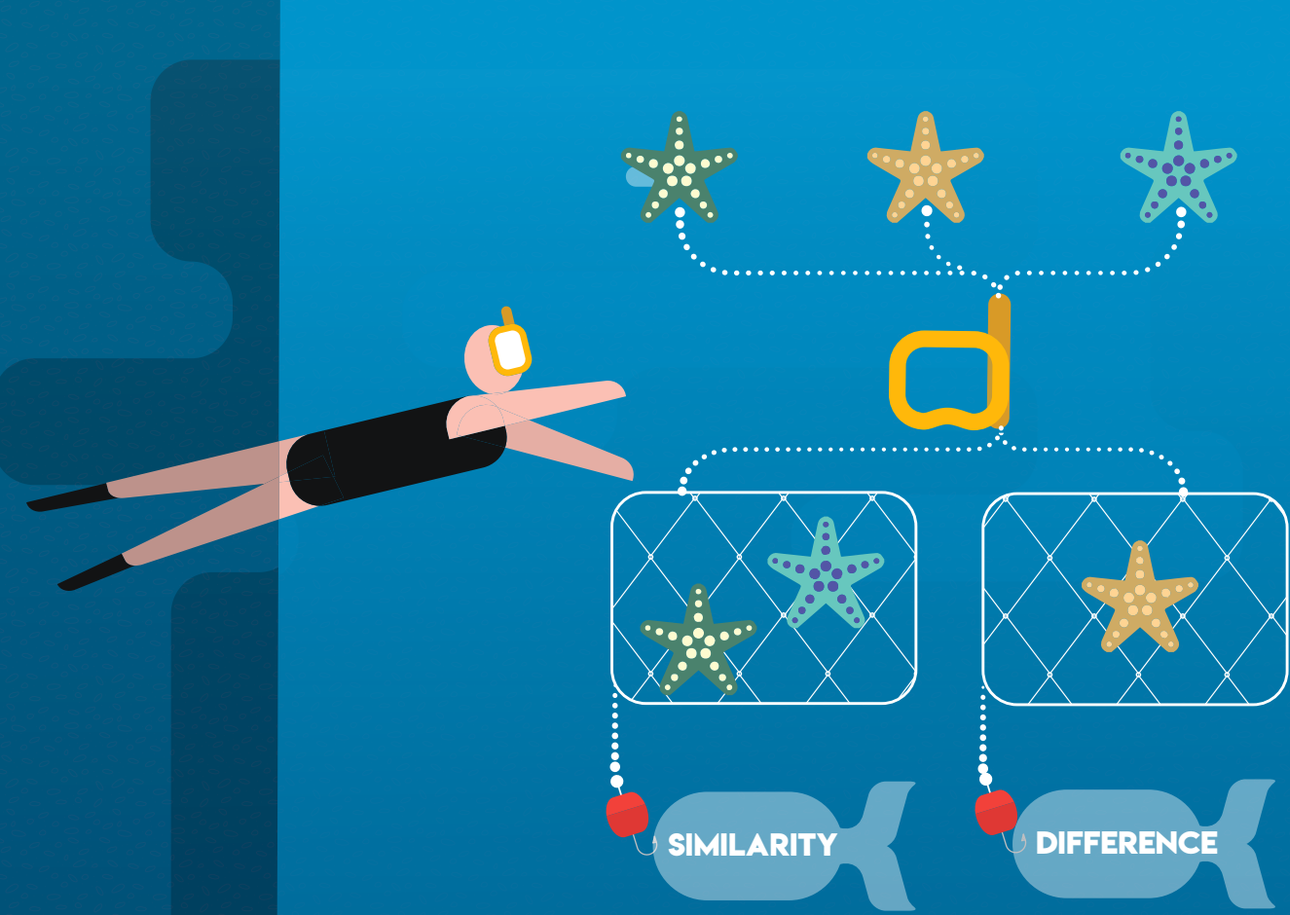
ITERATION		METHOD	DATA RESULTS
INTERVIEWS WITH MAPPING PROCESS Participants: 3 students who completed IDE Academy		 Mapping process + reflections	**1.** Results are mixed: perspectives and actions **2.** Collecting and analysing are extensive
PROBES WITH MAPPING PROCESS Participants: 8 students of IDE Academy.		 Mapping process + laddering	**1.** Results are mixed and sometimes unrelated **2.** Collecting is efficient, analysing is extensive
PROBES WITH METAPHORS Participants: 4 students of IDE Academy.		 Metaphores+ laddering	**1.** Results are somehow similar, there is a lot of treshold. **2.** Collecting is efficient, analysing is extensive
INTERVIEW WITH REPERTORY GRID Participants: 2 students who completed IDE Academy.		 Repertory Grid + laddering	**1. Results are similar, trigger directly perspectives.** **2.** Collecting is very extensive, **analysing is efficient**

Fig. 27 Summary of exploration of unveiling tacit knowledge



ELEMENTS

Examples which are compared to create constructs

EXERCISE

The student compared the elements according to his/her perspective and identify a similarity among two that create a difference in the third one.

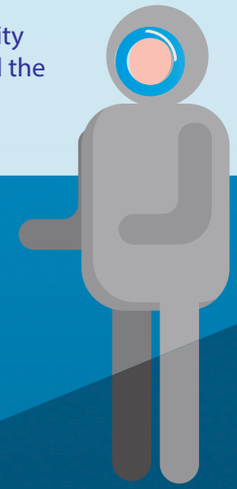
CONSTRUCTS

Concept based on the relationship of similarity and difference.

REPERTORY GRID TECHNIQUE

comes from the psychological theory by Kelly (1955) which claims that people during their upbringing make use of very personal criteria to give meaning to their experiences. These criteria are defined by bipolarity.

Therefore, asking to create bibolarity with examples helps to understand the perspectives of individuals.



IN THE SECOND CYCLE THESE FIVE POINTS HAVE BEEN EXPLORED

The five points resulted influencing the effectiveness of the tool in students unveiling the hidden curriculum and data collection.

ELEMENTS
Which elements work best?

CONSTRUCTS
What type of constructs?

REFLECTION
How to trigger reflection on the constructs?

EFFICIENCY
How can I collect the data efficiently?

ANALYSIS
How do I analyse the data?

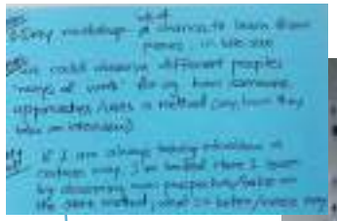
The full explanation is in the appendix B
Fig.28 Explanation of RGT and limitations

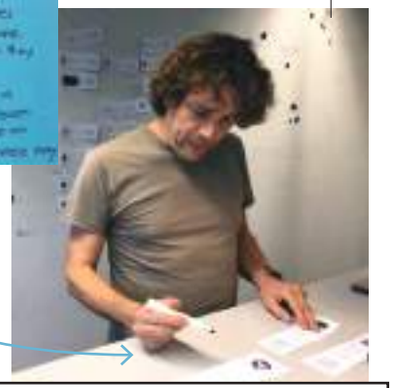
2.2.2 Unveiling the hidden curriculum

The cycle consisted of 3 iterations of exploring ways to develop Repertory Grid into a tool for a workshop in IDE Academy.
The iterations aimed to create a tool to enable students to discover their perspectives and used them to unveil their hidden curriculum.

The **main insight** of this cycle was that the students' perspectives have to be unveiled and combined into explicit learnings to unveil the hidden curriculum of students in the IDE Academy course.
In the visual below, I show the findings of the three iterations. (Fig. 29)

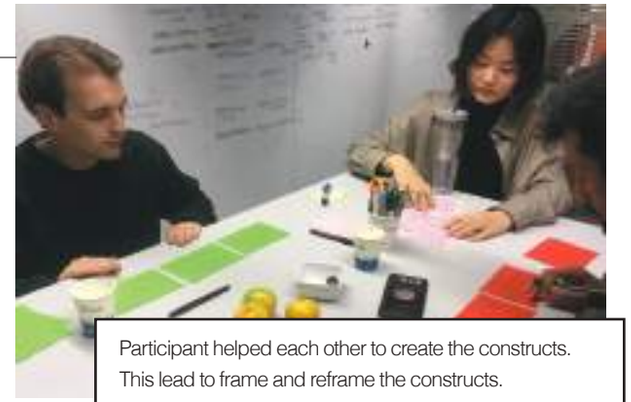
Detail of the cycle: selection of the participants, setting, findings etc. go to Appendix C





Using the workshop as elements helped students recalling the experience and became the first engaging moments among the participants.

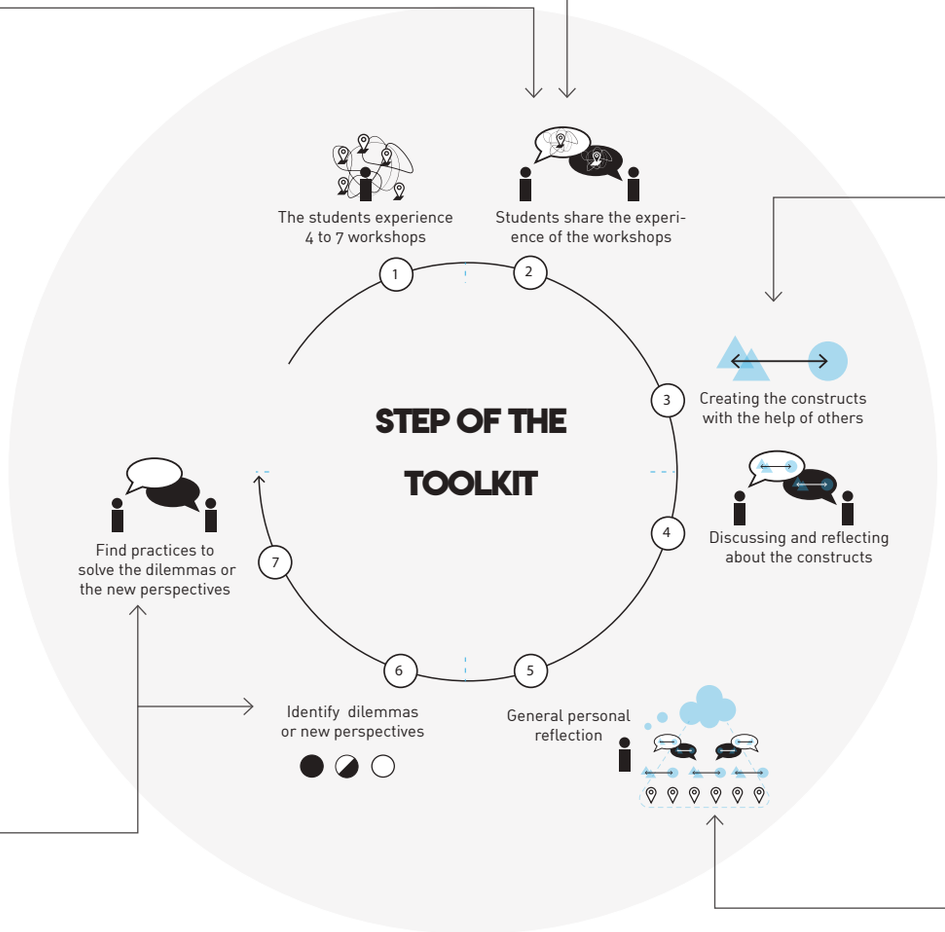
Explaining workshops to others is an ice-braker. When students experienced the same workshop differently they engaged more in the discussion.



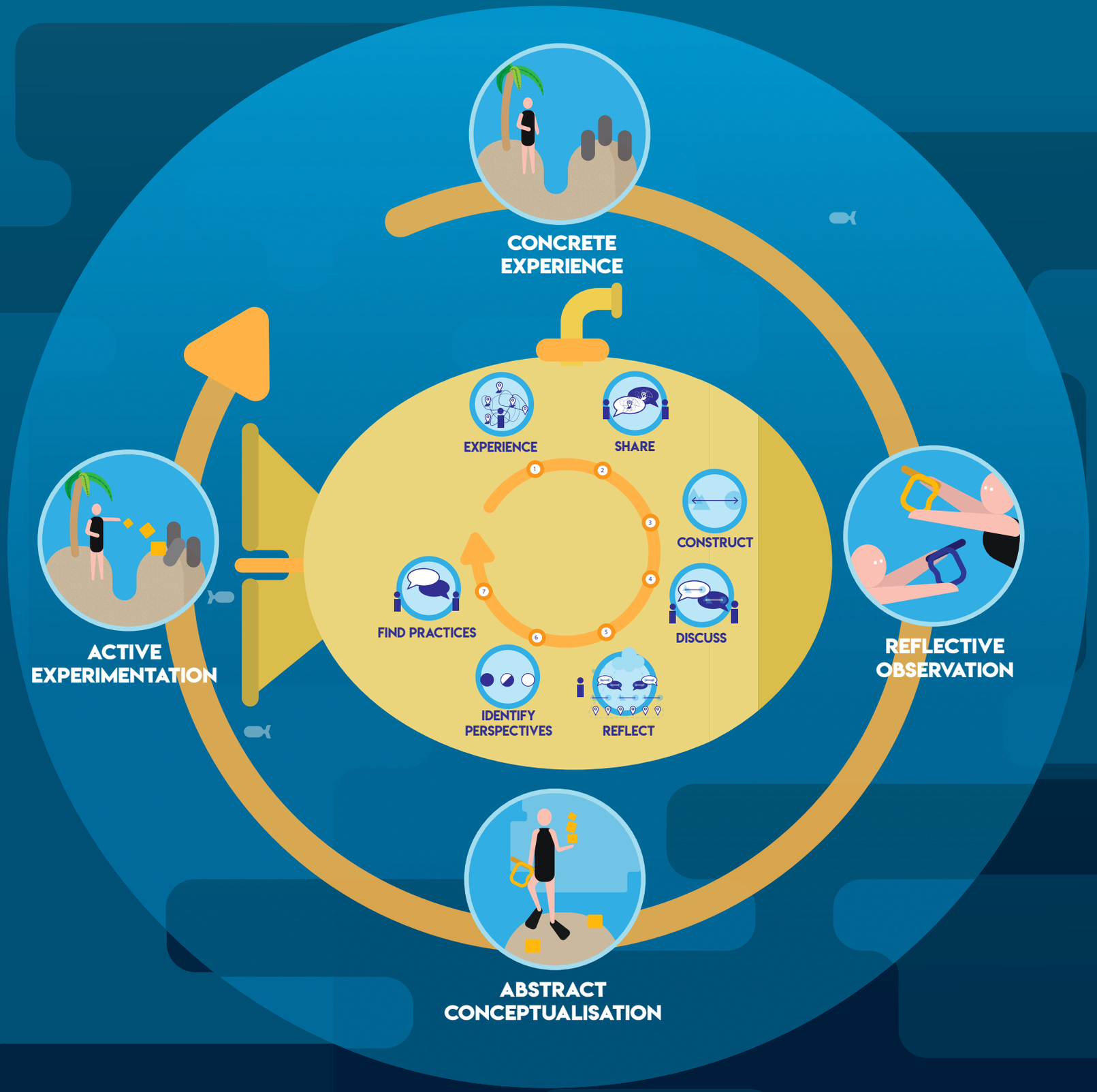
Participant helped each other to create the constructs. This lead to frame and reframe the constructs.

I see these constructs as my little personal dilemmas, I wish I could have some "actionable tips" to do.

In front of the board two participants started looking at all the material on the board and reflected upon it.



(Fig. 29) Visual summary of the insights of cycle B, Development of a tool to unveil HC

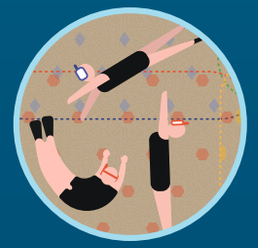


THE UNVEIL AWARENESS TOOL

The Hidden Curriculum is revealed when **students reveal their learning to themeselves**. Therefore, the Repertory Grid is integrated in the Experiential Model by Kolb.

MOMENTS OF TENSIONS

diverse personal perspectives are the trigger for unveiling the hidden curriculum



DIALOGUE

diverse perspectives supports students to frame their own perspectives

RECOGNITION

of hidden learning as learnings leads to reveal the hidden curriculum

Fig. 30 Summary of the main findings in the two cycles.

2.3 THE UNVEIL AWARENESS WORKSHOP

In this section I show the tool in use in IDE Academy. The tool was used to create a workshop in IDE Academy to unveil students' hidden curriculum.

Aim of the workshop

The aim of the workshop was to unveil students perspectives and collect the reflection on their (not longer) hidden learnings.

Research questions:

What are students' personal perspectives?
How do their perspectives create the hidden curriculum?

Workshop information

Participants

The workshop was carried out with 40 students of IDE Academy course in IDE, TU Delft. The students were all first year master students, from the three master tracks in IDE. All of the students had experienced at least 4 workshops in IDE Academy. Around half of the group was about at the end of the IDE Academy course whilst the other half was around the middle. In the workshop the students were divided in 10 groups of 4.

Presentation workshops

The workshop was been presented to the students as a:
"Workshop to unveil the perspectives that influence their learning experiences in IDE Academy."

Activity

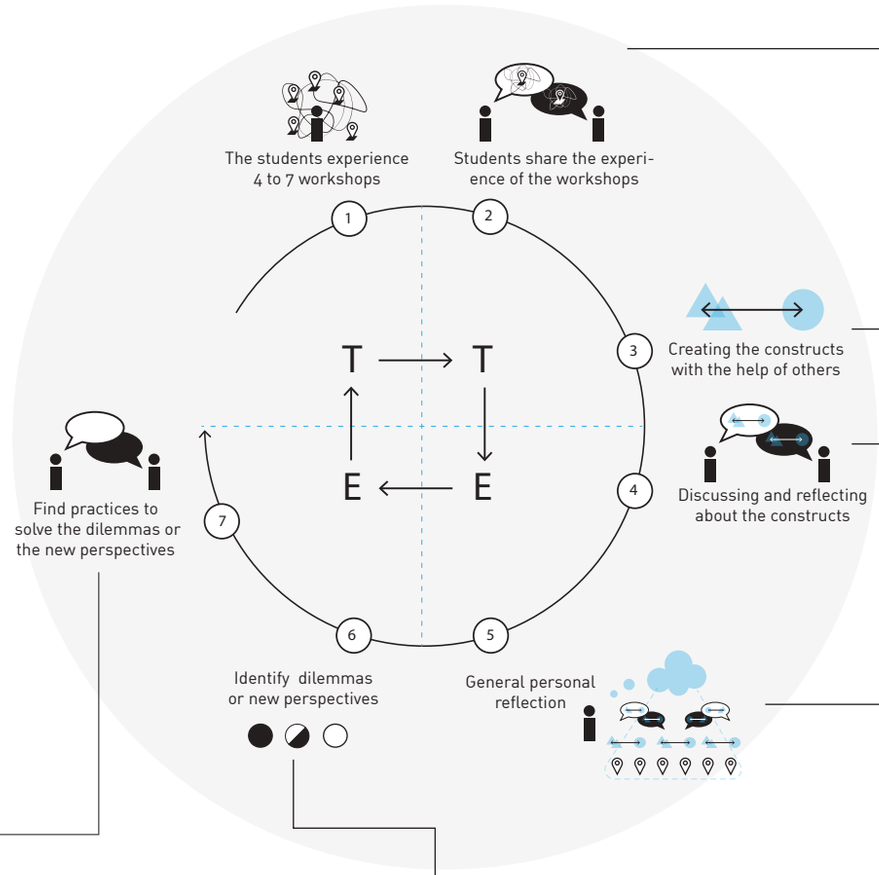
The students were been introduced to the topic and they experienced the workshop. At the end of the workshop, I introduced the research on TK and we concluded with a reflection-feedback session.
Anonymous feedback from students was collected.

Fig. 31, Photo of the workshop

2.3.1 Workshop execution

In this section I explain the steps followed in the workshop to unveil the hidden curriculum. (Fig. 32)

Find one dilemma or spark to solve with actionable practices.



2 Students choose workshops to use as elements to create the constructs.Then share the experience of the workshop and start comparing the workshops (as shown in the pictures on the right).

3 Students pick three workshops (green cards) find similarities and differences among the three cards. Then create the pair of constructs by identifying the opposites with a words. Then, the two words are written down in a post-it (as shown in the picture on the right).

4 When the constructs are built, students discuss about the meaning of the constructs. They are asked to reflect on the construct by answering the question: “Why do you think you have this pair of constructs?”. On top of each construct they answer: “because I...”

5 After creating the constructs, students look back at the chosen workshops, the constructs, the reflections and boiled them down in a final reflection

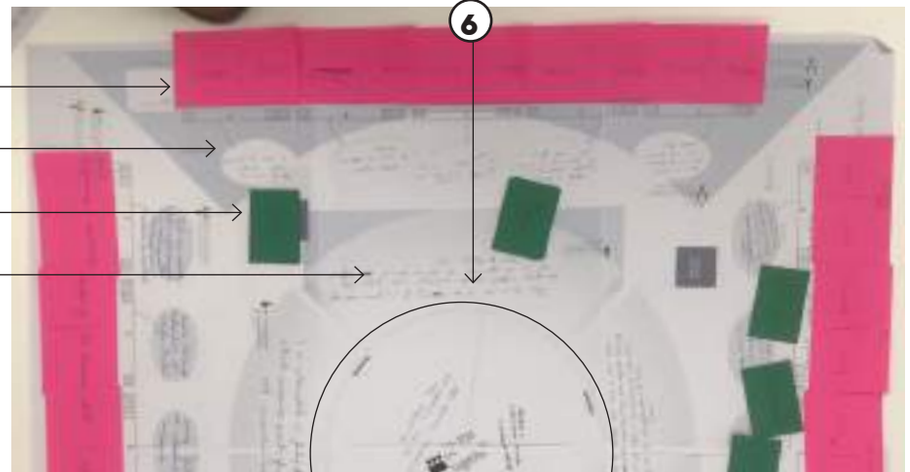
6

constructs

reflection

elements

general reflection



7

Fig. 31 Steps of the workshops and explanation

2.3.2 Benefits for students

In this section, I explain the benefits of unveiling students' hidden curriculum in IDE Academy. I looked at the data, reviewed the feedback from the workshop and integrates with interviews taken one month after the workshop had ended, to understand if the tool integrated in IDE academy could benefit students in the course.

In the RGT workshops I identified three benefits of the workshop for students:

- identification of different perspectives and reconsideration of own perspectives
- understanding of own perspectives
- identification of dilemmas

Identification of different perspectives and reconsideration of own perspectives
The topics of discussion are generated by the students while creating the constructs. In the data collected the topics of discussion vary per group. The discussions in the group sometimes influence the construct of students, while the reflections show the stands of students upon it.

Example 1: In one group students discussed the way of choosing workshops. They discussed choosing workshops for the relevance of their career or for their personal interest. Two students had opposite perspectives upon this. However, in the general reflection the two students show a reconsideration of their perspective:
after a month, I interviewed the students who chose workshops based on personal interests. She addressed this perspective caused by indecisiveness.

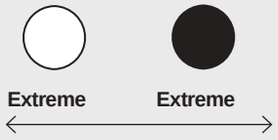


Fig. 33 opposites perspectives

Talking about her workshop choices, she mentioned:

"I know I did not choose bad workshops but now I should find better workshop that fit my professional self." (p. A)

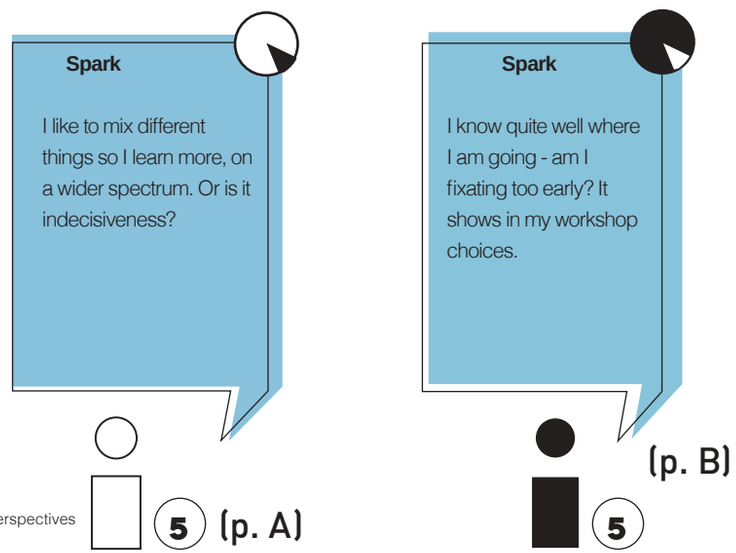


Fig. 34 Example of reconsideration different perspectives

The student shows that after the workshop, she reconsidered her mental model and she decided to follow different workshops based on the discussion in the RGT Workshop.

Understanding of own perspectives
In the data, students elaborate on the construct with reflection and discussion with their peers.

Example 2: One student created the construct engagetizing-obzzzerving, indicated that his engagement with the workshop was triggered by interacting with peers and coaches. Another pair of constructs with reflection explains the previous construct: *designer-professional, my social skills are also part of my design skill if I want to be a real professional.*

After a month I interviewed him about the experience of the RGT workshops and if something changed in the experience of IDE Academy.
He explained that the RGT Workshop helped him identify what he likes and what gives him energy.
He mentioned that discovering the importance of interaction with people helped him understand what he wants to develop more in the next part of IDE Academy, namely his social skills.

"In the workshop I stopped for a moment and I understood what I liked and why I liked it. I never thought how much I want to learn to interact with people" (p.C)

Identification of dilemmas
Students identify personal dilemmas that can be translated into practical actions.
In one group students reflected on their workshop choices, specifically choosing workshops for their future self or their present self. Below is shown the development of the reflection, from the constructs to finding the actionable practice to solve the dilemma.

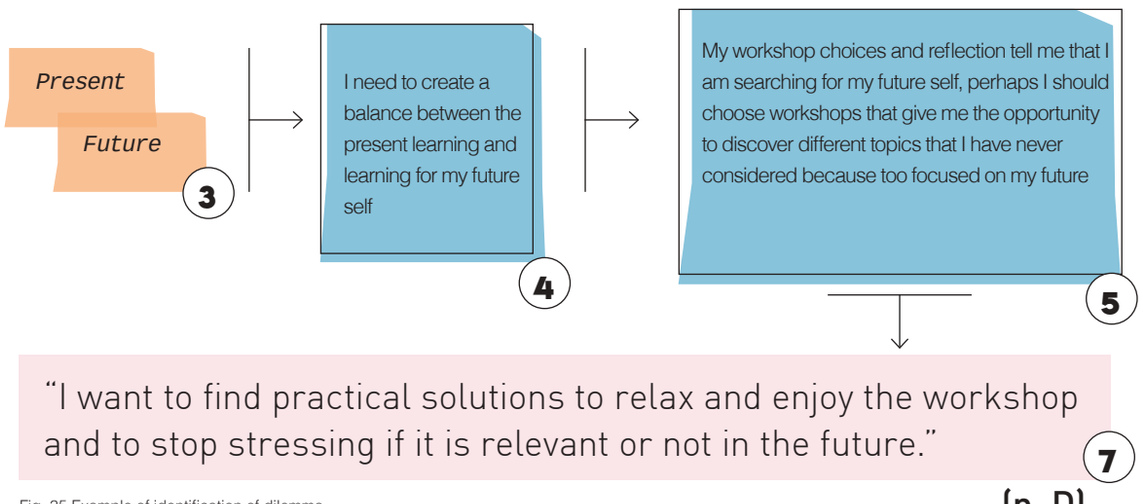


Fig. 35 Example of identification of dilemma

The student identifies the dilemma in the reflection of the constructs, identifies the influence of the perspective in the workshop choices and considers integrating workshops to the present self. The participant translates the dilemma into a question for actionable practices.

Another student identifies a dilemma in two pairs of constructs:

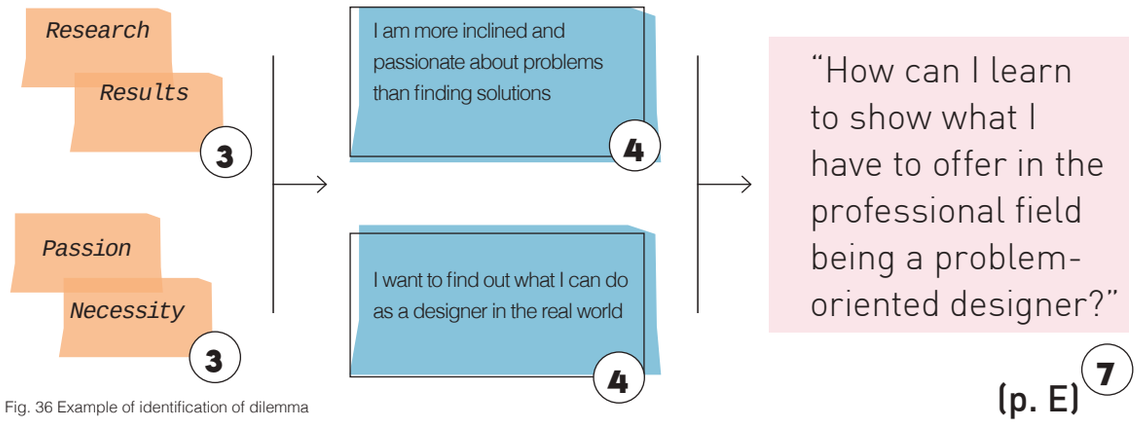


Fig. 36 Example of identification of dilemma

The students showed in two constructs and reflections two perspectives and combined them in a dilemma to solve with practical solutions.

After a month I interviewed the student if something had changed in experience of IDE Academy. She mentioned that:

> “I finished IDE Academy, so not really. But I am going to do an internship next semester, and I am applying for design studio which are focused on framing” (p. E)

The student did not benefit in IDE Academy course but re-uses the insights after IDE Academy.

Limitation

The tool did not provide students with benefits. In some cases, the tool did not provide any insight and “stated the obvious” as mentioned by one participant in the anonymous feedback. This is in line with the other 4 anonymous feedback received after the workshop.

The group dynamic influenced the discussion and the mood of the group, as mentioned by one of the participants in the anonymous feedback. The participant did not feel comfortable to share some thoughts with the group.

Conclusion

The tool support student to direct or re-direct their personal hidden curriculum in IDE Academy.

Reconsidering current perspectives is what Mezirow (1995) calls critical reflection. The author identifies in the process of effecting change in point of view (or in this research perspective) the way to develop autonomous thinking. The author promotes transformative learning as a way to identify own perspectives that are rooted in our social environment and might not be fully ours, or ours but not any more beneficial. In the examples of participant A, the student has been triggered to reconsider one of the perspectives affecting the interaction with the course IDE Academy.

Understanding own perspectives describes the process of becoming aware of owns perspectives which provides a new insight for the students. This benefit leads to create a new hidden curriculum for the student. For example, participant C decided to focus on developing soft-skills in IDE Academy.

Similarly, **Identifying dilemmas describes** the process of becoming aware of owns perspectives. However, the two perspectives are combined in one dilemma to solve: “how can I learn to show what I have to offer in the professional field being a problem-oriented designer?” (participant C). This question shows that combining the perspectives creates a new possible narrative when looking at the course IDE Academy.

However, the tool provides triggers to reconsider the hidden curriculum but they are highly dependent on the student’s personal openness.

2.4 CONCLUSION

In this chapter, I described the process towards the development of the tool into a workshop in IDE Academy, from unveiling perspectives to unveil the hidden curriculum of students.

Unveiling the hidden curriculum
In literature, I identified two main ways to unveil perspectives towards the course: creating tension among perspectives and breaking down actions and behaviors to reach perspectives.

During the iterations of the tool, creating tension with opposite views became the key to unveil perspectives. Dialogue in small groups amplified the tension of diversity and supported students in framing their view.
However, recognizing perspectives is not sufficient to identify the students' hidden curriculum.

In the tool, students are supported to combine and reflect on one specific perspective/dilemma that can be used as a direction to continue the IDE Academy course. This was done by asking students to find tips and practices for a perspective that could lead to the continuation of the course. **To explicit the personal hidden curriculum students acknowledge and transform their perspectives into an aim to purse in IDE Academy.**

Directing the hidden curriculum
The tool integrates the Repertory Grid (Kelly, 1955) in the Experiential Learning model (Kolb, 1984) because the former **creates tension for finding perspectives**, and the experiential model helps to **combine the insights into actions**. So, students create a sort of leading direction for the continuation of IDE Academy that defines a new unveiled Curriculum.

However, the tool is very dependent on the openness of students to reflect on personal views. The toolkit does not provide any benefit to the student if the student unveils the perspectives but does not recognize them as insights to reflect upon.

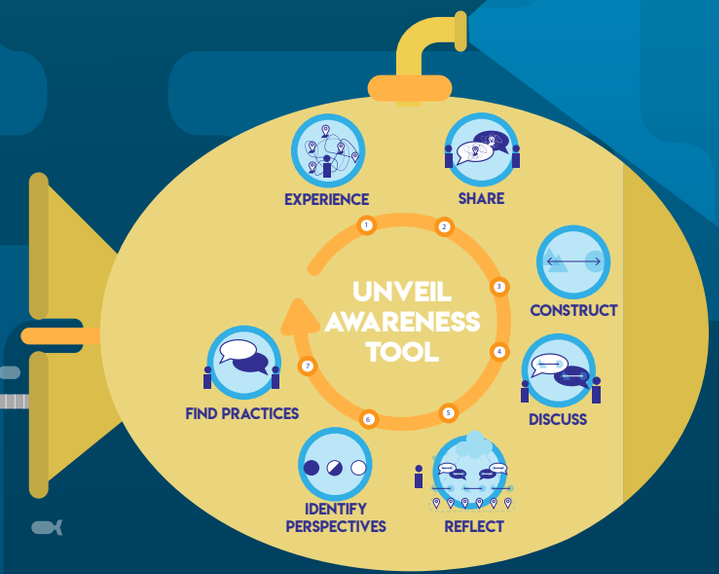
The personal hidden curriculum and the collective hidden curriculum.
Students unveil their personal hidden curriculum with the tool. However, during the iterations and the workshops conducted it became clear that **there were commonalities when experiencing IDE Academy**.

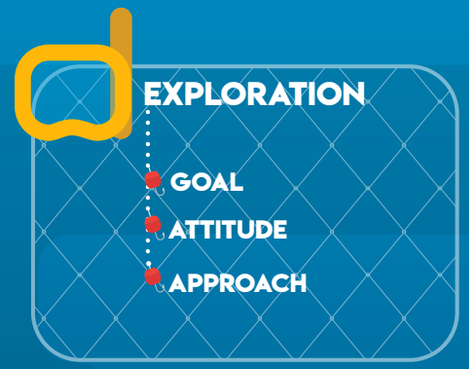
The hidden curriculum as well as tacit knowledge is considered highly personal but at the same time highly contextual. Moreover, Mareis (2012) endorses a collective dimension of tacit knowledge in design and design education.

Thus, in the next chapter, I present the data analysis of the boards used in the workshop to unveil the collective hidden curriculum. The next chapter aims to identify a contextual and/or collective hidden curriculum maintaining the diversity of students' perspectives.

WHAT YOU WILL FIND IN THIS CHAPTHER :

ANALYSIS AND FINDINGS OF THE TOOL





HIDDEN CURRICULUM
of the course and dimensions

FINDINGS

DATA ANALYSIS
and iterations

03

UNDERSTAND THE HIDDEN CURRICULUM

In this chapter I show the data collected from the IDE Academy workshop. I explain the summary of the ways to analyze the data, then I show the findings on the hidden curriculum and its dimensions.

3.1 DATA COLLECTION

In this section, I show the data extracted from the boards used in the workshops.

Participants
The participant of the workshop were 40 students, in each board 4 students discussed and reflected in group, thus the boards collected are 10.

Execution and data
Students are asked to choose 5 workshops they have experienced. As shown in the visual, the **workshop choices** are 5 and they are combined 5 times in groups of 3 generating 5 **pairs of constructs**. Each construct is related to the workshops (underneath the post-it). For each pair of constructs, students are asked to reflect on why they generated the constructs. The small **reflections** are collected above the pair of constructs are related to. In the **general reflection**, students summarize: the workshop choices, the small reflection in each construct and the stand they took during the discussions happened using the tool (Fig. 38)

The data represents student perspectives, in the first stage of data analysis, I identified two types of perspectives: dilemma and extremes. The extremes show a clear stand of the perspective whilst dilemmas show a struggle in taking a position or the willingness to balance two perspectives. (Fig. 37)

In the next section, I will show how the data can be analyzed.

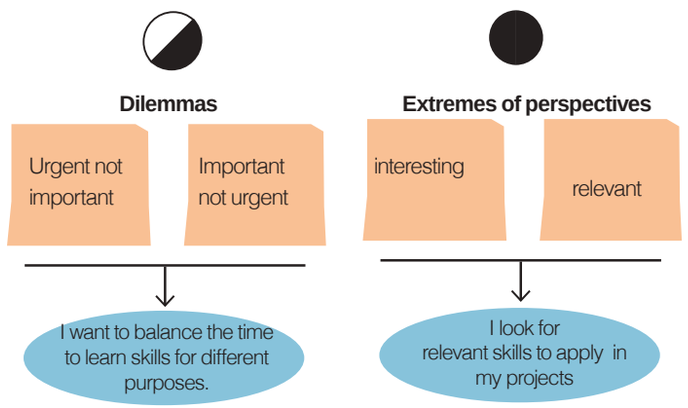


Fig.37 Illustration of the data collected

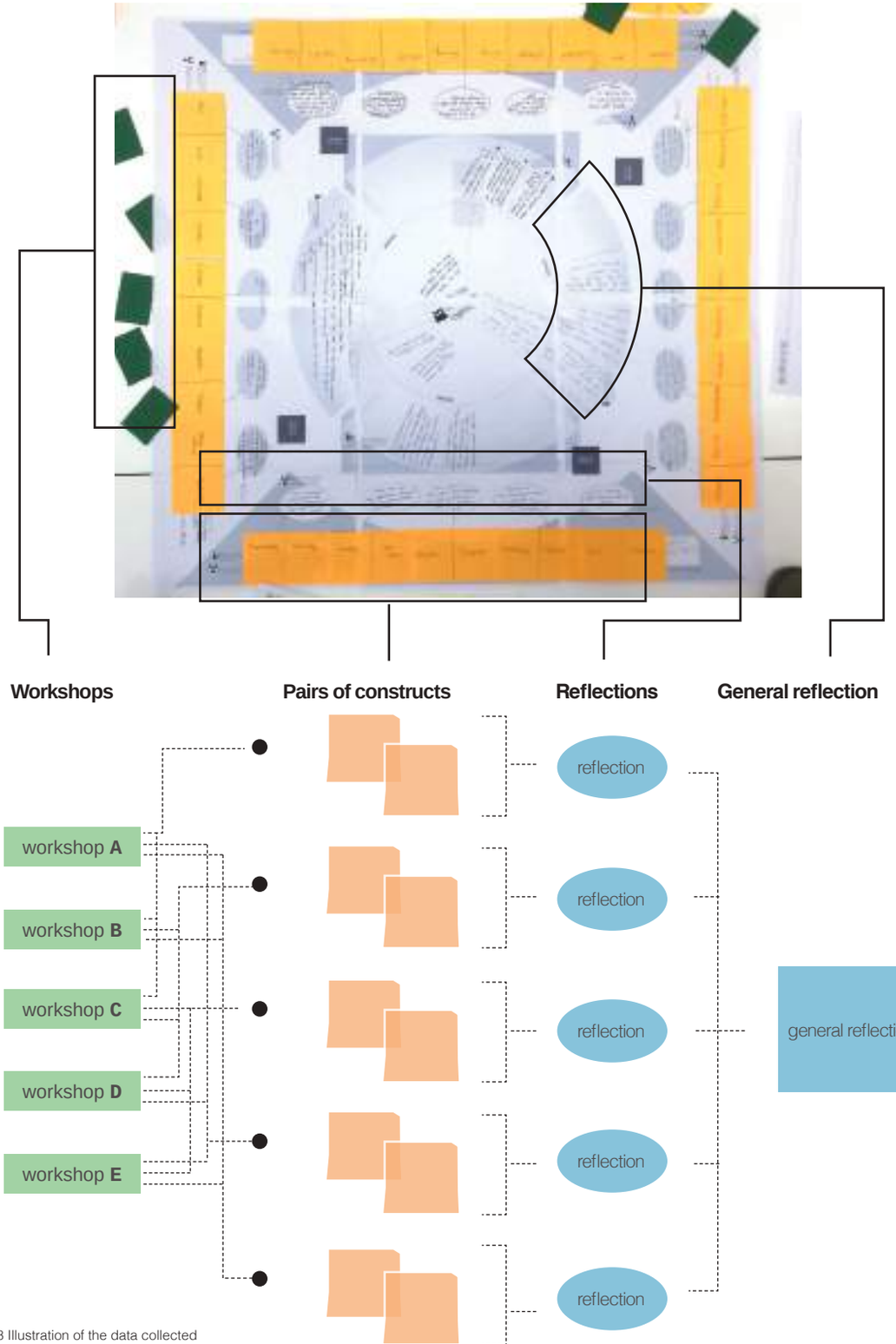


Fig.38 Illustration of the data collected

3.2 | VISUAL OF WAYS OF DATA ANALYSIS

The main three ways to analyze data are shown below: from an individual perspective, from a group perspective and the workshops experiences.
Three main ways have been developed along with the iterations of developing the tool, to know more about it, read the appendix (G).

WHAT

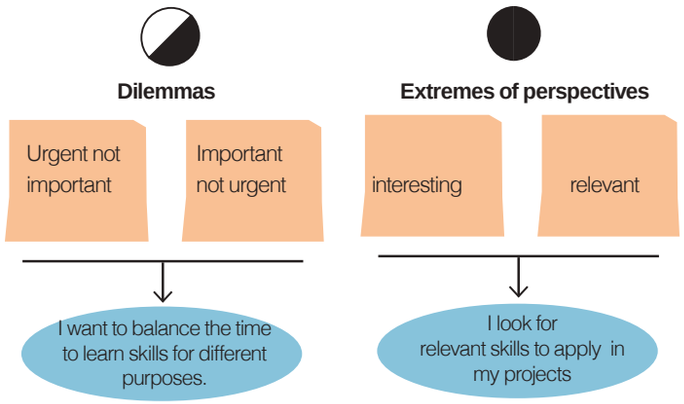
HIDDEN LEARNINGS AND TRIGGERS

THE HIDDEN CURRICULUM

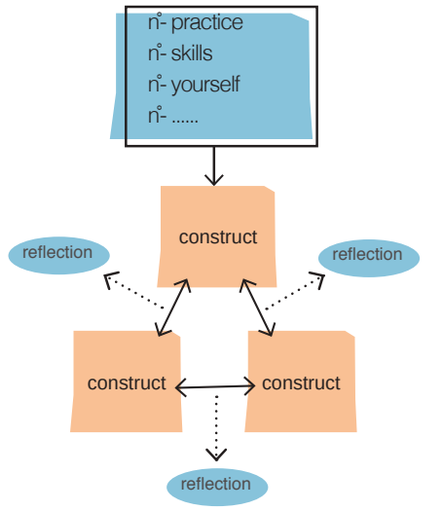
EXPERIENCES IN A COMMON CULTURE

HOW

CLUSTER ASSOCIATION
Clusters of dilemmas and/or perspectives related to the same topic



WORDS RELATIONS
Words counting, association of constructs and reflections connected.



ELEMENTS COMPARISON
Elements grouping, similarities and dissonance

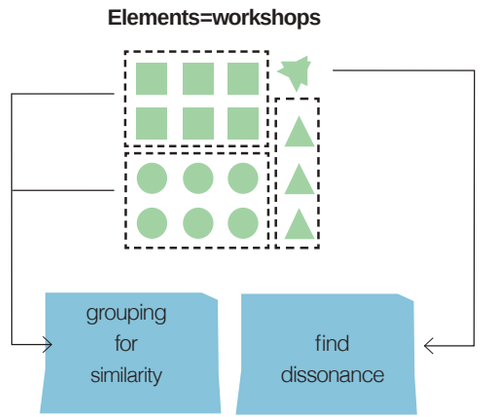


Fig.2 Picture of clustering perspectives and dilemmas per topic

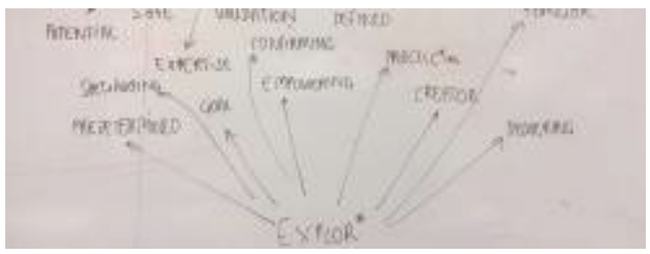


Fig.3 Picture of word counting and relationship.

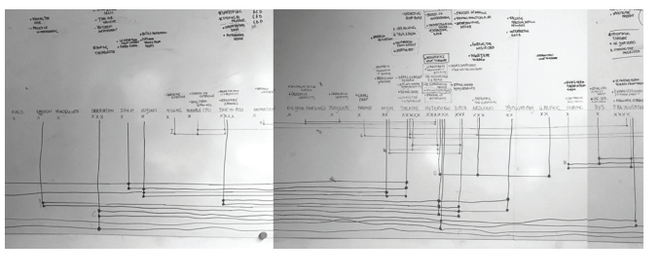


Fig.4 Picture of elements grouping.

WHY

To discover the hidden learnings during the course of the students and what triggers them.

To discover the tacit understanding of the course and the meaning for students.

To discover how the course set up is experienced within the culture of the university.

Note: this way to analyse have not been included in the research.

Fig.39 Visual of ways of data analysis

FINDINGS

In this visual the findings are shown.
The **hidden curriculum** of the course IDE Academy and the three dimensions.

THE HIDDEN CURRICULUM

Exploration

Dealing with exploration is the hidden curriculum of the course

Approach
Approach towards exploration

Attitude
Attitude towards exploration

Goal
Perceived goal of exploration

THE HIDDEN CULTURE

Dealing with theory and creation

Students perception and integration of theory and creation. This can be identified as the IDE TUDelft culture

Fig.40 Visual summary of the findings: hidden curriculum

3.3 ANALYSIS OF THE DATA COLLECTED

In this section I show the data, the process analysis and the findings of the hidden curriculum and its dimension. To have a detailed view on the process and the data you can look in Appendix (F). If you want to know the hidden learnings of students go to Appendix (D)

3.3.1 Data

The data for this analysis are the constructs, their relationship and the reflection for each pair of constructs as shown in figure 41.

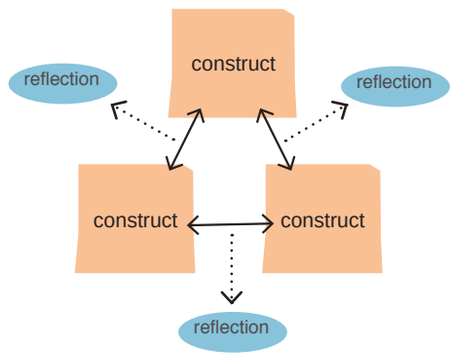


Fig.41 Data used for the data analysis of the hidden curriculum

3.3.2 Process Data Analysis

1. Word counting

I collected the data in an Excel file and then I run a word counting with Voyant tool -online website to word analysis-. At this stage, the most common words appear 6 times, they are: exploring, individual, personal, theory. The next group of words appears 5 times: digital, external, theoretical. When looking at theory and theoretical, it is clear that root words have not been taken into consideration by the program. Thus, I run a word counting of the roots word. The results show a higher number of common words, specifically: 11 times theor(y)(etical), 10 times explor(er)(ing)(ation), 8 times creat(e)(ation)(ing), 7 times appl(y)(ation)(iyng), 6 times new. The last word new does not have any roots but is easy to associate with novelty (2 times), therefore, in the next step I associate words for meaning.

2. Relationships among the constructs

The visual in the next page (Fig.43) shows the relationship among the most common constructs, which are: theor(y)(etical), explor(er)(e)(ing), creat(e)(ing)(ive) and appl(y)(ing)(ication). While exploring the constructs, I noticed that some words shared the same meaning, therefore I grouped them.

For example, the word explor* is strongly related to new, novelty, discover, unknown. Namely, the opposites of these words have been compared and they also relate. Since the opposites constructs shared similar meaning, I clustered the opposites and numbered them. An example is cluster number 1 containing the words structured, pre-determined, defined. (Fig.43)

3. Understanding dimensions

In this stage, I defined the meaning of explor* through the opposites clusters. The cluster contains about 20 pairs of constructs with the word explor* and 6 opposite clusters with similar meaning. (Fig.43)

I explored the relationship between the main cluster “explor*” and the opposite clusters with students’ reflections.

For example, the pair of constructs structure-exploring and the pair of constructs receiving-exploring refers to a similar concept, but the former shows in the reflection a positive meaning to the concept “structure” while the latter shows in the reflection a negative meaning, “structure” becomes “receiving”.

4. Creating dimensions

In this section, I created three dimensions with the clusters.

In step 3 I noticed that students attached a negative or positive meaning to the word exploration when using the opposite construct. Therefore I developed the three dimensions on the positive-negative meaning attached to the same concept. I label the three dimensions to make it communicable, helped by two other design students. The three dimensions refer to three concepts of the word explor* but show the diversity of the perspectives of students.

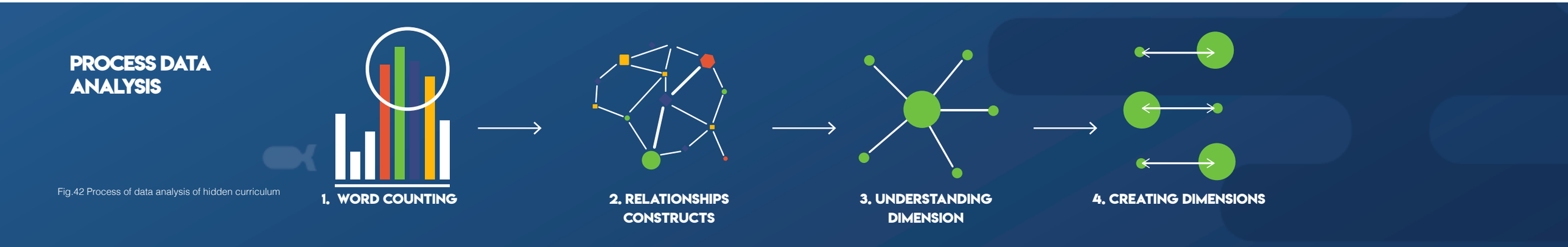
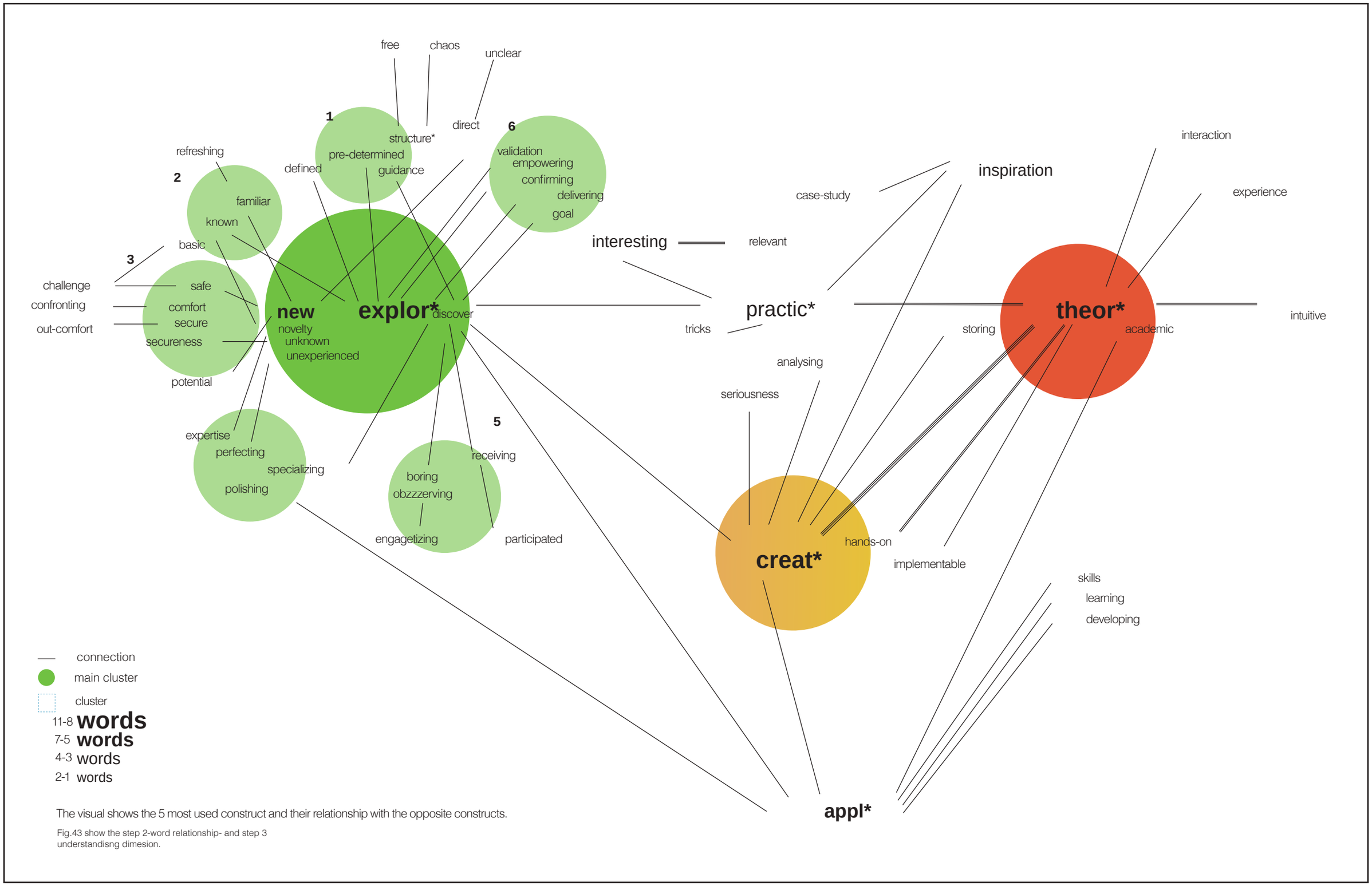


Fig.42 Process of data analysis of hidden curriculum



The visual shows the 5 most used construct and their relationship with the opposite constructs.

Fig.43 show the step 2-word relationship- and step 3 understandisng dimesion.

"Students with different perspectives identify the risks of their opposites"

3.3.3 Findings

The hidden curriculum and its dimesions

In this section I show the Hidden Curriculum of IDE Academy and its dimensions. The most common word is "exploration". The three dimension are defined by the opposite constructs in relation to the word exploration. The following dimesions rapresent three main concepst related to exploration: the goal, the attitude and the approach. In the diagram of each dimension (fig. 45) the collected reflections (light blue boxes) shows that students with opposites perspectives tend to identify in their "opposer" the risks of that perspective.

GOAL

Goal of exploration

Expertise

Students who try to develop their expertise risk to only looking for what is known to them.

Novelty

Students who look always for novelty risk to be superficial.

ATTITUDE

Attitude towards exploration

Uncertainties

Students who look for the challenge of uncertainty risk to never set a specif goal.

Confirm

Students who look for confirmation (ideas, deliverables, skills, etc) risk to look for comforting workshops.

APPROACH

Approach towards exploration

Guidance

Students who look for structure or guidelines, risk to receive information being passive.

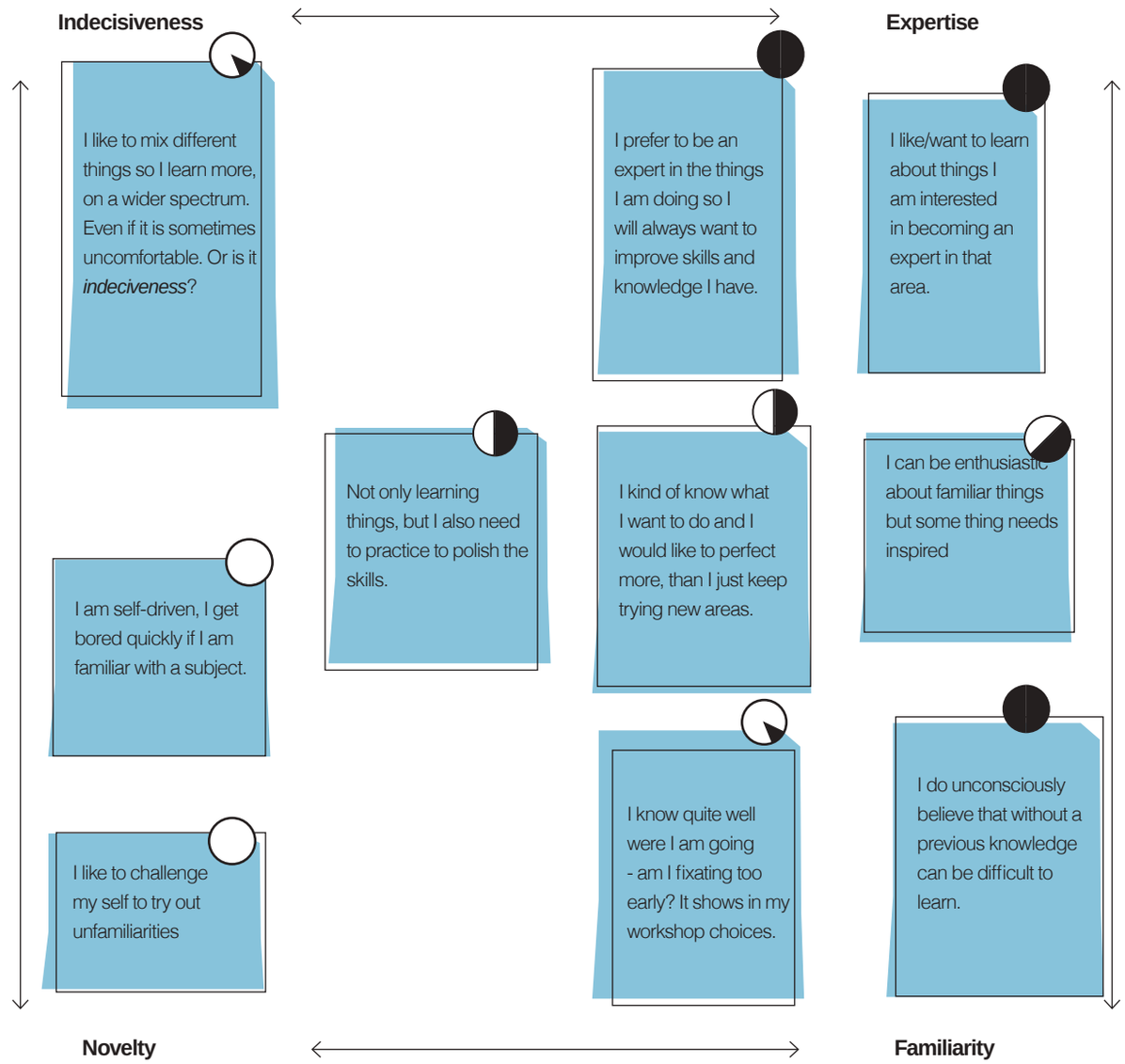
Inner compass

Students who discover by themselves risk to always look for freedom without dealing with structure.

Fig. 44 Summary of the final dimensions

Example of diagram for the dimension Novelty-Expertise

For the full overview of the diagrams go to Appendix (E)



Students driven to look for **novelty** and new things to learn are more open to surprises. They often enjoy novelty and feel it is the right direction for them, although some of them express a bit of uncomforted but the right way to go. Students looking for novelty explore easily new topics. There are unfortunately some drawbacks, boredom or indecisiveness can come into place.

Students trying to develop their **expertise** and specialize their skills prefer to improve existing skills and polish them. There might be some risks when striving for expertise if the driver is looking for familiarity (as shown in the reflection above familiarity), also as suggested in "spark" could be a sign of fixation.

Fig. 45 Exmple of diagram of dimension Novelty-Expertise

The hidden curriculum of ?
In the fig.y I show the relationship between the most common words. Besides the word exploring, I discovered a common pair of constructs: theor* and creat*. In this research, I do not provide an overview of all the reflections related to the two constructs. However, in the visual, the word “theor*” is related and opposite to words like creat*, practic*, apply*, etc. Half of the participants shows these opposites in at least one of their pair of constructs.

In the IDE Academy course is surprising to find the word theor*. The workshops are highly based on design experiences and design skills. These workshops are designed to reduce the content given to students, in general students experience maximum to hours of content and at least 4-5 hours of action. Therefore, the word* theory might not reflect the course but the Faculty of IDE.

3.4 CONCLUSION

In this chapter, I show the data analysis of the boards of the workshop in IDE Academy. This research aimed to identify the hidden curriculum of the course IDE Academy from students’ perspectives.

The hidden curriculum of IDE Academy
The findings show that the hidden curriculum in IDE Academy is dealing with exploration. This is in line with the idea of the course coordinator of IDE Academy, which is “IDE Academy is a kick in the butt to learn something new”. However, the concept of exploration becomes clear when students identify what exploration means to them. The three dimensions presented in the findings provide more understanding of students’ perspectives and learnings when exploring.

The Dimensions
The dimensions provide depth to the concept of “dealing with exploration”.
They create an understanding of what the students learn in IDE Academy besides the mere workshops. For example, *students who look at exploration as discovering new things will use differently IDE Academy from students that consider exploration as building expertise.* The former will use the workshops to experiment with the unknown unknown and the latter will use the workshop to look at the known unknown. However, finding shows that students are not highly polarized on this dimension and students will likely approach the IDE Academy in both ways.

The potential of unveiling to students the hidden curriculum in IDE Academy
In the previous chapter, I discuss the importance of directing the reflection on the perspectives towards an action. The same goes for the dimensions of the hidden curriculum. These dimensions can be explicitly integrated with the course and used to help students creating their own hidden curriculum based on these dimensions.
Students with opposites perspectives find the risks of their opposites, this is an insight to use for the implementation.

The collective dimension of the Hidden Curriculum
The common dimension of the hidden curriculum is shown by the hidden curriculum of IDE Academy, it provides evidence that the course triggers a common hidden curriculum in students. Therefore, the Hidden curriculum of a course can be unveiled and identified.
In the findings “ the hidden curriculum of?”, there is another type of collective dimension. The findings show that students perceive as opposite theory and creation, thus there is a common dilemma between the two. This common dilemma is not triggered by the course IDE Academy.

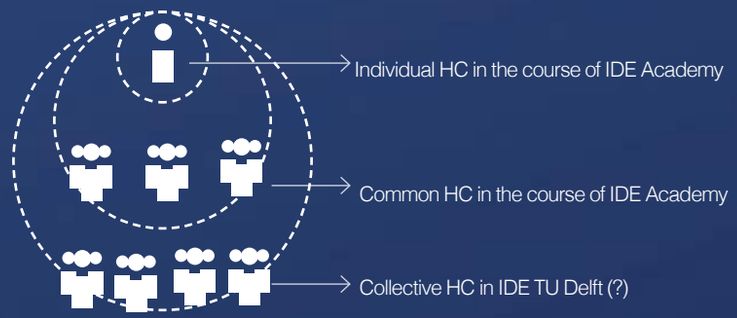
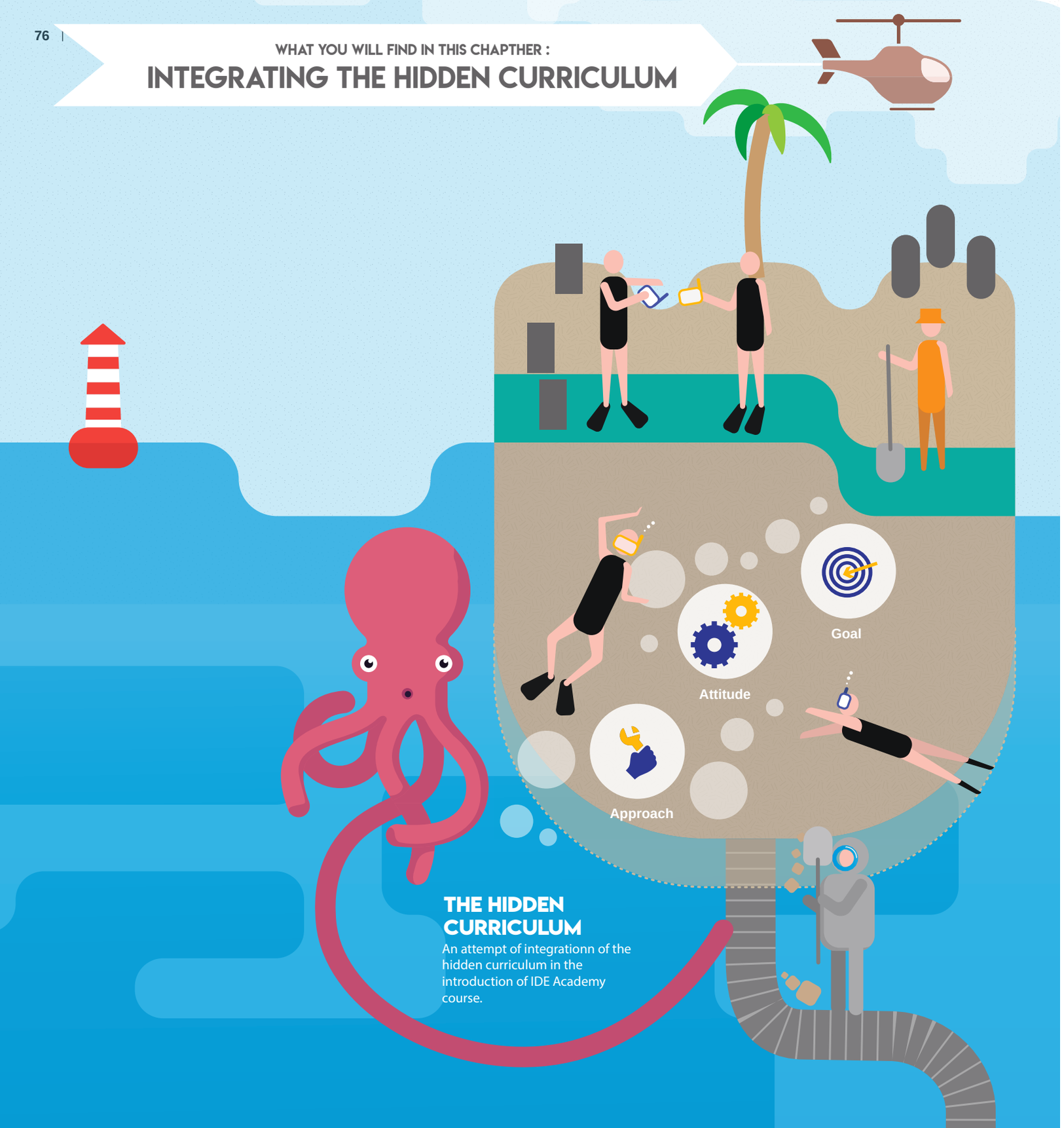


Fig. 46 The hidden curriculum and its social dimension

WHAT YOU WILL FIND IN THIS CHAPTHER :

INTEGRATING THE HIDDEN CURRICULUM



04

INTEGRATE THE HIDDEN CURRICULUM

In this chapter, I discuss with the coordinator the potential of the dimensions of the hidden curriculum. Then, I show how the dimensions have been integrated into the introduction of the course of IDE Academy. I conclude with a short evaluation of the integration of the dimensions.

4.1 IMPLICATION OF THE FINDINGS

In this section, I show the potential of integrating the dimensions of IDE Academy in the course discussed with the coordinator.

Implementation

The three dimensions of exploration can be a way to introduce the course to new students and to create some sort of narrative of the course, besides the scattered experience of workshops. The dimensions are easy to relate to and can be a way to trigger understanding on individual perspectives while getting to know the workshops offer. Discussion and reflection on the three dimensions can be a way to discover the workshops with more awareness.

Comunication

Understanding and defining common perspectives about "Exploration" creates a vocabulary to understand what students are learning beside the skills in the overall course. The course coordinator will consider to collect the findings to to comunicate better the purpose of the course not only to students but also to the Board of Examiners of the Faculty of IDE.

Conclusion

We speculated with the coordinator on the possible future integration of the findings and their potential use. We decided to integrate the hidden curriculum in the introductory workshop to prepare students for the "ride of IDE Academy". In the next section I will describe the introductory workshop.

Note: not all the findings of the data analysis have been shown in the report, some of them are in Appendix (F). All the findings have been discuss with the coordinator.

4.2 INTEGRATION OF HIDDEN CURRICULUM IN IDE ACADEMY

In this section, I explain the integration of the hidden curriculum and its dimensions in the introductory course IDE Academy.

The coordinator and I decided to intervene in the introduction workshop of the course. Currently, the introduction focuses mainly on providing an understanding of what workshops are offered. I decided to integrate the three dimensions of exploration because they are easy to relate to. Moreover, it can be a way to trigger students to understand individual perspectives when getting to know the workshops offered. Discussion and reflection on the three dimensions can be a way to discover the workshops with more awareness of their own perspectives.

AIM

The redesign of the introduction workshop aimed to let students **discover what the workshops offer and let them consider and reconsider their goal, their attitude, and their approach when exploring in IDE Academy.**

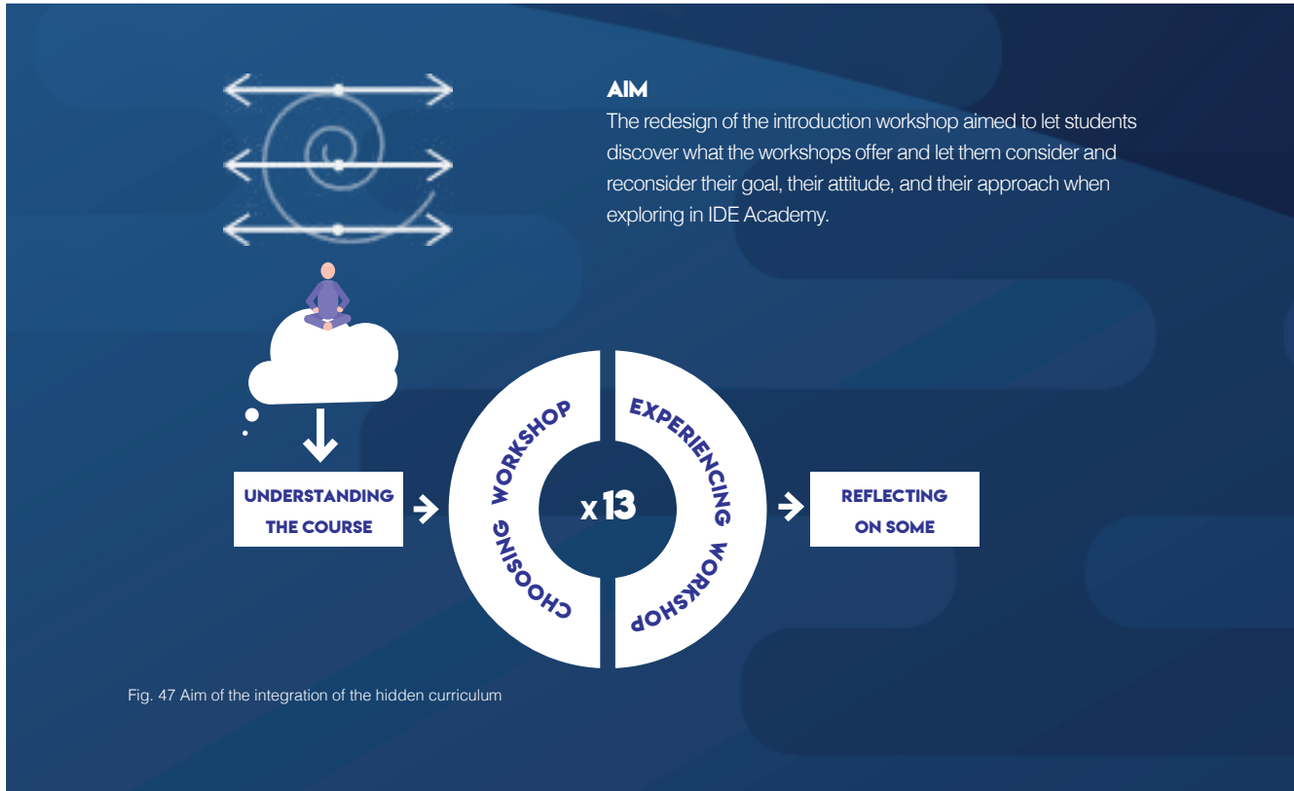


Fig. 47 Aim of the integration of the hidden curriculum

4.2.1 The introductory workshop in IDE Academy

The new re-designed introductory workshop of IDE Academy has been introduced to around 110 new master students of IDE in TU Delft.
After the introduction of the course, the reflective exercise on the dimensions of exploration were introduced. **The three dimensions were introduced with a metaphor of gears**. I created a character with a gear made of three parts: glasses, hat and hand tool, the three parts represent the three dimensions. (Fig. 48)

In the findings, it was found that **students with opposites' perspectives can find the risks of the opposing points of view**. This was used to enable discussion on these perspectives after the self-assessment. Students with opposites' perspectives found the benefits of their own perspectives and found the risks inn their opposite, then discussed their reflections. At the end of the exercise, they reassessed themselves on these three dimensions. They were then asked to explain the most interesting finding after the discussion in a video of 30 seconds.

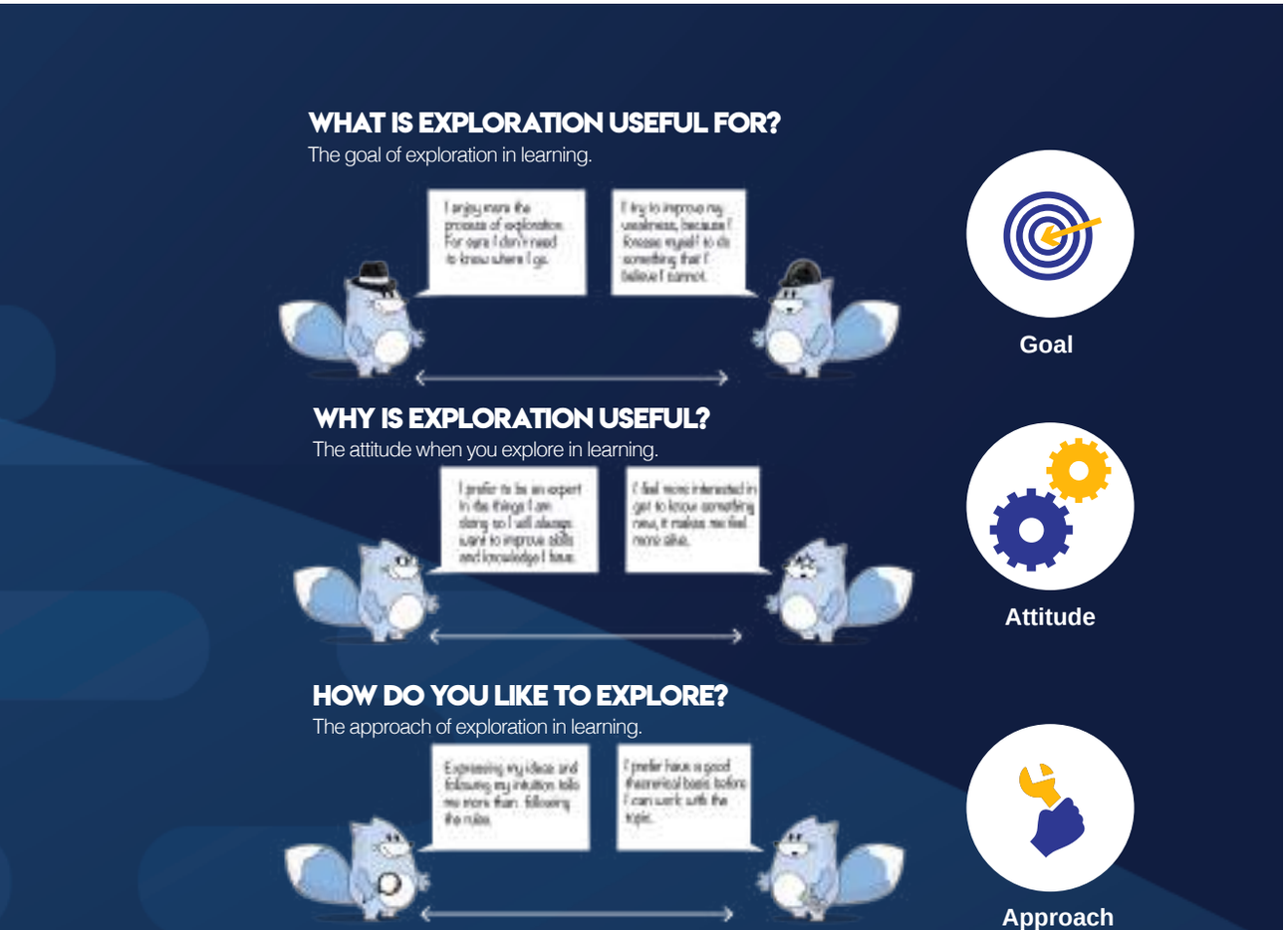


Fig. 48 Dimensions of Exploration: goal, attitude, approach.

The exercise
In the following visual I show the full exercise. (Fig 49) In the first exercise, students assessed themselves on the three dimensions (a). They created groups of different sides, they used the board below to prepare the discussion and then they discussed the findings.
At the end of the three discussions, one for each dimension, they assessed themselves again on the three dimensions (b) and uploaded the video reflection on the course webpage.

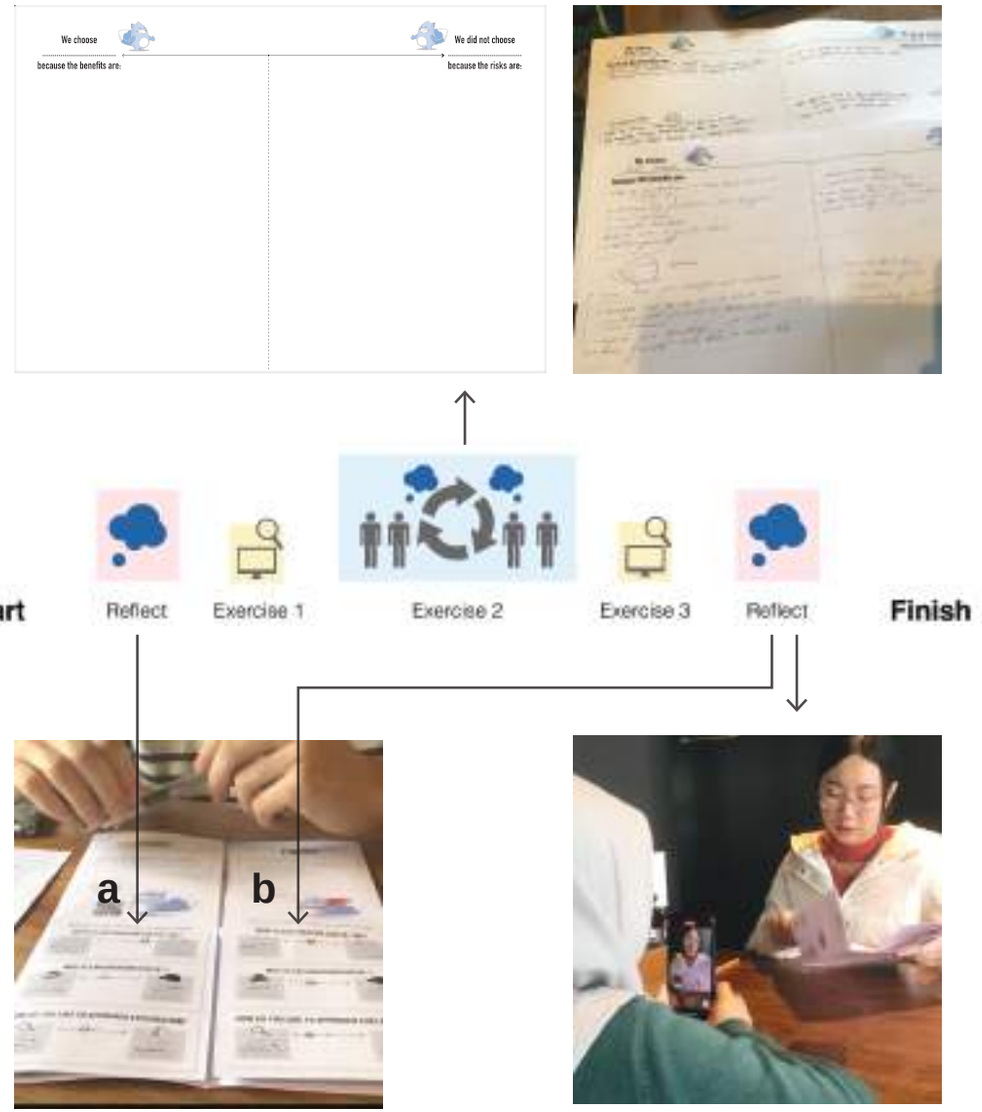


Fig. 50 Introductory workshop IDE Academy, The exercise

Fig. 51 Introductory workshop IDE Academy, Pictures

Evaluation
I followed two groups during the exercises and watched the reflections of students. The dimensions helped to trigger the discussion on how students look at exploration.

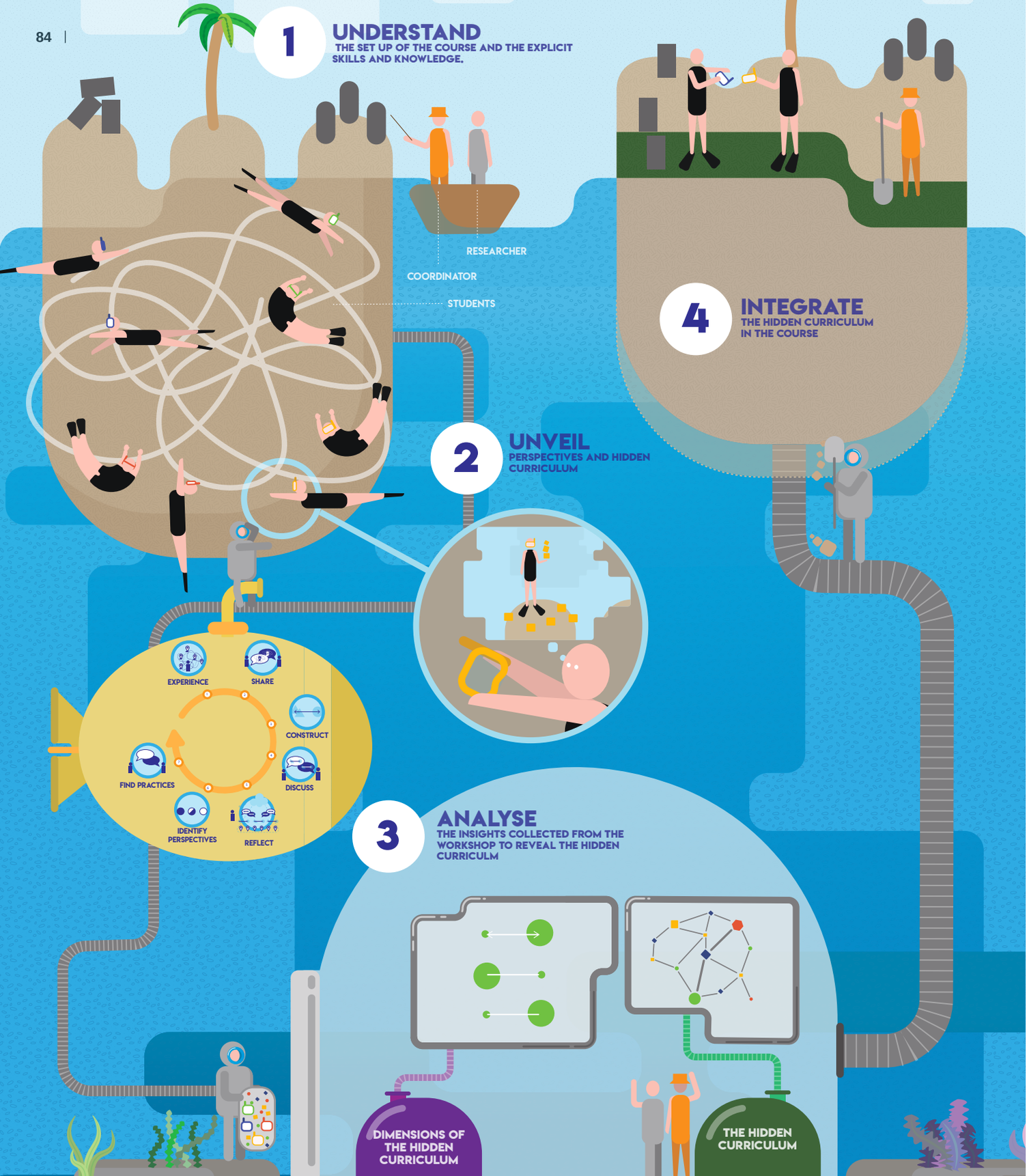
During the discussions, I noticed that some students reconsidered their perspectives, for example, one student in the middle of the discussion decided to join the “opposite team”.

In one group all the students as a final conclusion identified that the benefits of one perspective are also the risk of the opposite one and vice versa. Thus, they said, “ it’s just a matter of remembering not to bring your perspective too far”. The students did not reconsider their perspectives but acknowledged the potential and limitations of their point of view.
In many video reflections, the students reconsider their workshop choices after the exercise.

4.3 CONCLUSION

In the introductory workshop, the dimensions were presented to students as a topic to discuss when getting to know the workshop offer and to plan the workshop choices.

The exercise triggered students to re-think their perspectives when choosing the workshops. Discussing the dimensions showed students to not take for granted their perspectives and to consider the benefits and the risks of their perspectives. The workshop plan after the discussion showed that students reconsider their workshop choices. However, it is not clear if there was any retention of these reflections after the introductory workshop.



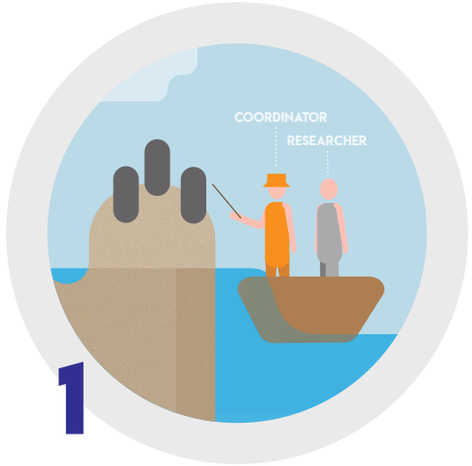
05

EVALUATION AND CONCLUSION

In this chapter, I provide an overview of the project, a toolkit based on the project. An evaluation with three course-coordinators in IDE of the toolkit and I conclude the research and the project.

5.1 OVERVIEW OF THE PROJECT

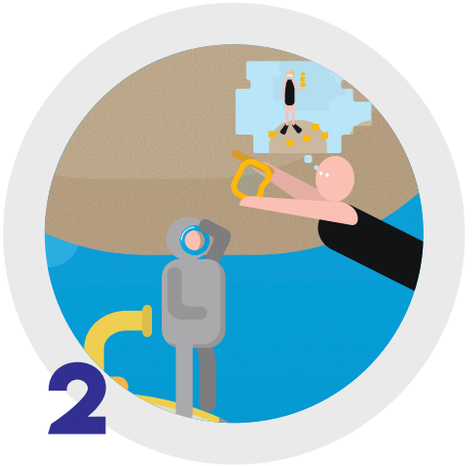
In this section I provide an overview of the four steps of the project.



UNDERSTAND
THE SET UP OF THE COURSE AND THE EXPLICIT KNOWLEDGE AND SKILLS

WHY
The set up of the course and the way of teaching influences the experience of learners and therefore the hidden curriculum, that is what students learn besides the content of the course. Understanding what is explicit is the first step towards understanding the hidden curriculum.

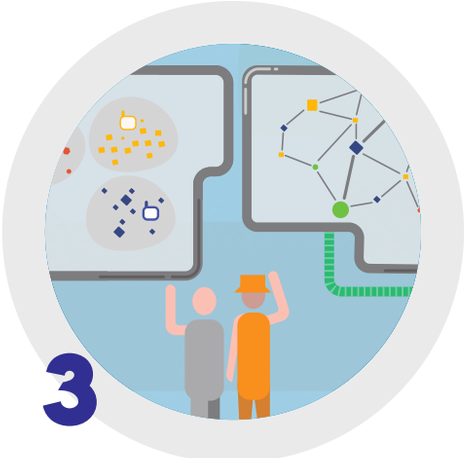
HOW
Map: The context of the course as journey of students, the content given and produced, and the interactions that students have.



UNVEIL
STUDENTS' PERSPECTIVES, HIDDEN LEARNINGS AND HIDDEN CURRICULUM

WHY
Perspectives are unique in each student but they are not always clear to students themselves. The tool supports students to identify their perspectives and unveil hidden learnings and hidden curriculum.

HOW
The tool board is based on Repertory Grid Techniques which helps students to reflect on their perspectives and on the Experiential Learning model which supports students to combine their perspectives and explicit their learnings and their curriculum.



ANALYZE
THE HIDDEN CURRICULUM OF THE COURSE

WHY
The data provides students' perspectives and reflections on the course. This information shows the diversity of students' perception of the course but also shows the commonalities of tacit learnings and understandings of the course.

HOW
The data are analyzed by counting and connecting words used in the boards and by combining students'reflections in common perspectives.

INTEGRATE
THE HIDDEN CURRICULUM AND ITS DIMENSIONS IN THE COURSE

WHY
Integrating the dimensions in the course means making sure that students do not overlook their common baises in the course. The dimensions give to student the power to become "more" aware of their decision.

HOW
The hidden curriculum is introduced as a topic to discuss by students when the course is introduced.

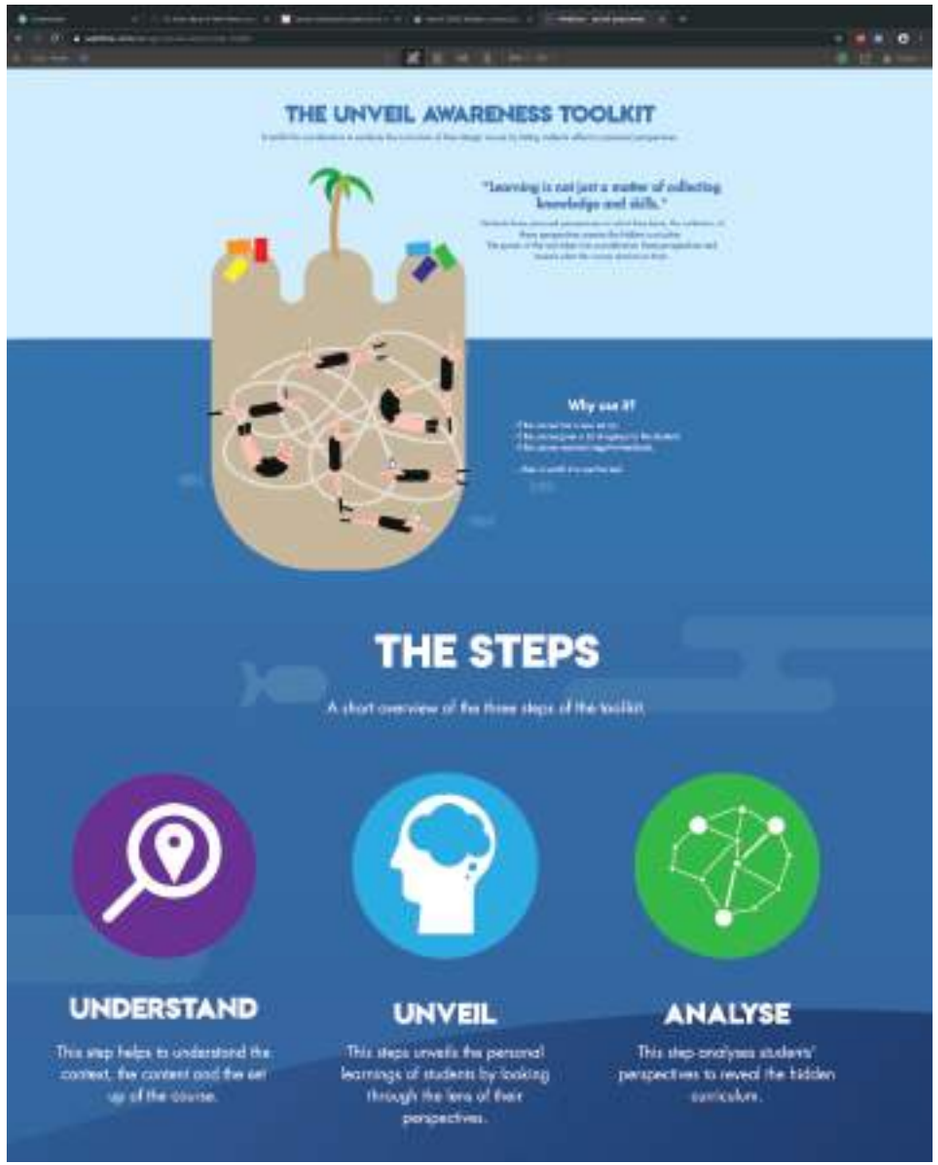
Note: this is one application of the findings of the hidden curriculum.

Fig. 52 Visual summary process of the project

5.2 THE UNVEIL AWARENESS TOOLKIT

The findings of the research and the process were boiled down into a toolkit to download from the website.
The website explains the step and the aim of unveiling the hidden curriculum provides a manual and the board.

THE WEBSITE



THE MANUAL

THE BOARD

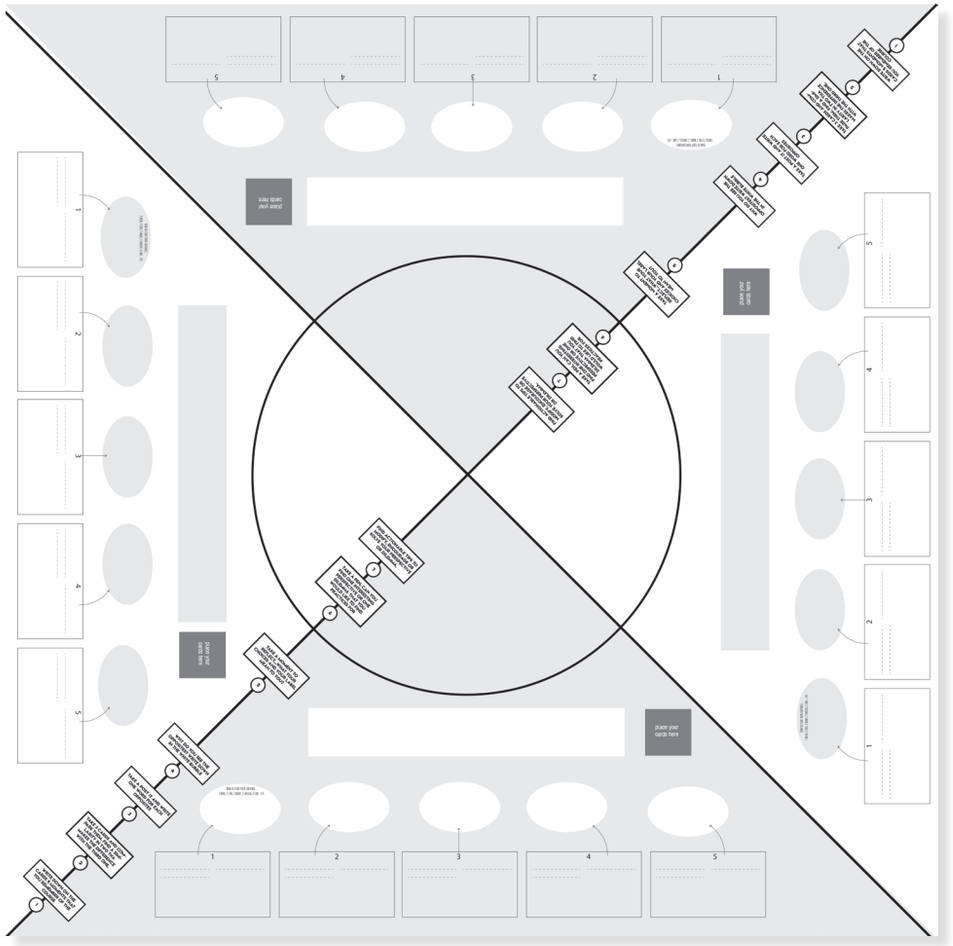


Fig. 53 Showcase of the project,The Website, The Manual, The board.

5.3 EVALUATION

5.2.1 Within the case study IDE Academy

The toolkit was tested in the course IDE Academy as shown in this report. The findings of the toolkit provided the coordinator with an understanding of the hidden curriculum of the course. Students learn not only skills but also how to explore skills to learn.

Evaluation with the coordinator

According to the coordinator, the hidden curriculum and the dimensions provide a way to communicate to the department of IDE, the learnings of students in the IDE Academy course.

Note: the coordinator and I discussed all the findings of the research. For readability, in this report, hidden learnings are shown and discussed only in the Appendix (X). This is because the hidden learnings add complexity to the overall understanding of the hidden curriculum. However, they can be utilized as inspiration for the course in different forms. For example, students learn what challenges mean to them and what is challenging for them.

The tool in the workshop supported the students to:

Reconsider their workshop choices in IDE Academy, and become aware of personal perspectives or dilemmas within the course. This leads them to re-think some of the future workshops to take. However, some of the participants did not unveil any new insights, probably due to the level of openness to reconsider one's perspectives.

The integration of the findings

Discussing the dimensions showed students to consider the benefits and the risks of their perspectives when choosing workshops in IDE Academy.

5.2.2 Evaluation of the toolkit with three coordinators

The toolkit has been discussed with three course-coordinator of the Faculty of Industrial Design Engineer in TU Delft. The main benefits and concerns are reported below.

BENEFITS

The toolkit as evaluation tool:

- **Discover narrative in complexity**
  - When the course provides diverse topics to learn which are not fully connected in a cohesive whole.
- **Show students their learnings**
  - When the learning is hidden by a mean. For example, if the learning is how to argue, the mean can be writing a paper. The risk is that writing a paper appears to be the learning rather than a way to learn how to argue.
- **Understand new set ups of a course**
  - When the course provides new setups or new ways of learning. the toolkit can reveal how students perceive the course if students are not ready for the new set up. This can help the coordinator to adjust the course accordingly.

CONCERNS

- **Provide narrative when is not necessary**
  - Revealing the hidden curriculum risks to be a distraction when the course is highly focused on providing explicit learning objectives.

LIMITATIONS

- **Efficiency of the data analysis**
  Large quantity of data to analyze and unused data is left over
- **"The feedback is only as good as the students you have"**
  - The tool relies on students to take agency and reflection seriously.

5.4 CONCLUSION

RQ1.
How can the hidden curriculum be unveiled?

SQ.
What is unveiled?

In this project, I researched ways to unveil the hidden curriculum of an MSc course. The project provides more vocabulary and tools to unveil and identify the hidden curriculum.

The hidden curriculum is tacit knowledge created by students during their education. It is influenced by the context and the individuality of the learner. Therefore, **I decided to unveil the perspective of the learner about the context.**

In IDE Academy, I facilitated unveiling perspectives with the use of a tool, inspired by the Repertory Grid Technique. When the perspective was unveiled students identified interesting perspectives or dilemmas to lead how they could approach the IDE Academy course.

The tool allows students to unveil their personal hidden curriculum, however, there is also a hidden curriculum of the IDE Academy course. While analyzing the results of the tool, I discovered a shared idea of what students are learning, which is **"exploring skills"**. There are diverse perspectives on the goal of exploration, the attitude, and the approach when exploring. The concept of exploration becomes clear when students identify what exploration means to them.

RQ2
What are the benefits in unveiling the hidden curriculum?

SQ1.
What are the benefits for students when they unveil their hidden curriculum?

SQ2.
What are the benefits for students when teachers unveil to them the hidden curriculum of a course?

The benefits in unveiling the personal hidden curriculum with the tool
The tool triggers students to reflects on their own perspectives. Through dialogue with peers students frame and re-frame their own perspectives. The tool supports the students in translating the new perspectives into actionable practices.
Below are three benefits:
- Promoting autonomous thinking
Reconsidering perspectives according to Mezirow (1997, 1995) promote independent thinking.
- Preparing the students to learn from their design practices
Adult learning is highly focused on learning from experiences. The tool uses experiences as a starting point to reflect on personal perspectives.
- Promoting conscious decision making
Understanding personal perspective leads to more conscious decision making.

The benefits in unveiling the hidden curriculum of IDE Academy
The dimensions of the hidden curriculum were introduced in the Introductory workshop of IDE Academy. Discussing the most influential perspectives on the course showed students to not take for granted their perspectives and to consider the benefits and the risks of their perspectives. This means, **reducing biases and supporting more conscious decision making when choosing workshops**

Limitation of the research
The findings on the Hidden Curriculum rely on one workshop with 40 students, more testing should be conducted.
The students who took part in the case study were interested in the workshop. Therefore, the level of openness in reflecting upon one's perspectives may differ in other settings.
I mainly conducted the data analysis, the findings were reconsidered several times and discussed with students of IDE Academy along the process. However, there was no proper triangulation.

Further research
- Testing the tool in diverse courses, to understand the potential and the limitation of the tool.
- Explore ways to facilitate the recognition of perspectives as insights.
- Explore ways to let student identify their personal hidden curriculum and the course's hidden curriculum, maybe in another Academy Workshop.
- Since the tool is in an education setting, revise the tool with an educational practitioner.
- Research ways to integrate the hidden curriculum as part of the curriculum and understand the benefits and limitations.