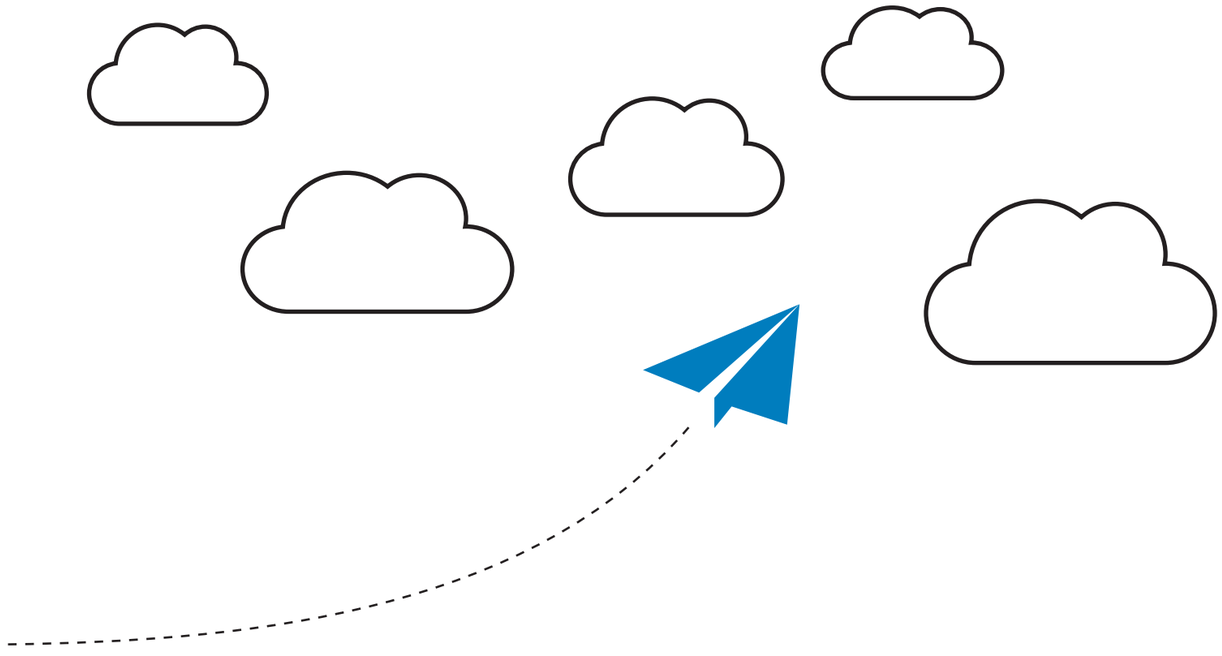
A Purposeful Way of Learning

Master Thesis
Strategic Product Design
Roël Tibosch

TU Delft

KLM



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PREFACE

Dear reader,

In front of you is my graduation report. Over 5 months ago I started my graduation journey at KLM Learning & Development. Since then I've been giving my best to deliver to you now this report. It's been an incredible experience for me and a worthy closing of three amazing years in Delft. Now it's time for me to find my place in the working world and continue my learning there.

I could not have realized this graduation report on my own. Therefore I would like to thank all the people that have supported me throughout this journey.

Beate, thank you for your optimism and support. I could always call you if I needed support or an opinion.

Barend, thank you for the fruitful discussions and your critical mind. It really helped me to get out of my bubble and have a critical look at my project.

Lianne, thank you for strategic design perspectives and razorsharp feedback. I could always come to you for support or a strong opinion to bring me further.

Thanks to all the experts who enlightened me with their expertise and the participants in my tests that provided me with critical feedback.

Last but not least, thanks to my family, friends, housemates and girlfriend, for always supporting me throughout the journey.

I hope you enjoy reading this report and it will bring you some learnings.

All the best,
Roël

EXECUTIVE SUMMARY

This report explores the opportunity of 'an informal learning solution to support digitals in their personal development' in the context of KLM. The result is a platform that supports digitals in giving direction to their learning practices, resulting in purposeful development.

The world is moving fast. Technologies are disrupting and customer needs are continuously changing. Companies must adapt to these developments and so do their employees. To gain competitive advantage, companies aim to establish a strong learning culture. However, building a learning culture is a complex undertaking. Theories on organizational learning and the learning organization contribute to solve the puzzle from an organizational perspective. In this study a different approach is taken by focusing on the individual employee.

The employees that are targeted in this study are the digitals at KLM. These digitals experience a need for growth in their professional role and their personal competence. However, currently their learning is reactive and driven by incidental opportunities. A structural and purposeful approach to learning is lacking.

Based on extensive literature review and practical research, a structural and purposeful approach to learning is proposed. The emphasis in this approach is on the development of learning ambitions to give direction to a purposeful and self-driven learning process.
These learning ambitions are developed through a human-centered process. In this process digitals draw from their individual interests and competences and relate those to the work environment to shape learning ambitions. In this way the development of employees is driven by their strengths to exploit their full potential for company value.

A platform has been designed to support digitals to guide and support digitals throughout this process. The platform entails three applications: a personal library, an ambition tool and a learner network.

The personal library is a tool for storing and retrieving all your interesting content and evaluations. From the overview of contents and evaluations, digitals can derive their interests and competences.

In the ambition tool these interests and competences are related to developments in the work environment to shape learning ambitions. For each learning ambition personal user stories are defined that can be integrated in a personal sprint planning to achieve integration in the work routine. The tool guides employees through the process and supports them along the way.

A learner network connects digitals to inspire and sharpen each other's thinking and collaborate to realize their ambitions. In this way the knowledge and diversity of perspectives that are already present in the company are leveraged.

Through the designed platform digitals are empowered to be in the driving seat of their own development. They are provided with a solution that helps giving direction to their development. This results in purposeful learning. Moreover, through integration of learning in the work routine it becomes part of the job.

For the L&D department, the platform shows a new approach on how development can be supported. Through focusing on the process rather than the content employees can be supported in their informal learning. Moreover, the focus is shifted from the actualization of learning ambitions to the development of learning ambtions. This shift in perspective generates a spectrum of new opportunities for solutions the L&D department can provide.

Also, the platform contributes to an aspired mindset change. This mindset change implies that learners are not passive recipients of learning provided by the L&D department, but are active owners of their own learning.

In conclusion, this study shows a new direction on how learning can be supported by the Learning & Development department of KLM. Within this new direction a platform is designed that supports digitals in self-driven and purposeful personal development.

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PROJECT CONTEXT & APPROACH

PURPOSE OF LEARNING

Sources of Competitive Advantage

Companies have always been competing to gain competitive advantage over each other. Porter (1989) described how competitive forces shape strategies to differentiate. Various of such strategies for competitive advantage have been adopted, like differentiation through efficiency or distinctive quality.

Nowadays, pace and adaptivity have become an important source of competitive advantage. Customer needs are changing fast and companies that are agile and fast-moving thrive in such environments (Davis, 2012; Tidd & Bessant, 2018).

Several approaches have been introduced to develop an agile way of working. Takeuchi & Nonaka (1986) introduced the concept of scrum, which was later formalized by Schwaber (1997). Scrum is a methodology for agile project management. In this methodology teams apply sprints to iteratively and incrementally develop innovations (Schwaber, 1997).

Another approach started from the concept of time-based competition described by Stalk (1990). He described how competitive advantage is gained by having shorter innovation cycles. In line with this, research at the Iacocca Institute resulted in the concept of the agile manufacturing enterprise (Nagel & Dove, 1991a; Nagel & Dove, 1991b). In the report is explained how competitive advantage is gained through agile manufacturing and how such an agile manufacturing enterprise is organized.

These approaches have shown to significantly impact project success (Serrador & Pinto, 2015). However, these projects have mainly been software development projects. Currently these agile methodologies are spreading across a broad range of industries (Rigby et al., 2016).

Some studies have shown that agile methodologies can lead to short-term advantages. However, no studies have shown long-term advantages of these methodologies yet (Kajko-Mattsson, 2006). A study by Drury et al (2012) showed a lack of longer-term strategic focus for decisions in agile environments. This raises questions regarding long-term competitive advantage.

An important source of long-term competitive advantage is corporate culture (Chan et al., 2004). However, strong cultures are only valuable if they include adaptive and learning qualities (Kim Jean Lee & Yu, 2004; Kotter, 2008). This implies that continuous learning is a key element of a strong corporate culture.

Competitive Advantage through Learning

Ever since Senge's (1990) writings on the learning organization, management of learning increasingly gained attention amongst companies. This gives rise to the movement of learning; gaining competitive advantage through continuous learning.

While the learning organization focuses on the (ideal) company structure to create organizational growth, organizational learning as described by Argyris (1977) is about (current) learning processes of individuals in the organizational context. Both these theories yield value in gaining competitive advantage. Combining the theories results in a learning organization that fosters organizational learning.

Creating such an organization is a complex undertaking, comprising various professions, such as human resource management, organizational change and strategic management. Therefore, in the context of this study, a specific approach has been adopted, rooted in the design discipline.

Focus on the Individual Learner

In learning organization theories, generally attention is directed towards how collective knowledge can be developed from individual knowledge. For example, Nonaka (2008) describes how knowledge can be expanded within a company, while Senge (1990) describes how development of organizational knowledge should be established.

In this study, a human-centered approach has been adopted, focusing on the individual's learning. The assumption behind this approach is that if all individual employees become better learners and therewith more knowledgeable, each individual input to the collective knowledge becomes larger and therewith the organizational knowledge becomes larger.
Besides, individual learning has been related to performance. A study by Hatch & Dyer (2004) found that training of employees results in better company-specific performance and learning performance.

Finally, the starting point of this study is a design perspective. In the design process customer centricity is essential (Brown, 2008; Brown & Katz, 2011). Since this study is focused on the internal strategy, the customer is the individual employee. In the next section will be further specified which internal customers are targeted.

Informal Learning

Three forms of learning can be distinguished: Formal, informal and non-formal learning. Formal learning is learning that takes place in formal educational institutions. Non-formal learning regards organized learning activities outside the formal education system. Informal learning is less organized and structured learning that takes place anywhere and anytime (Eurostat, 2019).

Corporate expenses on formal learning are generally high, while expenses on informal learning are generally low. However, for the learning outcome the opposite applies. This is the spending/outcome paradox of learning, visualized in figure 1 (Cross, 2011).

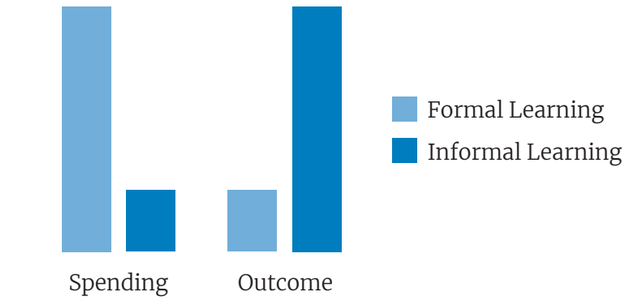


Figure 1. The spending / outcome paradox of learning. Adapted from Informal Learning: Rediscovering the Natural Pathways That Inspire Innovation and Performance (p. 4), by J. Cross, 2011, San Francisco: Pfeiffer. Copyright 2007 by John Wiley & Sons, Inc.

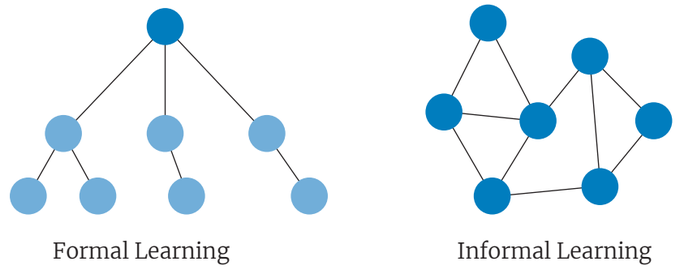


Figure 2. Single source vs network learning. Adapted from Informal Learning: Rediscovering the Natural Pathways That Inspire Innovation and Performance (p. 4), by J. Cross, 2011, San Francisco: Pfeiffer. Copyright 2007 by John Wiley & Sons, Inc.

In formal learning, the knowledge is centralized and spread from there, as visualized in figure NUMBER. However, knowledge in itself is not centralized as every human being has different knowledge. Therefore, an individual can learn something from multiple people with different knowledge. Informal learning is more like a network as visualized in figure 2 (Cross, 2011). This better complies to the nature of knowledge.

Because of both the arguments just mentioned, it is decided to focus on informal learning in this study.

KLM CONTEXT

This study is conducted in collaboration with KLM. KLM is a Dutch Airline employing 34,872 people. These employees work at a wide variety of departments, from ground services to marketing & brand.

KLM Compass

Recently KLM innovated their corporate strategy and communicated it internally through the KLM Compass which is depicted in figure 3. As can be read, the desired behaviour of staff consists of four pillars, as does the desired working climate.

Continuous growth of employees is not mentioned directly but is connected to several pillars. 'Reach out' and 'take ownership' are both related to learning in a sense that employees should take initiative for their own development. Then, if they better develop themselves, they will be more competent and able to 'go further'.

As regards the working climate, a learning culture is a way to empower and enable employees to bring out the best of themselves. Moreover, a more literal interpretation connects learning to these pillars as employees should be empowered, enabled and encouraged to learn.

Role of Learning & Development

The specific client for this study is the Learning & Development department. This department is a facilitating department, supporting other departments at KLM. Their purpose is to help employees develop to be better at their jobs. This purpose is twofold. Firstly, there a development component. The learning and development department is responsible for facilitating the necessary means for employees company-wide to develop themselves. Secondly, there is the job component. The development that is facilitated should be beneficial for KLM.

Formal Learning Offer

The learning and development department offers a wide variety of learning solutions. These solution can be divided in two categories: general solutions and targeted solutions. The targeted solutions are designed for specific learning objectives of a specific target group, while the general solutions are for development of all employees.

Employees can access the general learning solutions in two ways. They can ask their manager or they can search for it online. For online learning management, employees can use a platform called MyLearning. On this platform they can search for all kind of learning content that is provided by the Learning & Development department.

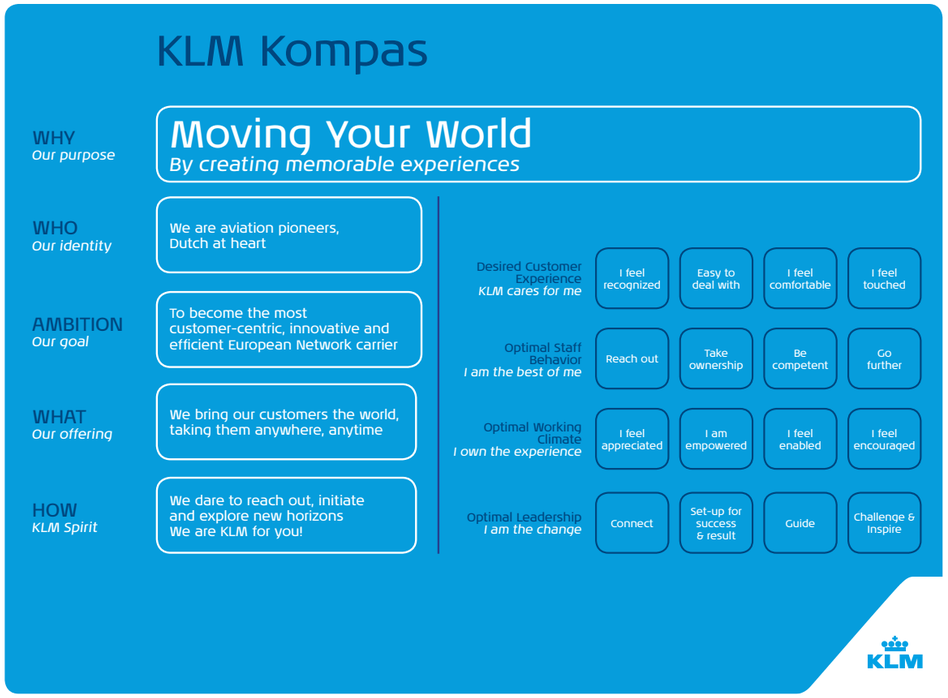


Figure 3. The KLM Kompas.

Currently the Learning & Development department is implementing a new learning management platform, called Cornerstone. This platform enables employees to manage their own learning. The three pillars of the platform are learning management, learning experience and content anytime.
Learning management concerns data-driven monitoring of ones learning.
Learning experience concerns the user interface of the platform allowing for convenient access to learning content.
Content anytime refers to the content that is offered on the platform.
Summarizing, this new platform provides a wide variety of formal learning content to all employees, that is easy accessible through a convenient interface.

The learning solutions offered by the Learning & Development department are almost exclusively formal learning solutions. Several employees of the learning and development department explained that it is difficult to provide informal learning solutions. This difficulty is twofold. Firstly, it is difficult to design informal learning solutions, since it then often becomes formal learning. Secondly, employees often experience difficulty in managing their personal development.

Binding Digitals

At Learning & Development there is a need for knowledge on digitals. These digitals are defined by KLM as recently graduated individuals working in the field of digital innovation and IT. Individuals in this target group are difficult for KLM to acquire, if not more difficult to retain. Gaining understanding of this target group is necessary to be better able to anticipate their needs.

Besides just gaining understanding, this study could also offer a solution on how to acquire and retain digitals. Studies showed that millennials are committed to continuous personal development and are rewarded by learning opportunities (Billings, 2004; Suleman & Nelson, 2011). So a culture that fosters their personal development could be an incentive for digitals to want to work for KLM.

Therefore, in mutual agreement it was decided to target the digitals in this study. More specifically, digitals from two different departments were included in the study. These departments are Digital Frontend and Digital Transformation.

Digital Frontend Department

The digital frontend department is responsible for the software part of the user interface of KLM applications for customers. The employees at digital frontend are mostly software developers. They work in teams and each team is responsible for a specific element of an application.

At Digital Frontend there is an agile way of working. The Scrum methodology forms the basis of their work routine. Teams work in sprints of two weeks. In these two weeks they plan, monitor and evaluate assignments to be done. These assignments are based on user stories.

Need for T-Shaping

In conversations at the Digital Frontend department of KLM, the demand for T-shaping was explained. The efficiency of the operations could be increased if the amount of transfers and therewith dependencies within the projects would decrease. To achieve this, employees must broaden their skills to take on parts of the projects that would otherwise be transferred to other departments. In combination with the ongoing in-depth learning, this is called t-shaping.

Lack of Structured Approach

Currently, there is no structured approach to personal development at Digital Frontend. Employees can ask their superior for time or resources to focus on personal development. Then they can discuss the plan and make arrangements. Besides, if they want to improve specific job-related skills, they can ask their teammates during the sprint planning if they can take on the user stories that require these specific skills. In this way they can improve those skills on the job.

Digital Transformation Department

The digital transformation department is a support department. The purpose of the department is to develop digital solutions for and with KLM employees. In their approach they adopt a user-centered approach. Since the focus is on developing digital solutions new technologies like VR, AR and Blockchain are explored in the innovation process to understand their potential value.

The employees at digital transformation are from a variety of backgrounds. In teams they work on specific projects initiated from employee needs. In these projects they apply an agile way of working. Teams work in sprints of two weeks. In these two weeks they plan, monitor and evaluate assignments to be done. These assignments are based on user stories.

OKR's in Early Phase

At Digital Transformation recently OKR's were introduced. These Objectives and Key Results are an attempt to actualize continuous growth. It is a method for setting, communicating and monitoring goals. The goal of the OKR's is to connect company, team and personal objectives in a measurable way. Since these OKR's are just recently introduced, it is still at an early phase and some optimization is needed.

Currently the format of the OKR's is a text document. First the purpose of the OKR's is explained and it is described what OKR's are. Subsequently guidelines are provided on what the objectives and key results should look like and how they will be evaluated. Then the employee is asked to write down four objectives and for each of them three to five contributing key results. Two of the objectives should be project-related, one of the objectives should be regarding one's contribution to the department and one should be a personal objective. The document is evaluated and renewed on a yearly basis.

Current Learning Strategy

Some teams at Digital Transformation applied an 80/20 rule to stimulate learning. This rule entails that employees work four days a week on the assignments of the team sprint. One day a week they then can invest in their personal development. There is no structured support for employees in drafting learning activities.

PROJECT OBJECTIVE

Aim

The learning and development department offers a wide variety of learning solutions. However, these solutions are almost exclusively formal learning solutions. In this project the aim is to explore how employees can be supported in their personal development through informal learning.

The informal learning solution should provide a structural approach that can be integrated in the existing work routine. The solution should empower employees to develop at work rather than impose activities on them.

Finally, it is aimed to develop a solution that is desirable, feasible and viable. This should be achieved through a human-centered approach, use of feasible technologies and regular contact with stakeholders from the involved departments.

Target group

The target group of this study is digitals at the Digital Frontend department and the Digital Transformation department. Digitals are defined in this project as millennials (individuals between 20 and 35 years old) that work in the field of digital innovation and IT.

This target group has been selected in mutual agreement with the Learning and Development department, because of a need for knowledge on this group of people.

Research Question

The research question that follows from the project aim is:

> How can digitals be supported in their personal development through informal learning solutions that are integrated in their work routine?

Sub-questions:

- What are needs and wishes of digitals regarding their personal development?
- What does an effective learning process look like?
- How can informal learning be supported by the Learning & Development department?
- How can work and learning activities fit well together in the existing work routine?

Scope

The study is executed in the context of KLM. All solutions are specifically developed for this context.

The focus of this project is on individual learning. This means the individual is targeted and team learning or organizational learning are out of scope.

Moreover, the focus on individual learning means that only the acquisition or development of knowledge is targeted. The sharing of knowledge is out of scope.

Stakeholders

Besides the supervisory team from TU Delft and the company mentor from KLM Learning and Development, the KLM departments of Digital Frontend and Digital Transformation are stakeholders in this project. The participants of the study are from these departments.

Since the client of the project is the Learning & Development department, but the participants of the study are from different departments, the participants and the client might have different interests. Therefore, strong stakeholder management is needed to deal with the complexity of the stakeholder field and gain the required commitment from the different stakeholders.

PROJECT APPROACH

The approach for this project is illustrated in figure 4. A combination of the double diamond approach (Design Council, 2007) and design sprints is used for this project. The research phase consists of a diverging analysis part and a converging synthesis part. Then three design sprints are applied to develop and validate the design in iterations, before it is finalized.

The first diamond of the double diamond process is used because of its exploratory nature. This fits well the fuzzy front end of this project with limited prior knowledge.

Design sprints have been applied because it enables fast and prioritized learning. Moreover, in this way the final design is rooted in the context of application.

Analysis
The goal of the analysis phase is to gain insight in the topic of learning, the project context and the target group. Literature review has been conducted to gain insight in the topic of learning. Through semi-structured interviews with company experts as well as external expert information on the research object, project context as well as the target group was gathered. Interviews with the target group were conducted to develop understanding of their needs. In these interviews a generative tool was used to discover tacit and latent needs (Sanders & Stappers, 2012).

Synthesis
The goal of the synthesis phase is to derive insights from the comparison of practice and literature and align these insights with the user and business needs. In this way direction can be given to the design phase.

Sprints
The goal of the design sprints is to iteratively develop a validated concept. Each sprint included ideation, prototyping and user testing.

Each sprint a concept is designed, which is then tested with a prototype. Based on the insights from the test, the concept is redesigned and again tested with a prototype. In this way gradually a validated concept is developed.

Finalization
The goal of the finalization is to create compelling communication for the concept.

Throughout all phases numerous strategic design methods have been applied. The most important ones per phase are listed below in figure 4.

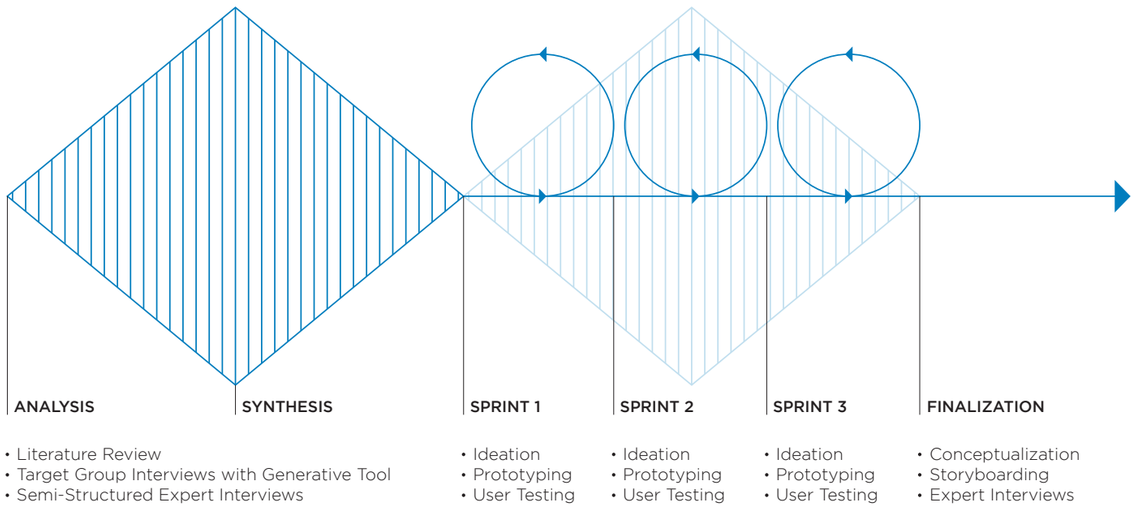


Figure 4. The project approach including strategic design methods.

RESEARCH APPROACH & INTRODUCTION ON LEARNING

RESEARCH APPROACH

Objects of Research

A combination of target group interviews, expert interviews and literature review has been conducted to gain insight in the problem. Participants are listed on the next page in figure 7, 8 and 9. The aim of this approach is to test theory against practice and validate if findings from practice are grounded in theory. Gaps between theory and practice can serve as a basis for further research.

Engeström (2001) explained every theory of learning must consider at least four questions:

- Who are the subjects of learning?
- Why do they learn?
- What do they learn?
- How do they learn?

Since I believe the context is important as well, I added two questions for the analysis phase:

- When do they learn?
- Where do they learn?

Five of these six questions are translated into four objects of research:

- Digitals
- Learning Ambition
- Learning Process
- Learning Routine

The four objects are schematically depicted in a development process in figure 5. The digitals are the subjects of the development process. The current situation is their current knowledge. By defining learning ambitions and actualizing them in a learning process, a new situation with new knowledge is created. The learning routine is underlying this process as it specifies when and where digitals engage in these activities.

The question 'why do they learn' is included in a different way. In my approach this question is included in the learning ambition. This learning ambition must be based on intrinsic motivation, inherently treating the incentive to learn.

The research question, as stated before, is:

How can digitals be supported in their personal development through informal learning solutions that are integrated in their work routine?

The Digitals are the subject. The learning ambition and learning process are covered by "personal development" and "informal learning solutions". The learning routine concerns the integration of learning in the work routine.

ROLE	AGE	DEPARTMENT
Frontend Developer	24	KLM Digital Frontend
Frontend Developer	25	KLM Digital Frontend
Frontend Developer	33	KLM Digital Frontend
Communication Specialist	24	KLM Digital Transformation
Consultant software engineering	24	KLM Digital Transformation
Consultant frontend development	31	KLM Digital Transformation
Consultant software development	29	KLM Digital Transformation

Figure 7.
An overview of participants from the target group.

Target Group Interviews

Interviews with digitals at KLM were conducted to gain insights in the target group. Seven individuals that comply to the specification of the target group were interviewed. These interviewees are listed in figure 7.

Career Journey

For the interviews, generative tools (Sanders & Stappers, 2012) were adopted in the approach. Interviewees were asked to fill a career journey template that I developed to gain insights in the learning ambitions, processes and routines of digitals (see appendix B).

To discover the learning ambitions, besides ambitions also the talents and motivations of digitals were addressed. This setup is based on a conceptual model I developed (see figure 6) based on research by Csikszentmihalyi (2014) on flow.

He suggested that individuals can have a peak experience, which he called flow. Two main components are fundamental for this state to be reached, a competence and a motivation component. I defined the ambition as reaching the state of flow. The competence component I renamed to talents and the motivation component I called motivations.

By addressing all three elements it was aimed to develop digitals' learning ambitions and what is underlying these ambitions.

By using a generative tool (Sanders & Stappers, 2012), it was the objective to go beyond explicit knowledge of the participants regarding these aspects. Participants were asked to think out loud while filling in the template. I used a semi-structured interview approach as I asked questions to go more into detail on answers and gain more in-depth information. The interview template can be found in appendix A.

Besides the career journey template, in the second round of interviews, which consisted of the three participants from Digital Frontend, the participants were asked to draw their learning process. The starting point in this process was the current situation and the learning objective could be anything.

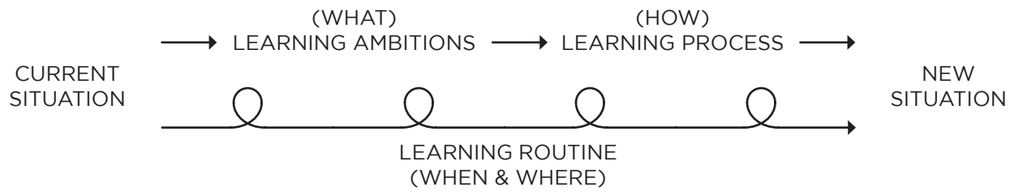


Figure 5. A basic development process including the objects of research.

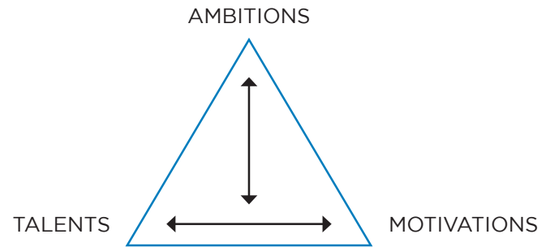


Figure 6. A visual depicting the relations between talent, motivations and ambitions.

Expert Interviews

Several experts were interviewed to gain insights in learning in organizations.

External Experts

Four experts unrelated to KLM were interviewed. These experts are listed in figure 8.

This selection of experts provides a broad range of knowledge on learning at work. Jos Baeten is an expert on workplace learning. Mark Willems developed with his company an e-health platform for the workplace. From their different perspectives they both provide insights in learning in the workplace. Chrstistian de Waard is an expert on employee feedback and hereby acquired extensive knowledge on employees' needs and developments in the field of human resource management. Nathalie Faber is an expert in the field of human resource management. So in the interviews with the first two the emphasis was more on the learning, while in the interview with the latter the emphasis was more on the people that are learning.

A semi-structured interview approach was used for these interviews. The interview guide can be found in appendix A. The topics that were addressed in the interview were learning ambitions, learning processes & learning routines.

KLM Experts

Nine experts within KLM were interviewed to gain insight in learning at KLM. These experts are listed in figure 9.

This group of experts was selected as they have knowledge regarding learning & development at KLM, human resource management at KLM and the management of learning at the Digital Transformation and the Digital Frontend departments.

These people were interviewed using a semi-structured approach as well, using the same interview guide as for the external experts. The topics that were addressed in the interview were learning ambitions, learning processes & learning routines. The difference with the interviews with external experts is that the goal in these interviews was to gain insights in these topics in the context of KLM rather than in general.

Literature Review

Literature was reviewed to examine if the findings from practice are grounded in theory. The topics of learning ambition, learning process and learning routine were used as starting point for the review as these topics together provide a comprehensive image of a learning process.

An individual persperspective was adopted in the study. Theories on learning were reviewed to develop understanding of the learning process. In this review multiple perspectives, such as psychological and pedagogical perspectives were included to gain theoretical as well as applied knowledge.

Subsequently, theories on performance were reviewed to be able to link the insights on learning to the professional context. In this way organizational learning was approached focusing on the individual employees.

Theories on routine were explored to gain insights in how learning in the work environment could become routines.

In general in my approach I aim to start from the foundations of learning. Therefore a psychological perspective on learning and performance are included in the study and also it is the reason for including not just the learning ambitions, but also the underlying talents and motivations in the study. By getting to the core of individual learning, I aim to gain new insights in its application in the organizational environment.

ROLE	COMPANY	EXPERT ROLE
Founder & Creative Director	CSS Breda	Workplace Learning
Founder & CEO	Effectory	Knowledge on Digitals & Human Resource Management
Founder & CEO	Minddistrict	(Digital) Workplace Learning
HR Manager	Minddistrict	Human Resource Management

Figure 8.
An overview of external experts interviewed.

ROLE	DEPARTMENT	EXPERT ROLE
Career Development Coach	Transition Center	Personal Development
HR Program Manager	Learning & Development	(Digital) Workplace Learning
Education Expert	Learning & Development	Workplace Learning
L&D Consultant	Learning & Development	(Digital) Workplace Learning
Consultant L&D Innovation	Learning & Development	(Digital) Workplace Learning
Consultant HR Business Development	Human Resources	Knowledge on Digitals
Consultant IT Innovation	Digitization	Knowledge on Digitals
Manager Digital Frontend	Digital Frontend	Knowledge Digital Frontend Department
Product Manager 'The Future of Rostering'	Digital Transformation	Knowledge Digital Transformation Department

Figure 9.
An overview of KLM experts interviewed.

LEARNING BASICS

To create some basic understanding of learning, this paragraph will be dedicated to explaining the essence of learning and types of learning.

Essence of Learning

Learning emerges through interaction or transaction with the environment (Jarvis, 2010). So, there is an individual, a context and processes. Regarding the individual, there are internal processes in the individual, comprising cognition, conation and emotion (Hilgard, 1980). These processes can be conscious or unconscious. Regarding the context, there are external processes in the environment. Regarding them both, there are processes concerning the interaction between the individual and the environment. This basic situation is depicted in figure 10.

Both individual and environment cause learning conditions. Internal learning conditions are intelligence and learning styles while external learning conditions are the direct environment and nurture (Illeris, 2018).
So, combining the findings of Jarvis (2010), Hilgard (1980) and Illeris (2018), the emotional, cognitive and conative capabilities of a person affect the learning of a person. Over the years nurture has affected these capabilities, while the direct environment provides the direct learning situation.

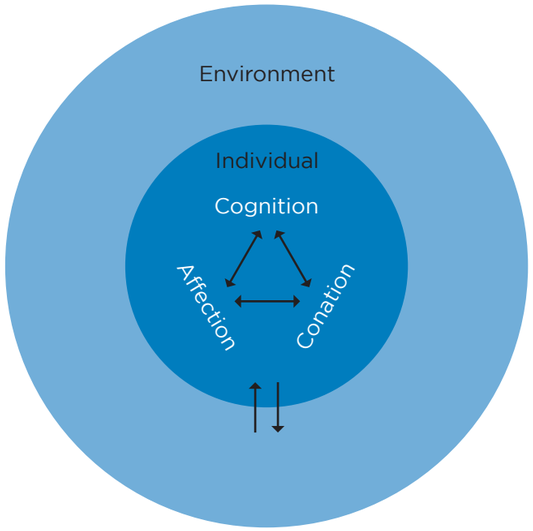


Figure 10. The basic situation in learning: an individual, a context and interaction between them.

Internal barriers to Learning

As explained, over the years the environment has affected the internal processes of an individual, therewith affecting the learning. Besides the learning itself, also the perception of information is affected (Illeris, 2018).

According to Illeris (2018) people have developed defense mechanisms to regulate external impulses. This is necessary to function as a human, but can also obstruct learning. Defense mechanisms are semi-automatic responses that occur prior to learning. The purpose of this is to prevent an overload in volume and kind of influences. The volume is decreased by filtering based on pre-understandings. We filter out certain kinds of influences based on our identity and believes. So, our identity and past experiences shape our defense mechanisms.

Informative & Transformative Learning

Learning is effectuated if it is internalized and affects the cognition, affection and conation. Four distinctive ways can be distinguished in how this happens (Illeris, 2018; Kegan, 2018). Cumulative, assimilative and accommodative learning are three types of informative learning. The fourth type of learning is transformative learning.

Through informative learning we make changes in what we know. Transformative learning concerns changes in how we know. So, the three types of informative learning help us to fill our pools of knowledge, while transformative learning focuses on how we constructed this knowledge. The four types of learning are explained in figure 11 based on the studies of Illeris (2018) and Kegan (2018).

Looking at the figure, each nodes is a bit of knowledge. The links between the bits are the associations we have between them.
In cumulative learning, we add a new bit of knowledge, which we cannot relate to existing knowledge.
In assimilative learning, we add a new bit of knowledge, which is related to existing knowledge.
In accommodative learning, we add a new bit of knowledge, which is related to existing knowledge and even changes the way we used to link the bits of knowledge to each other.
In transformative learning the bit of knowledge we gained helps understanding how knowledge is shaped from the existing bits of knowledge.
So, informative knowledge is about adding nodes, while transformative learning is about understanding the connections.

Both types of learning are valuable as we want large pools of knowledge to tap into and these become even more valuable if we know how this knowledge is constructed and therewith how to use it mindfully.

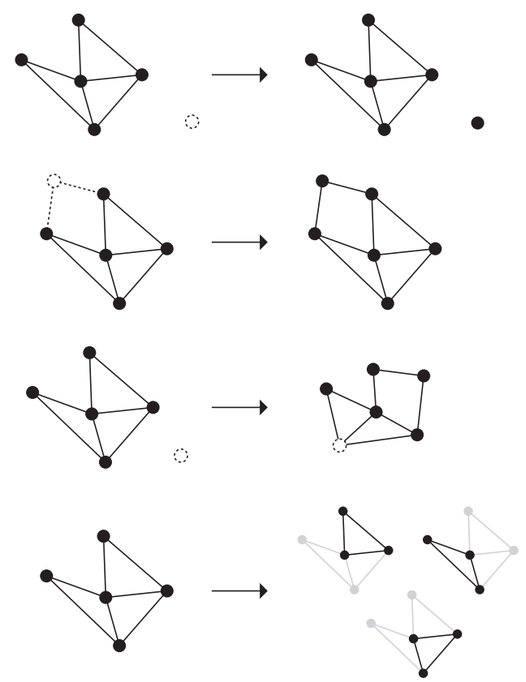


Figure 11. Four types of learning, from top to bottom: Cumulative, Assimilative, Accommodative & Transformative Learning.
The notes represent bits of knowledge that are connected in the brain.

LEARNING AMBITIONS

NEED FOR GROWTH

Twofold Need for Growth
Millenials have a need for continuous growth. A study by Suleman & Nelson (2011) showed that they are committed to continuous personal development. On top of that, learning opportunity even has shown to be a reward to them (Billings, 2004).

The digitals that were interviewed showed this need for growth as well. Their need for growth is twofold: growth in the role someone fulfills within an organization and someone's personal competence growth. An example of the need for professional growth is that multiple participants from Digital Frontend told they wanted to become tech lead. All of these participants declared as well that they wanted to become better at software development, displaying the need for personal competence growth.

Participants from Digital Frontend had a clear career path in mind within the organization. This mainly regarded vertical growth in the existing roles. So for example, as mentioned before, multiple participants wanted to become tech lead. This shows how a clear career path can provides guidance for professional ambitions. At Digital Transformation such obvious career paths did not come up.
Participants showed difficulty defining their ambitions regarding their competences. No guidance like the career paths came up for this.

Personal growth and growth in ones professional role are related, since personal growth is an enabler for professional growth, while professional growth provides new opportunities for personal growth. In this way the co-develop, like illustrated in figure 12. However, while professional growth happens by leaps and bounds, personal growth happens more gradually. For determining a learning ambition, either one of them can be taken as starting point.

Competence-Driven Ambitions
An interview at Digital Transformation showed that competences rather than roles should provide guidance for ambition. A participant studied biopharmaceutical sciences but ended up working as a software engineer. Her explanation was: "I like logical thinking, which is important for both". From this can be derived that people do not like a role, but they like specific activities within roles. Based on what activities a person likes, the best fitting role can be determined.

Moreover, the obvious career paths like at Digital Frontend might change, as experts mentioned that work is changing and therewith people's roles. For example, technological developments will change jobs. Therefore focusing on activities provides more enduring results.

According to experts, in evaluations the described shift results in a purpose- and competence-driven approach. The philosophy behind this approach is the believe that if the competence and motivation of an employee are strong, the results will be good.
This partly held for the target group. In their learning ambitions participants were application-oriented. Often the learning ambition was a specific competence needed to develop a solution. A participant for example said: "I look for theory when I encounter a new problem". This is only driven by directly applicable competences. They showed difficulty defining learning ambitions based on a desired competences.

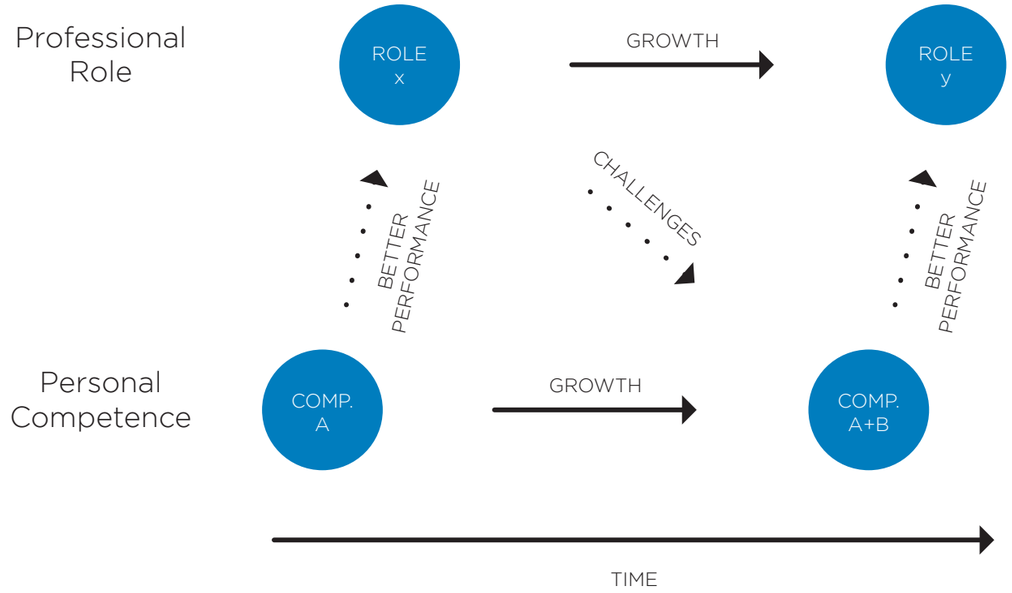


Figure 11. Schematic representation, showing how professional growth and personal competence growth co-develop

LEARNING INCENTIVES

Reactive Learning

Participants did not show to be purposeful in their ambitions. They showed difficulty defining ambitions on what they wanted to do or explained they wanted to focus on their current activities and think about a next opportunity as soon as the current situation is not satisfying anymore. A participant from Digital Transformation said: “I’m happy now and I’ll start looking for something else when I’m not happy anymore”.

The described incentives to learn are mostly in line with Schön’s view on learning. According to Schön (2017) learning starts from a problem or discomfort; Through doubt and critical thinking a problem is defined.

Following from the reactive ambitions participants do not actively seek sources for personal development. The main source for personal development are opportunities that come their way, such as a course or a conference they come across. So learning is based on singular opportunities rather than a structured development plan.

Proactive Learning

The experts in the field confirmed the motive to learn often is reactive, caused by a problematic situation. A more active approach, anticipating possible problems or challenges, is desired.

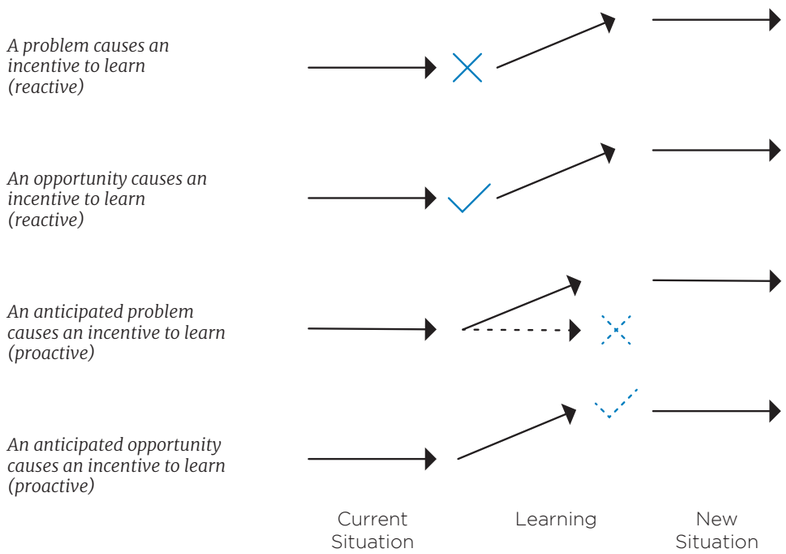
From a pragmatism perspective this is supported. A problem being the incentive for learning lacks future orientation in this view (Shapiro, 2010). Since experience is future oriented in a sense that it contains imagination of consequences (what-if), from a pragmatism perspective learning is driven by the aim to draw an ideal into practice rather than solving a problem. So, in both cases there is a gap between current and desired state, the difference is whether the current state or the desired state is taken as a starting point. Taking the desired state as starting point yields a more proactive approach.

In figure 12 reactive and proactive learning are schematically depicted.

Structural Learning

The proactive approach can be used incidentally or structured. In this study the aim is to actualize continuous learning. Through structured use of the proactive approach, continuously incentives for learning are induced.

Figure 12.
Schematic representation of reactive and proactive learning



Contextual Influence on Learning

Learning is not an isolated process; The environment affects the learning of an individual. Numeral contributions have been made to study the influence of environment on learning.

Amongst others, Lave and Wenger (1991) explain the situated nature of learning. They described learning as being existential, the invention and reinvention of knowledge and dependent on context. They understood knowledge is continually evolving due to continually evolving social, cultural and historical activity systems.

Miettinen (2000) further specified the influence of the context by suggesting that learning starts with a concrete situation disrupting the habitual.

In his writings on experiential learning, Kolb (1984) underlined the importance of experience as well. However, a distinction as opposed to the theory of situated learning is that he discusses real-life situations instead of real-life environments. This is fundamentally different in a way that real-life situations can be simulated in for example classrooms while situated learning inherently takes place in a real-life environment.

Diversity of Perspectives

Engeström’s (2001) expansive learning takes a different approach than learning through experience. A contradiction between perspectives is the starting point of this learning process. In this way the focus is on the differences between people’s activities rather than the difference between states of one individual.

Although participants notified that they learned a lot from peers, they did not mention this as a starting point for learning, but as a solution to a learning need. A possible explanation could be a lack of interaction with people from different disciplines to provide different perspectives.

Since knowledge is situated in the context, learning is based on the contexts people know. However, there are a wide variety of contexts, which people do not know. The approach applied in expansive learning might be a useful method to include a wider variety of contexts as multiple people have experienced different contexts. These different perspectives can help to recognize a (anticipated) problem or opportunity.

Future Situations

Another consequence of the situated nature of learning is that the current situation is inspiring the learning towards the future. A future-like context would cause more future oriented learning. Inspiration regarding possible future contexts could help envision more future oriented ideal states or recognize imperfections in the current state that are currently not recognized.

Shaping a Desired State

In the initiation of learning, the focus should be on inspiring people to envision an ideal future situation. The development of an ideal state might be comparable to generative tools. The purpose of generative tools is to find latent needs (Sanders & Stappers, 2012). Therewith developing an ideal state might be a useful method to go beyond explicit and implicit needs and address latent needs.

Due to the situated nature of learning inspiration for learning is limited. By means of inspiration containing possible future contexts, more future oriented learning might be accomplished. Through dialogue with others, besides familiar contexts also unfamiliar contexts can inspire learning, possibly resulting in a broader spectrum of learning objectives. In figure 13 this process is illustrated. Inspiration from future and unfamiliar contexts are related back to the current situation to stimulate initiation of learning.

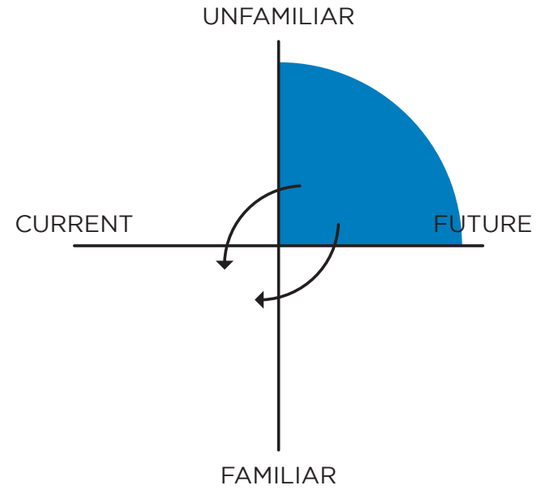


Figure 13.
Unfamiliar and future contexts should be related back to the current familiar context to be able to develop broader and more future oriented ambitions.

PEAK EXPERIENCE

Flow Experience

Participants talked about daily experience rather than achievement while talking about their ambitions. The focus of their ambition was on being satisfied at work. The main factor mentioned affecting happiness at work were colleagues. For example, a participant explained his goal as: "Together, doesn't matter with who you are, putting nice things into work".

In this direction, Csikszentmihalyi (2014) developed a theory of flow. This flow can be seen as the optimal work experience. He suggested that individuals can have a peak experience in which they are fully immersed in an activity. To achieve this state certain requirements must be met. These requirements can be roughly divided into a perceived competence component and a motivation component.

Perceived Competence

The general implication of the perceived competence component is that flow is experienced in case of a high perceived challenge in combination with high perceived personal skills. So, if personal skill is too low for a challenge, it should be developed through, for example, training or experience. If the challenge is too low, it could be increased by increasing the complexity of a task. An important notion in this is that we are considering perception of these elements, so it is not always the actual skills or challenge that need to be adapted, but sometimes it is only the perception of those.

The level of challenge of a task depends upon its complexity. When considering the human brain, complexity could be reviewed based on the cognitive load it imposes on the brain. From this perspective, a couple of suggestions can be made regarding the composition of tasks.

The cognitive load of a task can be divided in external and internal cognitive load (Sweller, 1994). External cognitive load mainly refers to the form of a task, while intrinsic cognitive load refers to the content. Therefore, to affect task complexity, external cognitive load should be targeted. By narrowing down the problem space and/or solution space, task complexity is decreased. This allows for increased complexity of the internal cognitive load.

Intrinsic Motivation

The motivational component basically involves that the activity is intrinsically rewarding. According to self-determination theory three core psychological needs affect intrinsic motivation: Competence, relatedness and autonomy (Ryan and Deci, 2017).

Competence

Competence regards the perception of ability to influence the outcome of an activity. This self-efficacy is shown to increase intrinsic motivation (Bandura, 1982). Positive competence feedback is an effective method to affect self-efficacy. The form of this feedback should be considered, as research has shown that praising for effort results in a different attitude than praising for performance (Mueller and Dweck, 1998). Targeting effort rather than performance improves involvement and learning.

Relatedness

Relatedness concerns having satisfying social connections. This means feeling belongingness and being recognized for one's contribution to the whole.

In the interviews relatedness was also mentioned as an important factor influencing motivation. Participants declared that the people were an important determinant for how they liked their job. A participant stated: "The most important to me is the team, then the environment and content comes third"

Autonomy

Autonomy refers to a sense of volition. The activity should be voluntary and self-regulated to foster intrinsic motivation. The congruence of concrete, task-specific goals with more abstract personal goals contributes to this (Harackiewicz et al, 1998).
During the interviews participants indicated this need for autonomy as well. They explained that they want freedom over and within projects and in decision-making. They mentioned several times that they did not want to be limited in their activities due the organization, a superior or dependencies on others.

Moreover, participants indicated a need for psychological safety. A participant explained he wanted "no eyes in his back", while others talked about trust and confidence. This safety is related to the sense of autonomy.

KLM experts mentioned the need for autonomy in learning. According to them, the initiative of learning should be at the employee. Learning should be voluntary and therefore start from intrinsic motivation. Through inspiring rather than imposing, the employees should be stimulated to learn.

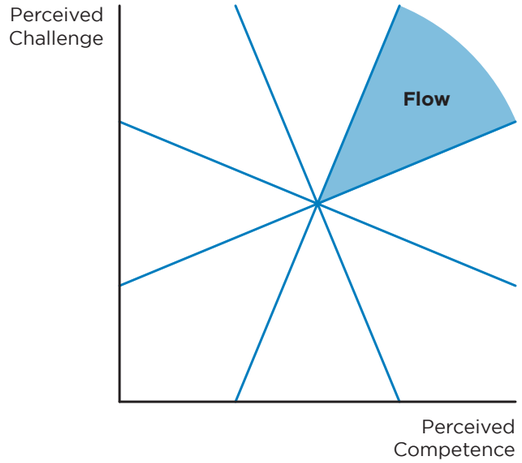


Figure 14.
Flow experience. Adapted from Toward a psychology of optimal experience, by M. Csikszentmihalyi, 2014, Dordrecht: Springer.

Insights

Need for growth

Digitals experience a need for growth. This growth is twofold. They want to develop in their professional role and their personal competence. Since people like specific activities within a role, personal competence should be guiding the direction of their personal development rather than a professional role.

Lack of Structural Approach

Despite the need for growth, a structural approach to learning is lacking. Employees should structurally engage in learning to anticipate challenges or opportunities.

Out of the Bubble

An envisioned ideal state could guide the structural learning. A diversity of perspectives can help to identify challenges or opportunities and shape the ideal state. People shape their visions based on what they know. The knowledge of other people is shaped by different experiences and provides a different perspective. Therefore they can contribute to a more comprehensive worldview to base the ambition on.

Also, a worldview is rooted in the past and present. Future contexts must be included in the learning process to develop competences towards the future rather than continuously lagging behind.

Pursuit of Flow

As a starting point for the ideal state, the concept of flow can be used. Flow is a peak experience in which an individual is fully immersed in an activity. Therefore the ambition is to have such experiences as much as possible.

LEARNING PROCESS & ROUTINES

PRACTICE-DRIVEN LEARNING

Learning from Experience

From the interviews can be derived that most learning is project-based. Either the projects within their jobs and private projects were stated to be important learning experiences. A significant number of participants were working on, related or unrelated, side projects in their own time.

This is in line with the theories of inquiry and expansive learning. According to these theories, which are described in appendix K, projects in practice are guiding the development of new knowledge.

Instrumental Knowledge

The digitals explained that training courses mostly served as means to develop foundational understanding. This method was used in two distinctive ways. In some cases, the theory was directly instrumental to practice as a project was the direct incentive for the training. In other cases, the training was more development-driven and not directly applicable. These trainings often were related to management skills: “Next week I’m doing a management training”.

In line with this, in both perspectives of activity theory and pragmatism, acquisition of knowledge is instrumental to practice (Elkjaer, 2004; Engeström, 2018). In activity theory the tools are the mediating factor between subject and object, while in pragmatism acquisition is instrumental to inquiry. The knowledge referred to in these cases is defined as knowledge that is a stable, existing entity that can be learned from a teacher.

Acquisition of knowledge being instrumental to practice implies that learning should be practice oriented. Acquisition of knowledge should not be a final goal but serving the purpose of establishing the ideal state. To reach this new state, some acquisition of stable knowledge might be needed, and some development of new knowledge will inherently arise.

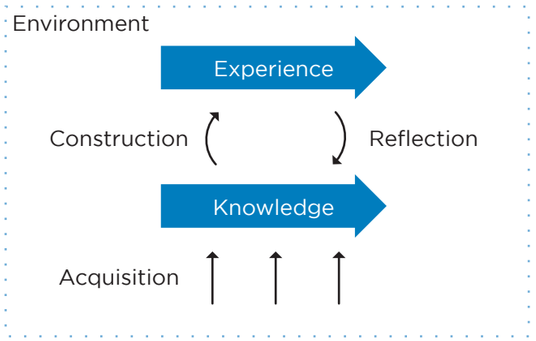


Figure 15. Codevelopment of experience and knowledge.

KNOWLEDGE ACQUISITION

Means-Driven Acquisition

Regarding the instrumental knowledge, participants had difficulty explaining their learning process. They mentioned means to develop, like courses or projects, but not the goals of development. This indicates a lack of goal-directed learning behavior.

Conforming this insight, experts questioned the current ability of employees to manage their own learning process. It was assumed that employees do not know how to learn, let alone from their own ambition. Therefore, management is important in this process.

Moreover, experts at KLM explained the approach to learning at KLM often starts from the mean rather than the end. If an employee needs to learn something, the prevailing approach is to look for a course that fits the need. However, a goal-centered approach to learning is desired, because an informal learning solution might be more effective and often is less expensive as well. This requires a mindset change as people need to think about what is needed to reach a goal rather than think about what course to do next.

Outside of the KLM context, a general shift in the purpose of learning in the professional context was identified by experts, from certificate-driven to competence-driven. Instead of piling up certificates, which is a means-driven approach, learning is increasingly focused on learning to be competent for a job, a goal-driven approach.

Goal-Driven Acquisition

Goal-driven acquisition is beneficial as opposed to the currently dominating means-driven acquisition. As Skiba & Barton (2006) stated: “One should start with the content to be mastered and then figure out what technologies might enable the activity.”

Acquisition of knowledge has been widely studied over the years. This knowledge can be used for goal-driven acquisition. The situation in case of knowledge acquisition is illustrated in figure 17. There is knowledge, a learner and a medium that transfers the knowledge to the learner. This can be any medium that can transfer information to an individual, such as a person or a digital device. Knowledge about these three elements enables someone to shape an effective learning process.

The learning object, the knowledge, can be further defined based on its content and form; The content being the elements of the learning object and the form being the way this information is represented.

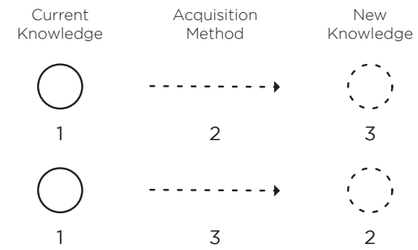


Figure 16. Means-driven acquisition (top) and goal-driven acquisition (bottom).

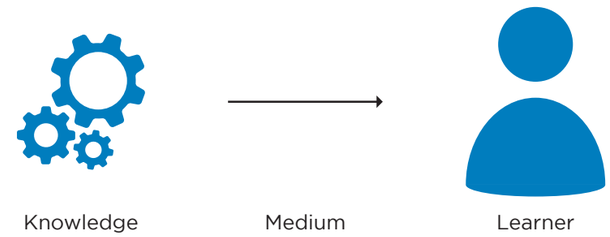


Figure 17. Basic situation in knowledge acquisition, containing knowledge, a learner and a medium.

4.2.3 Optimizing Content

To be able to set concrete goals for learning, it is useful to categorize results. In an attempt to do so, Bloom (1956) distinguished between six categories in the cognitive domain. Krathwohl at all (2002) elaborated on his work and defined a cognitive dimension and a knowledge dimension of learning. The knowledge dimension concerns the nature of the knowledge, while the cognitive dimension concerns how the knowledge is used. Both dimensions are hierarchical and increase complexity and abstractness gradually. The revised taxonomy is illustrated in figure 18.

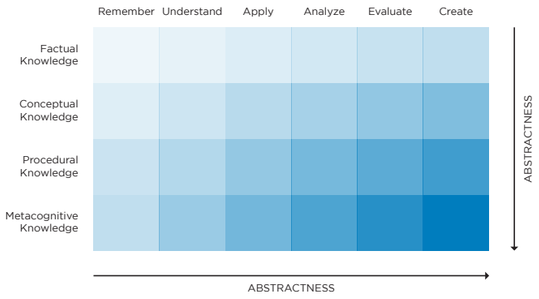


Figure 18. Revised Bloom's Taxonomy. Adapted from A revision of Bloom's taxonomy: An overview, by D.R. Krathwohl, 2002.

Based on the taxonomy can be suggested that the purpose of any learning is to increase abstractness in the cognitive as well as knowledge domain. This general principle holds for either an expert trying to create a product, making use of metacognitive knowledge and a novice trying to remember factual knowledge.

Since the learning object is well-defined, one can determine the desired state and his current state regarding that object in the cognitive as well as knowledge dimension. Based on this, the abstractness can be gradually increased from current to desired state. This graduality is necessary to enable understanding and to prevent cognitive overload as will be explained later.

4.2.4 Appropriate Form

Content of a learning can be represented in different forms to approach different learning styles.

Gardner (1992) described individual differences in learning styles and how they should be approached differently. He distinguished between seven different intelligences and later added three more intelligences, adding up to ten intelligences (Gardner, 2011):

- Linguistic Intelligence
- Musical Intelligence
- Logical-Mathematical Intelligence
- Spatial Intelligence
- Bodily-Kinesthetic Intelligence
- Interpersonal Intelligence
- Intrapersonal Intelligence
- Naturalistic Intelligence
- Existential Intelligence
- Moral Intelligence

The value of this distinction is that it enables a more effective approach to learning. If one is aware of the level of each of these intelligences of an individual, the strategy for knowledge acquisition can be tailored to this. Moreover, it is possible to specifically approach the development of one of the intelligences. So, awareness of own's own intelligences is valuable for effective learning.

Besides what intelligence to approach, also its purpose should be considered. Gardner (2018) identified a three-step process towards understanding. The steps are first creating commitment, then establishing links with the known and finally approaching the core for in depth understanding. These steps require different forms of information.

In the three steps, specific intelligences can be approached. In depth understanding is achieved if an individual is able to transfer the core of the concept to apply it in different situations or represent it in multiple ways.

4.2.5 Appropriate Media

The teacher of the learning object can be anyone or anything that conveys the information. So, a wide variety of media can be used to approach the intelligences.

Mayer (2002) suggested that a combination of verbal and pictorial representations would stimulate more cognitive processes and therewith increase the effectiveness of learning.

Besides using multiple representations, Mayer and Moreno (2003) described how these multiple representations should be used. They claimed that for information to be effectively learned, it should comprise:

- Spatial and temporal contiguity
- Exclusively relevant material
- One representation per sense
- Gradually increasing complexity

In this way the working memory is approached through multiple channels, without causing cognitive overload on one of the channels. This is explained in more detail in appendix L.

EXPERIENTIAL LEARNING

Construction of Learning Experiences

In learning from experience, either the experience or the learning can be central. For example in double loop learning (Argyris, 1977), the experience is the starting point. However, experiences can also be shaped for the purpose of learning. Such learning is often referred to as problem-based learning. In essence, problem-based learning is an active process in which a learner starts with a problem and through individual and joint research gains understanding (Schmidt, 1983). Learning is the goal of these projects. The process is illustrated in figure 19. This approach to learning has been argued to be more effective than conventional methods of learning (Thomas, 2000). Moreover, research has suggested that individuals that have been engaged in problem-based learning methods, demonstrate self-directed learning skills (Blumberg, 2000).

Training students in self-regulated learning has shown to result in improvements in their processes and performance (Azevedo and Cromley, 2004). Although this research was focused on students, it can be assumed that training other individuals in their learning process will yield similar results.

Goal-setting and evaluation affect the performance of various aspects of self-regulated learning. Mastery orientation rather than performance orientation has shown to positively affect aspects of self-regulated learning (Pintrich, 2000). Mastery orientation adopts a focus on capabilities of the self, while performance orientation adopts a focus on outcomes of the task. Besides a difference between mastery and performance goals, also a distinction can be made between process and outcome goals. Schunk and Ertmer (1999) found that the first yielded superior results in the fields of self-efficacy, self-judged learning progress, self-regulatory competence and strategy use.

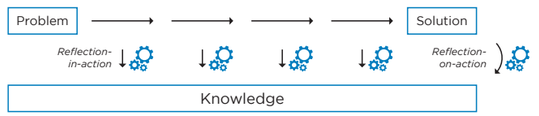


Figure 19. Problem-based learning.

Reflective Practice

Reflection is important in problem-based learning as it helps deriving knowledge from activities and shaping subsequent activities towards the solution.

Kolb (1984) illustrated the relationship between thinking and action in his learning cycle. He described how we interact between concept and experience through experimentation and reflection. In this way thinking and action are separated, and experience is explained as a method to gain knowledge, rather than something existential. This is an inadequate display of reality. Moreover, experience is oriented to the past, which is in contrast to the pragmatists' notion of experience.

Schön (1983) differentiated between reflection-on-action and reflection-in-action. Hereby he distinguished between the process of reflection taking place during an action and the process of reflection on that action afterwards. This notion is more in line with pragmatism than the notion of Kolb.

Based on this notion of reflective practice, the relation between experience and knowledge is depicted in figure 20. Continuous interaction between abstract concept and concrete application take place. Through construction of and reflection on experience, knowledge and experience co-develop.

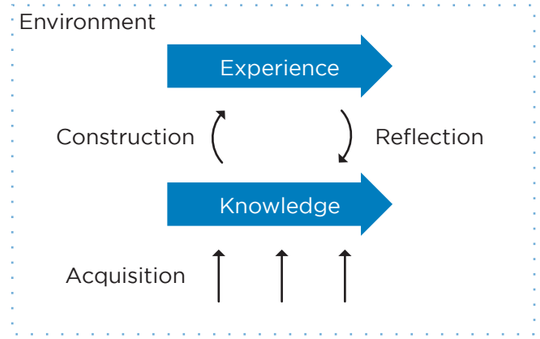


Figure 20. Codevelopment of experience and knowledge.

ROLE OF INTERACTIONS

Interactions for Learning

Digitals pointed out the importance of peer interactions for learning by stating they learned the most from colleagues. Also they described that sometimes personal development is discussed in interaction with colleagues. Besides colleagues, also other interactions like with superiors or other experts were implied to be valuable.

Experts supported this finding and explained making skills and knowledge explicit is important for the learning process. It serves the purpose of becoming aware of one's tacit and implicit knowledge as well as expansion of learning through interaction.

In literature the importance of interactions is suggested as well. Connectivism underlines the essentiality of reviewing knowledge as a network (Siemens, 2004). By connecting dots within the network, which is connecting multiple viewpoints, different, more holistic knowledge is created. Expansive learning is based on similar thinking, emphasizing the value of multiple perspectives for learning.

On the other hand, sometimes employees do not want such interaction on their learning. In a recent project where employees received budget to invest in their own development, anonymity was claimed to be important for employees to develop in line with their own ambition. It ensured employees dared to learn what they wanted without being evaluated on it by their supervisor.

Evaluation on Learning

According to the digitals, in evaluations with superiors, personal development is barely addressed. Experts from KLM explained accordingly that formal evaluations focus on the operation instead of the person. More attention to the person would be beneficial for the organization as well, since this could help employees develop themselves and increase loyalty. Some managers probably do this right, but it should be structured in a way that all of them use a person-centered approach rather than a job-centered approach.

In the evaluation of development, a distinction can be made between evaluation on the learning process or the learning result. Evaluating the learning process is considered more effective by experts, as it is a more constructive approach that helps improving the subsequent learning process.

LEARNING MASTERY

If individuals masters the learning process, they master their own learning. Various learning processes have been discussed. Now we will discuss how an individual can develop mastery of one's own learning.

Self-Directed Learning

Self-directed learning and self-regulated learning are closely linked. Both concern learner control of the learning process and activities (Loyens, 2008). However, self-directed learning is more holistic as it includes control over aspects of the learning environment as well. Despite this difference some findings from research on self-regulated learning can be translated to self-directed learning.

According to Candy (1991) there are four dimensions of self-directed learning: Personal autonomy, self-management in learning, independent pursuit of learning and learner control of instruction. From this can be concluded that a self-directed learner controls the learning objectives, learning process and aspects of the learning environment. Therefore, to develop mastery of ones own personal development, these four dimensions should be addressed.

Metacognition

Metacognition is the knowledge of our own cognition and cognitive processes (Flavell, 1985). Later, Livingston (2003) defined metacognition in the field of learning as "higher order thinking which involves active control over the cognitive processes engaged in learning". This implies that metacognition is important in mastering one's own learning processes.

Livingston (2003) distinguished between two elements of metacognition: Metacognitive knowledge and metacognitive experiences.

	PLAN	MONITOR	EVALUATE
PERSON VARIABLES			
TASK VARIABLES			
STRATEGY VARIABLES			

Figure 21. A matrix combining metacognitive knowledge and metacognitive experiences

Metacognitive knowledge concerns knowledge about cognitive processes. A distinction can be made between knowledge on three types of variables:

- person variables: general and one's own learning processes
- task variables: nature of the task and its cognitive demand
- strategy variables: cognitive and metacognitive strategies and their appropriate use

Metacognitive experience refers to the use of metacognitive strategies. A metacognitive strategy is a strategy to evaluate if a cognitive goal has been achieved, so to evaluate if the cognitive strategy applied has been successful. Based on the study of Olson & Land (2007), I derived three dimensions of cognitive strategies: Plan, monitor and evaluate.

Both metacognitive knowledge and metacognitive experience are important in developing maturity in the learning process. The metacognitive knowledge and metacognitive experiences categories can be mapped to create a table, as illustrated in figure 21. For mastering metacognitive learning, each box in the table should be considered.

Learning Mindset

According to experts, to achieve mastery of continuous learning, an increasing abstractness is desired. Starting from a concrete process this should result in a more abstract learning mindset. In achieving this mindset, first the process should be understood in depth. As soon as the employees truly understand activities in the process, a development from process to mindset will take place. This is illustrated in figure 22.

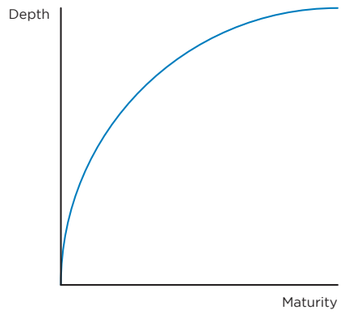


Figure 22. The process of mastering learning. Depth of understanding precedes maturity.

LEARNING ROUTINE

Habituation
We discussed the learning ambition and the learning process. This section will discuss how the learning process can be integrated in the work rhythm.

Situated Routines
To build a routine, Bucher and Langley (2016), suggested two ‘spaces’ being important mechanisms: a reflective space and an experimental space. A space is characterized by social, physical, temporal and symbolic boundaries; In other words, who are part of the routine, where and when does it take place and what interactions does the routine consist of. So, a situation for reflection on routine should be designed and a situation for experimenting with routine.

This focus on situations is in line with findings of Elkjaer (2004). He described that an individual in a context is triggered by the situation, intuitively, emotionally or bodily. Therewith identifying the opportunity to trigger behavior by designing situations.

This holistic approach to routine was implied in the expert interviews as well. Besides when to engage in a specific learning activity, also where to engage in the activity is important. So, for the creation of a holistic routine, the type of activity, time and place should be considered.

Block Approach
At Digital Transformation an 80/20 rule is in effect. This means team members must spend 80% of their time working on the operations, while having the opportunity to spend 20% of their time on their own projects.

One of the participants made a powerful statement about this rule, stating: “Nobody dares to work on it”. This clearly shows the relationship between a learning strategy and a learning culture. If culture is not in line with strategy, the actual application of the strategy is limited as the example shows.

An interesting experiment at Digital Frontend was mentioned. In this experiment, on a Friday afternoon a time block of four hours was reserved for employees to work on an own project. At the end of the afternoon they presented the results to each other. The results of these four hours were promising according to participants.

Scattered Approach
In contrast to the approaches explained above, experts suggested to focus on habitual changes for effective implementation of continuous learning. So, rather than developing a process for employees to apply, small habitual changes could make a large impact by changing the mindset.

Experts at KLM advised as well to aim on making multiple small changes to achieve big impact. She said: “A long timeframe scares people of, it’s better to schedule many short ones”. Therefore, requiring multiple smaller time blocks will probably be more effective than requiring one large time block.

Moreover, habitual planning contains a large opportunity for learning activities according to the KLM experts. Employees often do not recognize learning opportunities due to their way of thinking. For example, if there is a ten-minute gap between two meetings, this is an opportunity for a short learning activity. Currently these time blocks are often wasted.

At Digital Frontend no specific time is allocated to personal development. However, employees can choose their own user stories to work on in consultation with the team. A balance between operational efficiency and personal learning ambitions is attempted to achieve. This offers potential for personal development strategies.

Dittrich and Seidle (2018) suggested that intentionality does not only drive routine change but can also emerge from routine change. Therefore, through changing the routine by designing situations that trigger this change, purposive action can emerge. So the habitual changes do not necessarily have to happen consciously, but can be triggered by situations.

Interactions play a significant role in the design of these situations, since group level reflection is important for routine change (Dittrich et al., 2016). This importance is twofold. Firstly, group level reflection fosters learning, as explained in the theory of expansive learning. Secondly, it requires articulation of knowledge, providing an opportunity for creating a shared ideal situation.

Insights

Learning through Experience
Learning and experience are inseparable. Through learning, experience can be improved and experience is a valuable source for learning.
For development of new knowledge, experience is critical. Through reflection-in- and -on-practice individuals derive learnings from experiences and create new knowledge.

Effective Acquisition
Acquisition of existing knowledge is instrumental to developing new knowledge through experience. For effective acquisition of knowledge, learners must have understanding of the characteristics of the knowledge, the teaching medium and themselves.

Valuable Interactions
In both learning from experience and acquisition of knowledge, interactions have an important role. They add knowledge and different perspectives to the learning processes. Therefore the management of interactions in a learning process significantly affects the learning.

Learning Mastery
The effectiveness of developing and acquiring knowledge depends on the learning ability of an individual. If an individuals become better at learning, their growth will accelerate. There mastery of the learning process is important. By mastering the learning process, people become better in self-directed learning.

Integrated Learning Routines
Besides the quality of learning, also the regularity of learning affects growth. To ensure regular engagement in learning, learning routines must be shaped. For developing effective learning routines, the focus should be on habitual changes to integrate learning in the work routine.

GROWTH FRAMEWORK & DESIGN OBJECTIVES

Based on the insights from the research section, I developed a theoretical framework. I will explain this framework in steps.

The Foundation
The basis of the framework is a continuous interaction between learners' personal competence and their learning ambition (see figure 23). As I explained in the research section, personal competence in activities should guide development. Based on the current condition of the personal competence learners develop learning ambitions on how they want their personal competence to be. In shaping these learning ambitions they go through a process. The learning ambitions give direction in the development of the learners; It answers the question: What do I learn? Then the learning ambition is actualized through a learning process. In this way the personal competence is extended. The learning process answers the question: How do I learn?
This process of defining learning ambitions and actualizing them through a learning process takes place at a certain place and time: the learning context. That context is the answer to the question: When and where do I learn?

The process from personal competence to learning ambition has been discussed in chapter 3, while the process from learning ambition to personal competence has been discussed in chapter 4. Including findings from these chapters in the framework generates the conceptual framework in figure 24.

Defining the Learning Ambition
The process of defining learning ambitions starts from the initial personal competence. From research was derived that competence rather than roles should be driving learning ambitions. This competence is not an isolated object. The competence of a learner is rooted in a situation consisting of the learner in a context.

In the process of defining learning ambitions, the learner and the context are analyzed separately and then findings from both are combined to create a fit and define the learning ambitions.

As I explained before, learners should seek flow, so the learning ambition should help reaching this state.
As I explained before, two person-related factors affect this flow: perceived competence and motivation. Therefore knowledge about these two elements is included in shaping the learning ambitions. Instead of motivations, interests are used, because intrinsically motivated behaviors are an expression of a person's interests (Deci & Ryan, 2010).

One context-related factor affects flow: perceived challenge. Therefore knowledge on what challenges could arise from the context is included in the process towards learning ambitions. As explained in the research section, this context analysis should be future oriented and diverse perspectives should be included.

When knowledge on these aspects has been gathered, it is combined in the learning ambition. These learning ambtions describe an aspired personal competence of a learner in a context. This aspired personal competence is build from the interests and competences of the learner and the fit with the future context.
The learning ambition gives direction to the learning process.

Actualizing through the Learning Process
The learning process starts from the learning ambition. Based on the ambition, learning activities are planned, monitored and evaluated to develop personal competence. In the research section is explained that these three activities are important in mastering the learning process.

Besides, it is explained that knowledge on the learner, the learning task and learning strategies are important for effective learning. The knowledge on effective acquisition or creation of knowledge from the research section, must be applied during the planning, monitoring and evaluation.

Exploiting the Learning Context
As I explained in the research section, the learning context affects the learning. Therefore the process is visualized within a learning context. An important factor in this context affecting the learning are other people. Gathering people in the learning context and involving them in any step of the process can improve the results. Their experiences and perspectives bring new knowledge to the table that can inspire or sharpen ideas.

Building a Learning Routine
The framework depicts the process of competence-driven learning. The purpose of this project is to develop structural engagement in learning. Therefore a routine of going through this process must be created.

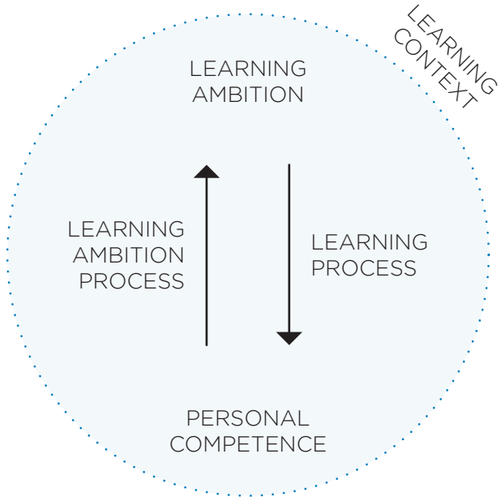


Figure 23.
A basic representation of the competence development process, serving as a basis for the conceptual framework.

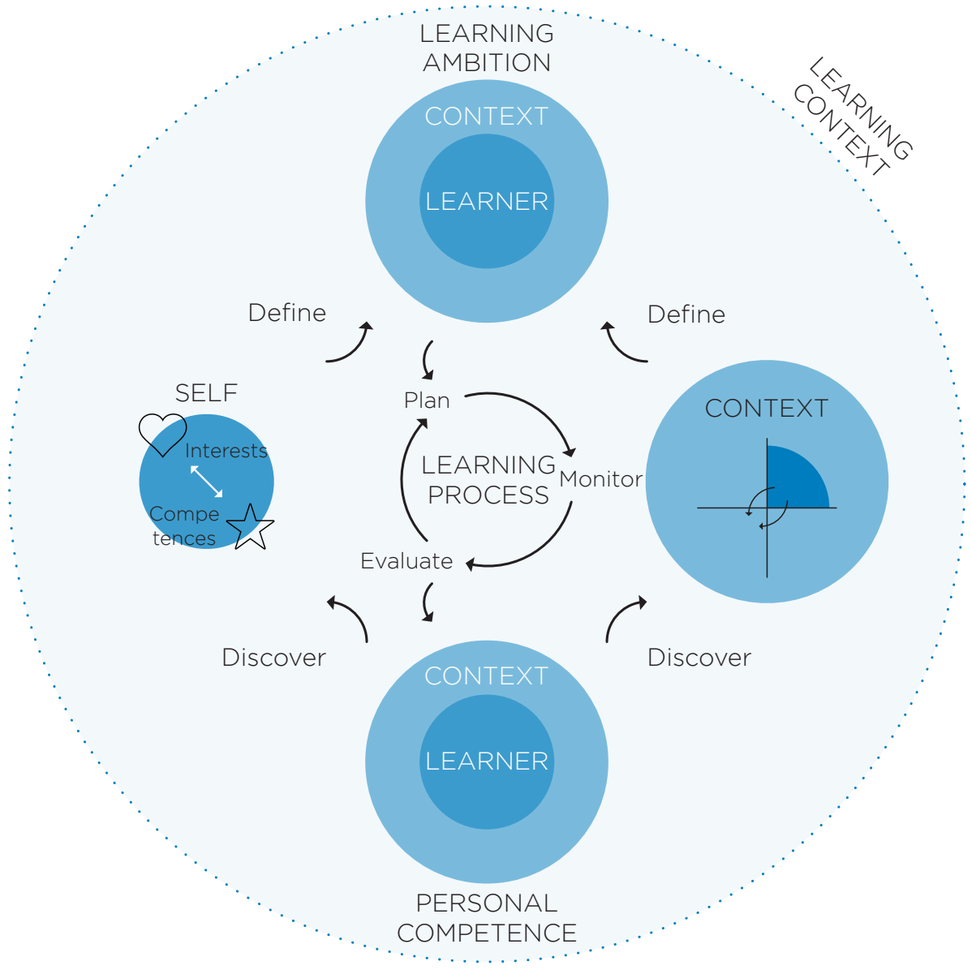


Figure 24. A conceptual framework, depicting a continuous process of defining and actualizing learning ambition to extend personal competence, taking place in a learning context.

DESIGN OBJECTIVES

Based on the research phase I composed design objectives. An overview is provided in figure 26.

As can be seen, I defined three pillars that are all three needed for optimal actualization of the vision. These pillars are based on the conceptual framework. People with ambition refers to the process of shaping learning ambitions, which is needed to give direction to learning. Competent learners refers to the learning process for actualization of the learning ambitions. The enabling environment refers to the learning context that must be supportive to the learning. Looking at the basic representation of the framework in figure 25, people with ambition refers to the upward process, competent learners to the downward process and enabling environment to the circle.

Focus on the ambition
Due to the limitations of the project, it was decided to focus on one of the pillars: People with Ambition. The other pillars are out of scope for the design phase.

To me the first pillars is the logical decision to focus on first, because I think giving direction is the first step in realizing effective learning. Without direction, a competent learner is effectively learning the wrong competences. If there is an appropriate learning ambition, at least the right competences are learned. Learning them effectively is the next step. An enabling environment is the third step to me, because if people do not know how to learn, a supportive context is worthless.

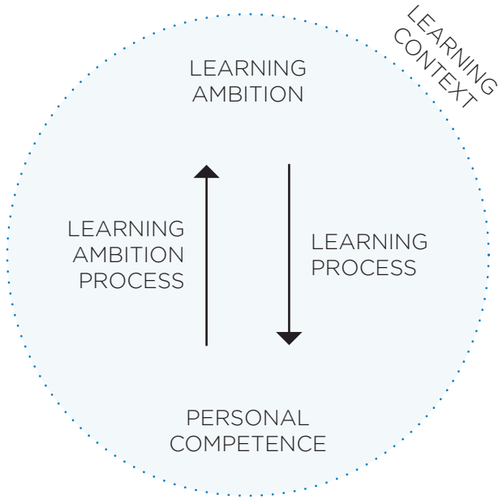


Figure 25.
A basic representation of the competence development process, serving as a basis for the conceptual framework.

PURPOSE		
Enabling people to be their best selves		
VISION		
A way of learning with self-driven, continuous and goal-oriented growth		
PILLARS		
People with Ambition	**Competent Learners**	**Enabling Environment**
OBJECTIVES		
Structural engagement in developing activity-centered ambitions that fit the person and the future context	**Employees' mastery of their learning process towards continuous goal-oriented growth**	**An environment in which self-driven personal development is part of the work routine and the right resources are available to actualize growth**

Figure 26.
An overview of the purpose, vision, pillars and objectives of this project.

DESIGN SPRINTS

DESIGN APPROACH

In the design phase I adopted an iterative approach. The purpose of this approach was to learn fast by building prototypes and testing them with users. In this way I could validate assumptions and reflect on my direction in an informed way a couple of times in the design process to pivot if needed. Each iteration yielded findings, gradually shaping the final design.

In the next section, I will explain for each design sprint, the design of the prototype, the setup of the sessions, the goals of the sessions, the method and the results.

The Framework as Foundation
Findings from the research phase are the basis for the design of the prototypes. Looking at the conceptual framework in figure 28, one can see that three components are included in shaping learning ambitions. These are the learner's interests and competences and the context. In all prototypes these three components shape the process towards the fourth component, the learning ambitions. In the schematic representation of the first prototype in figure 27 this is depicted. These components do not change over the various prototypes, but their content does. Throughout the iterations the process of defining interests, competences and the future context as well as translating them into actionable learning ambitions is improved.

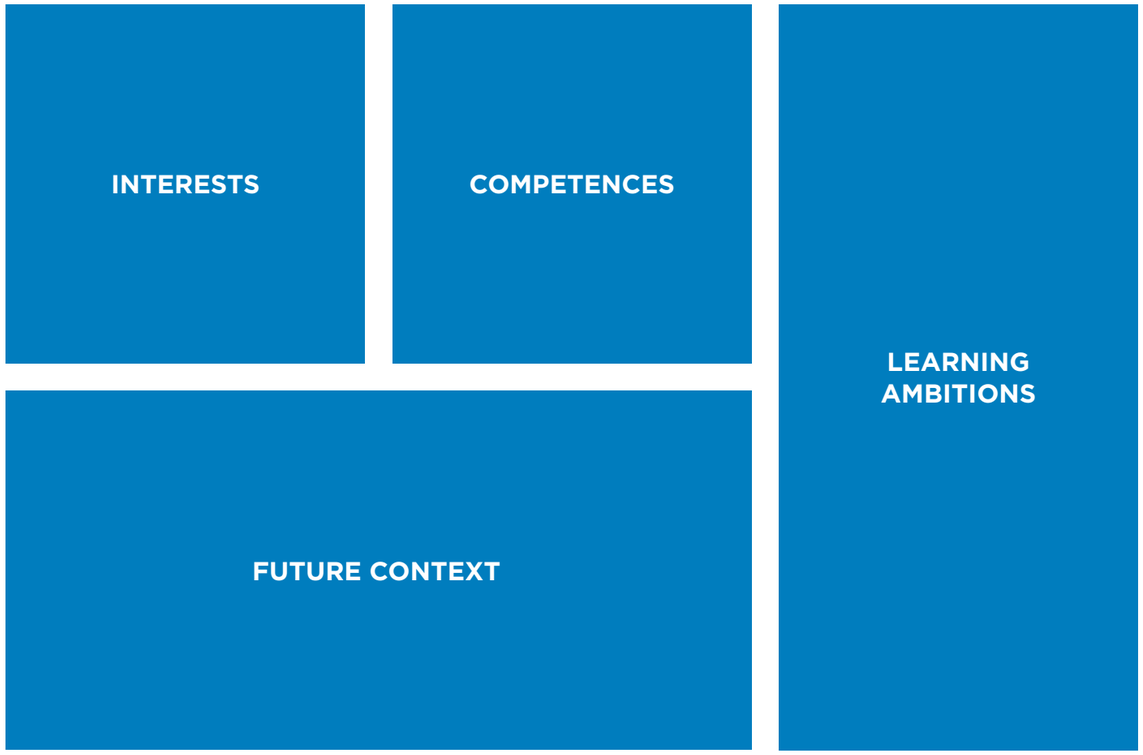


Figure 27. A schematic representation of the first prototype, showing the sections of the canvas.

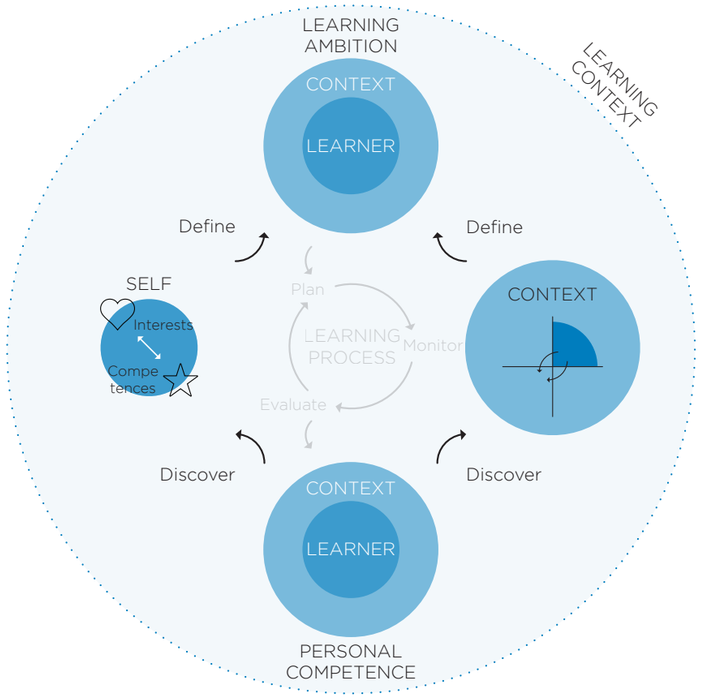


Figure 28. The conceptual framework with a focus on the process of ambition development

FIRST DESIGN SPRINT

In the first iteration I started with developing a vision and from there developing a concept. I had a brainstorm session with four people to generate a large quantity of creative ideas. The inspiration from this session was used to create a first prototype. This prototype was tested in three sessions with digitals that are not employees of KLM.

Design of the Ambition Canvas

The first prototype can be found on page 44 & 45.
As explained before, the basis for the first prototype is shaped by the four components, interests, competences, future context and learning ambitions. The first three components shape the ingredients, while in the learning ambitions section these are used to define learning objectives and actionable user stories.

The processes within the sections I designed to start from specific input from the user's daily experience. Starting from this specific input the process should guide the user towards the interests, competences and future context.

In the skills section I made a categorization in breadth, depth and foundational skills. This was based on the need for T-shaping at the Digital Frontend department.

In the context section, future context is addressed rather than the current context. In this way I aimed to create more future-orientation. Also, a definition of the future context is not the final outcome. I added one step, relating the future context to ones job. In this way I aimed to filter the outcomes, only leaving the relevant elements of the future context.

In the ambition section, users are asked to select outcomes from the other three sections and combine them in an ambtion. In this way I aimed to achieve integration of the components in the ambition.

The process from ambtion to objectives to user stories I designed this way to ensure a goal-driven approach. Moreover, through the way of questining I aimed to generate competence-driven objectives.

Besides, by ending up with user stories I aimed for integration in the work routine. As explained in the research section, the work routine of the target group is based on sprints of two weeks in which they plan and execute user stories from the sprint backlog. By creating such user stories for learning ambitions as well, they could be directly added to the sprint backlog. In this way learning could become part of the existing work routine.

I designed the prototype to fit on an A3 paper. In this way there is one overview which could function as a conversation starter, stimulating conversation on people's development.

The implementation of the design is of significant importance. I designed the canvas to be used quarterly, to ensure the backlog stays filled and employees engage in defining learning ambitions structurally. Moreover, employees must be with at least one other employee when using the canvas. As explained before, interaction can help improving the process and outcomes.

Setup of the Sessions

Three sessions with respectively one, three and two participants were held. The participants of those sessions are listed below in table 29.

Goals of the Sessions

The goal of the sessions was to gain insights in three aspects of the prototype: the outcomes, the process and the form.

Outcomes

To test the value of the prototype, the outcomes were analyzed. This analysis was twofold. First it was analyzed whether the interests, competences & future context are linked to the ambition and objectives. Secondly the user stories were analyzed based on four criteria:

- Specific and actionable
- Measurable
- Outcome-related
- Relevant to the objective

Process

Besides testing the value of the prototype, the goal of the sessions was to gain insights in the content and the form of the solution. Three layers can be identified for the content: The individual assignments, their interaction shaping the different components and the interaction of the different components shaping the overall process. For each of these layers, three aspects were tested:

- Users know what to do
- Users are able to do it
- Users understand why they are doing it

Form

Regarding the form of the solution the goal was to gain insights in the advantages and disadvantages of using a canvas.

Method of the Sessions

After a short introduction explaining the purpose of the session, the participants were asked to fill in a template (see appendix C, D & E). The third group was asked to write down their ambition, before starting with the template. Also the third group was provided with an additional list of skills and a trend canvas (see appendix E). The participants were allowed to discuss the assignments with each other. Also they could ask questions to the facilitator. After finishing the template the process and activities were discussed to derive insights from the participants' experiences. The sessions lasted for about 1,5 hour.

ROLE	AGE	EXPERT ROLE
Premaster Student Computer Science	22	External Digital
Masterstudent Strategic Product Design	26	External Digital
MSc Strategic Product Design	25	External Digital
MSc Strategic Product Design	26	External Digital
MSc Strategic Product Design	24	External Digital
MSc Strategic Product Design	24	External Digital

Figure 29.
An overview of the participants of the first iteration.

ME

3 IDENTITY

How do these elements relate to you as a person?

2 SPARKS

What elements in these items sparked that interest?

INTERESTS

What are your interests ?

- How do the sparks represent your interests?
- What interests follow from your identity?

4

5 FOUNDATIONAL SKILLS

Basic skills you need as a KLM emloyee

What foundational skills do you consider important for you?

For example:
- Communication
- Teamwork
- Problem-Solving

BREADTH SKILLS

Skills that broaden your field of expertise

What breadth skills do you consider important for you?

Think of skills of:
- Suppliers
- Teammates
- Other Departments

TALENTS

Looking at this variety of skills, how would you briefly describe your talents and weaknesses?

6

DEPTH SKILLS

Specialist skills you need for your expertise

What depth skills do you consider important for you?

Think of skills of:
- Yourself
- Colleagues
- Specialists in your field

1 INSPIRATION

What have you seen/ heard/ read/ done lately that you found interesting?

For example in:
- Articles
- Talks
- TV shows
- Podcasts

What have you seen/ heard/ read/ done lately that demonstrates a trend towards the future?

For example in:
- Articles
- Talks
- TV shows
- Podcasts

2 FUTURE ELEMENTS

What trends for innovations do these items demonstrate?

FUTURE VISION

5

How do these developments and emerging needs shape your vision towards the future?

3 NEEDS

Which emerging human needs do these innovations fulfill?

4 VALUE DRIVERS

What developments in the world are driving these changes?

Think of:
- Societal developments
- Technological developments
- Industry developments
- Scientific developments

PROFESSIONAL IMPLICATIONS

6

How does this future affect your role as a professional?

Think of:
- Activities
- Possibilities
- Limitations
- Responsibilities
- Dependencies

FUTURE SITUATION

FUTURE ME

1 INTERESTS

Which of your interests would you like to develop?

DESIRED SKILLS

Looking at the skills and your talents, what skills would you like to acquire/ improve?

3 AMBITIONS

Based on your interests and skills, describe what you aspire to be / do / be able to do in the future context

In 2 years I aim to be ...

FUTURE CONTEXT 2

How does the changing context affect what you like to do and what you are able to do?

4 OBJECTIVES

List 3 key objectives to realize your ambitions

1 2 3

5 USER STORIES

For each objective, list smart goals (in the form of user stories) that help you achieve this objective

Roël Tibosch

SECOND DESIGN SPRINT

In the second iteration the vision and concept direction did not change significantly. I improved the execution of the concept, based on the findings from the first iteration. The second prototype was tested in a session with digitals working at KLM.

Design of the Prototype

The final canvas of the second prototype can be found on page 48 & 49.
Based on the findings from the first iteration, I developed a new prototype. I will describe the main changes here.

First of all I changed the form of the prototype. Instead of one canvas, I designed a booklet for the interests, competences and future context sections and a canvas for the ambtitions section (see figure 31). By creating a step by step process, I aimed to resolve unclarity participants experienced regarding the process. Moreover, the ambition canvas could still function as a conversation starter.

Secondly, I changed the input for the competences and future context section. I designed probes to make it easier for participants to generate input. For the competences section these probes were cards depicting competences while for the future competences section a trendcanvas was used as probe (see figure 32 & 33).

Thirdly, I made small changes in the processes within the sections. In the interests section I removed the step of relating interests to ones identity, because it caused confusion and proved no added value. In the competences section I used different categorization of skills, as the previous categorization caused confusion among the participants.

Finally, I improved the explanation of the assignments and added examples, based on the feedback of the participants.

Setup of the Session

A session with four participants was held. The session was held at the KLM office with four participants from the Digital Frontend department. Three of these participants are part of the target group. The participants are listed in table 30. At the Digital Transformation Department no session with participants was held, but the prototype was discussed multiple times with the scrummaster of one of the teams.

Goals of the Session

The goal of the session was similar to the goal of the first iteration, so the outcomes of the concept, the usability of the process and the form of the prototype were tested using the same analysis methods. No changes were needed in the goals of the tests because the concept did not change significantly.

Method of the Session

After a short introduction explaining the purpose of the session, the participants were asked to write down their ambitions. These ambitions were gathered. Subsequently they were asked to do the exercises in a workbook (see appendix G). They were provided with pictures representing competences and a trend canvas (see appendix G). After finishing the workbook, the participants were asked to fill in the ambition canvas (see appendix F). The participants were allowed to discuss all assignments with each other. Also they could ask questions to the facilitator. At the end, the process and activities were discussed to derive insights from the participants' experiences. The session lasted for about 1,5 hour.

Figure 30.
An overview of the participants of the second iteration.

ROLE	AGE	DEPARTMENT
Frontend Developer	24	KLM Digital Frontend
Frontend Developer	23	KLM Digital Frontend
Frontend Developer	33	KLM Digital Frontend
Scrummaster of 2 Frontend Development Teams	40	KLM Digital Frontend

Figure 31.
A picture of the booklets.

Figure 32.
Tha cards used as probes for the competences section. Each card depicts a competence.

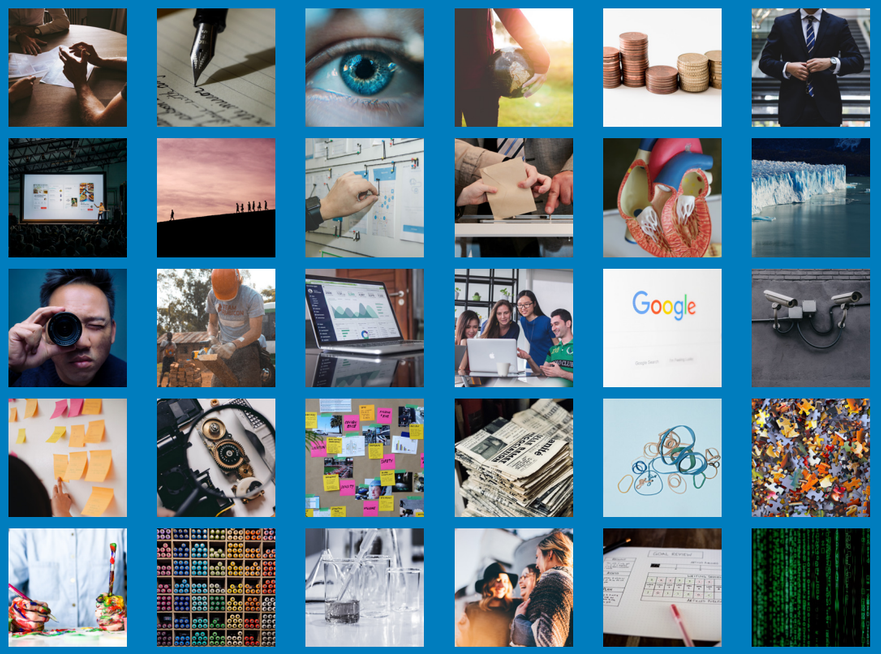


Figure 33.
The trend canvas used as probe for the future context section. Retrieved from The Bigger Picture, by TrendWatching, 2017. Copyright 2017 by TrendWatching.

.....'s Personal Ambitions Canvas

INTERESTS

What are your interests ?

TALENTS

What are your talents and weaknesses?

FUTURE CONTEXT

What will your future professional environment be like?

AMBITIONS

Based on your interests and skills, describe what you aspire to be / do / be able to do in the future context

OBJECTIVES

List 3 key objectives to realize your ambitions

ME STORIES

For each objective, list smart goals (in the form of user stories) that help you achieve this objective

THIRD DESIGN SPRINT

In the third iteration again the process and its activities were improved based on the findings from the previous iteration. Moreover, the concept was improved and extended to provide a more holistic solution. A third prototype was created to test the same part of the concept as the previous prototypes tested. For the other parts a presentation of the concept was created. These solutions were tested in a session with digitals working at KLM.

Design of the Prototype

The ambitions page from the third prototype can be found on pages 50 & 51. The full prototype can be found in appendix H & I .
I build the prototype, based on the findings from the previous iterations. I will discuss the most important changes here.

Firstly, I changed the input for the competences section. Since participants showed difficulty listing skills, in the third prototype they are asked to describe specific moments from their and others' experience in which they did well and did not well. From these moments they could derive competences.

Since participants in the previous iterations complained about ending up with irrelevant interests and competences, I added one exercise to the process. I asked participants to map the outcomes of the interests and competences section. The graph that was used for this mapping can be found in figure 34.

The process of the future context section appeared to be a bottleneck, so I changed the method of analyzing the trends and innovations. Since innovations are built at the intersection of human needs, technological developments and business value, these three elements are used for the analysis (see figure 35).

Furthermore, in the future context section some participants generated outcomes regarding their role and some regarding the solution they develop. Since they both could be valuable, in this design I distinguished between them and asked for both.

In the ambitions section, I made two main changes. First of all I removed the step to define an ambition, because it showed to be redundant. Also I changed the form of the user stories and described this more elaborate as the user stories in the previous iterations did not meet the set criteria.

In the previous iterations, the interaction between participants was limited. Therefore, in this prototype after each section a page was included asking participants to discuss their results. In this way I aimed to stimulate conversation.

To improve transitions between sections and the integration in the backlog, the third prototype is in digital form. However, to retain the possibility of displaying the ambition canvas, the format of the canvas is A3 and appropriate for printing.

A number of small changes were made to improve the understanding of exercises and enable participants to go through the process more smoothly.

Design of the Concept

The concept of this project extends beyond the prototype. The prototypes were used to test the core of the concept and validate the value of the solution. The full concept expands on this basis.

Besides the ambition tool, the concept entails a personal library and a learner network. These elements are gathered in one platform. The personal library is created to enhance the input for the ambition tool and make it more of a routine. The learner network is created to improve interaction and collaborative action on the outcomes of the ambition tool. The importance of such interactions is explained in the research section.

The personal library is a part of the platform that enables employees to save content for the interests and competences section whenever and wherever they want. This content is all saved in their personal library, so they can always access it. In this way employees can build a routine of saving interesting content and personal reflections. rk is a part of the platform that enables employees to build connections with other employees, based on shared interests in their personal libraries or similar learning objectives. As explained in the research section interactions and multiple perspectives are important in learning. The previous iterations showed an additional solution was needed for this.

The personal library and the learner network are explained in more detail in the concept section of the report.

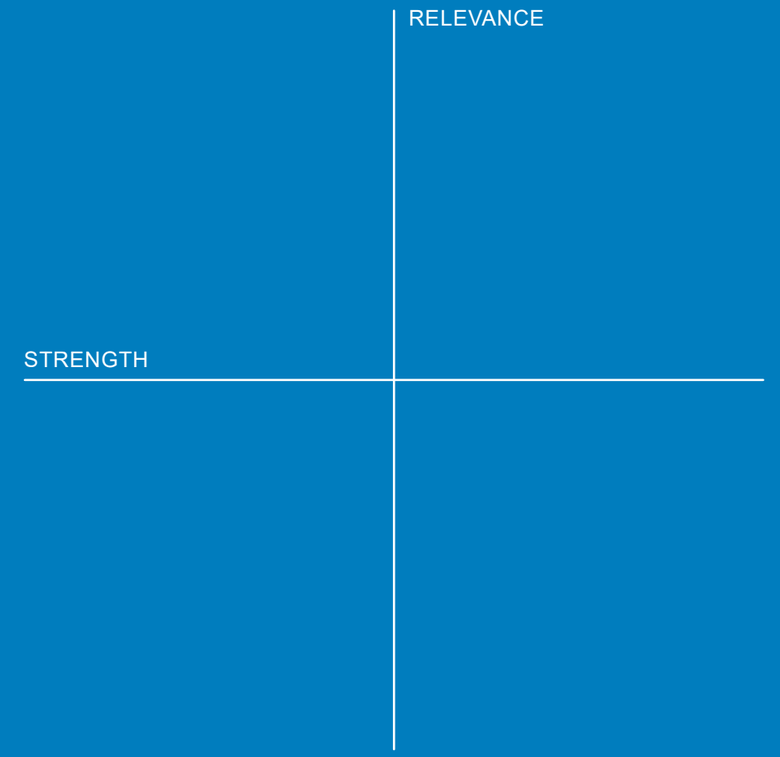


Figure 34.
The graph in which participants can map their interests and competences on strength and relevance

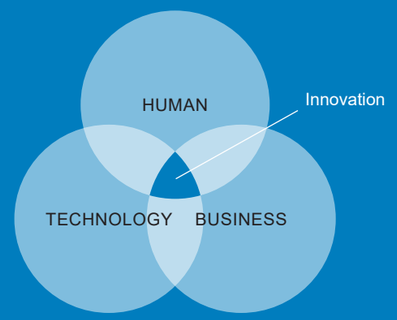


Figure 35.
Innovation takes place on the intersection of human, technology and business.

Setup of the Session

A session with the same four participants from Digital Frontend as in the second iteration was held. The setup was similar to the previous session too.

At the Digital Transformation department again no session with participants was held. However, the lead scrummaster of the department, who is a digital, had tested the prototype individually. Based on that experience we discussed the prototype and concept. These were also discussed with the scrummaster of one of the teams.

Goals of the Session

With regard to testing the prototype, the goal was similar to the goal of the previous iterations. So, the outcomes of the concept, the usability of the process and the form of the prototype were tested using the same analysis methods.

Regarding the concept, two main assumptions needed to be tested. These assumptions are:

- Employees are willing to develop a habit of saving interesting content and reflections
- Employees are willing to connect to fellow employees

These assumptions are the core assumptions underlying the personal library and the learner network.

Method of the Session

After a short introduction explaining the purpose of the session, the participants were asked to sit down in pairs. They were then asked to use their laptops to do the exercises in the digital workbook (see appendix NUMBER). They could discuss the assignments with their partners.

After finishing the workbook, the full concept was explained to the participants using a storyboard (see figure 36). The concept was discussed with the participants to derive insights in their attitude towards specific elements of the concept. In this way the assumptions were tested.

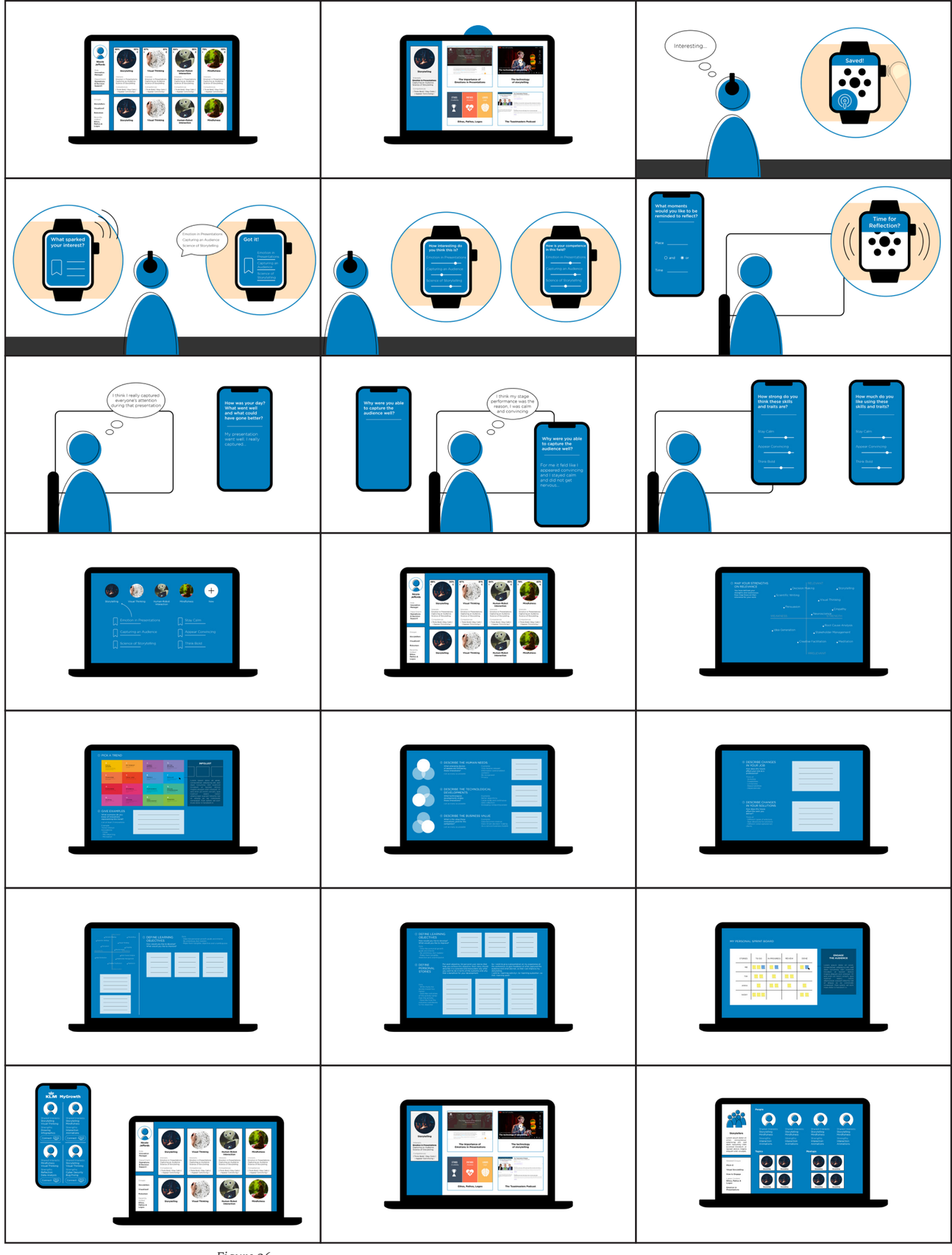
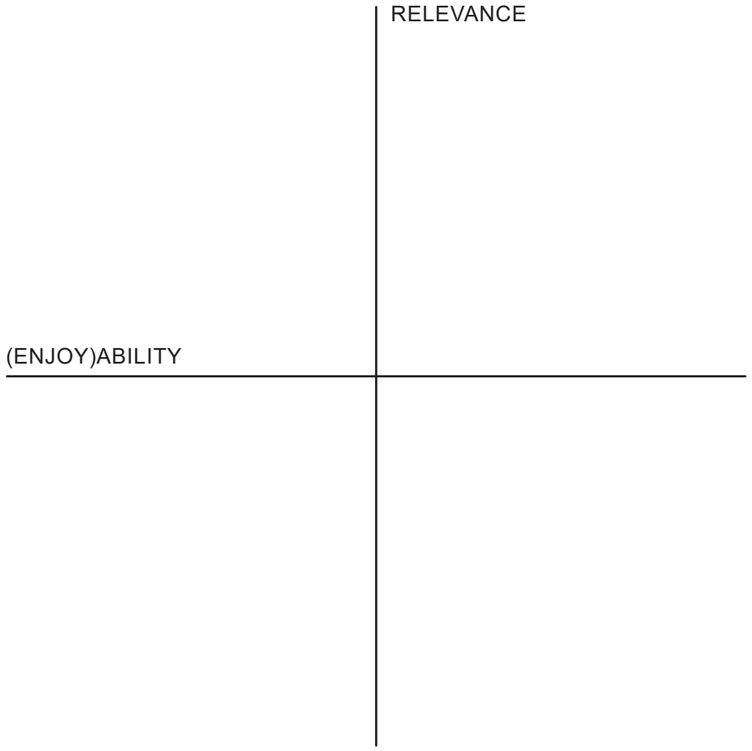


Figure 36.
The first iteration of the storyboard explaining the concept, showing first the personal library and how it is created, then the ambition tool and how it is integrated in the work routine and finally how employees connect through the learner network.



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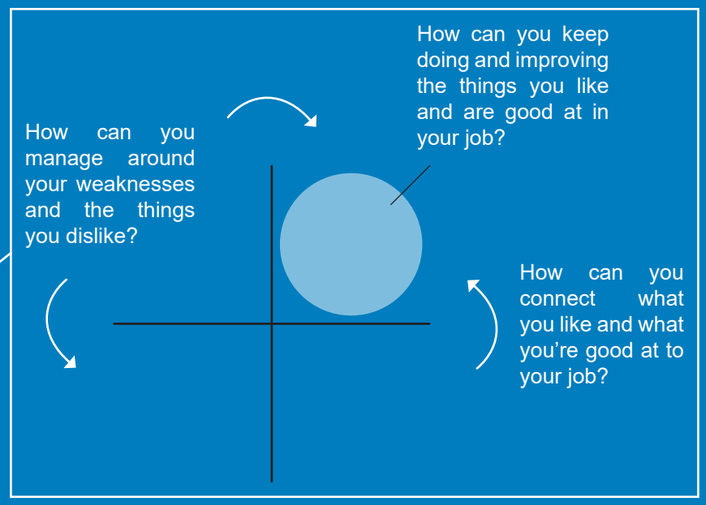


+ **FUTURE CONTEXT**

① DEFINE LEARNING OBJECTIVES

How would you like to develop?
What would you like to improve?

Do's:
- Describe personal growth goals and intents
- Be ambitious, but realistic
- Make them tangible, objective and unambiguous

Roël Tibosch

LEARNER INSIGHTS

As explained in the sections on the design sprints, the prototypes were tested on three aspects: the outcomes, the process and the form. Besides, in the third iteration two main assumptions underlying the parts of the concept that are not included in the prototypes were tested. The most important results are described in this section. A detailed description of the results per session can be found in appendix J.

Outcomes

Methods

To gain insights in the value of the outcomes, the data generated by the participants is analyzed. As explained before, three aspects were analyzed. First of all, in one of the sessions in the first iteration and in the session in the second iteration, participants were asked to write down their ambitions at the start of the session. These ambitions were compared to the ambitions at the end of the sessions. Secondly, it was analyzed whether the interests, competences & future context are linked to the ambition and objectives. Thirdly the personal stories were analyzed based on four criteria:

- Specific and actionable
- Measurable
- Outcome-related
- Relevant to the objective

Comparison of the Ambitions

The comparison of the ambitions before and after using the prototypes showed that due to the process the ambtions became more specific. A good example of this are the ambitions defined by a participant in the second iteration.

Ambition before:
"Share knowledge with other developers"

Ambitions after:
"Learn more about AI and machine learning, data science and how to apply this as a front end developer to give our clients a better experience."

Besides being more specific, for most of the participants the ambitions after using the prototypes were more elaborate. For one participant the ambition at the end of the session was totally different than before the session.

Analysis of the Ambitions

The canvasses or pdf's filled out by the participants are displayed in appendix NUMBER. Color marks show how interests, competences and future context are represented in the learning ambition and objectives.

From this analysis can be concluded that nearly all learning ambitions and objectives included elements of the interests, competences and future context sections. This shows that these elements of the process contribute to the definition of the learning ambitions.

Analysis of the Personal Stories

The results from the analysis of the user stories are summarized per iteration in this table:

Criteria \ Iteration	1	2	3
Specific & Actionable	28%	64%	47%
Measurable	39%	59%	40%
Outcome-Related	25%	9%	7%
Relevant to the Learning Objective	94%	100%	100%

Figure 37. The percentage of personal stories meeting the criteria per iteration.

For each iteration the percentage of personal stories meeting a criteria is shown. A couple of conclusions can be drawn from this.

First of all, the data show that the personal stories resulting from the process barely are in the right format. This means either the participants did not understand the instructions for the format, they did not read them, or they did not follow them. A different communication mean, coaching or training could solve this problem.

Mainly writing outcome-related stories should be targeted. The criteria of being outcome-related is lacking for the vast majority of stories. Employees tended to describe actions rather than their outcomes.

The relevance of the personal stories for the learning objectives they are serving is almost without exception present. This shows some goal-directed behavior in formulating personal stories.

Participants' Quotes

Besides these analysis methods, also some quotes of the participants showed the value of the outcomes. A few of the examples are explained here.

A participant explained that the processes of defining interests, competences and the future context helped defining his ambition. He stated after filling in the ambition section: "This was really easy to do, after you filled in this *(pointing to the booklet)*".

Another participant explained going through the process was an eye opener: "Quite confronting that everything I fill in has nothing to do with my current study".

Also a participant gained an idea for a project while going through the process. He said: "I got a new idea for a project, but is was by luck". This idea for a new project originated from combining the trend with his work. He claimed is was luck, because he could have chosen a different trend. Yet, without the prototype he would not have had that idea.

Finally, a participant provided an interesting example to show a value of the process. After finishing the interests section, he said: "One of my outcomes is sports, but that is not relevant for KLM". After which he toned down his statement: "Although, health at work is becoming more of an issue". Finally, he ended up composing a learning objective regarding health at work, based on the interest in sports.

Process

Findings on the process of the prototypes were gathered from the answers of the participants and their behavior while going through the process. This behavior includes their talking and questioning, the speed and quality of their answering and their attitude towards exercises. The main insights that I derived are explained here.

General

The iterations helped improving the general usability of the prototypes. In the first iteration the explanation of the assignments was short. Participants explained they needed more explanation and mainly more examples. In this way, throughout the iterations, the usability improved and a participant once again confirmed the value of examples in this: "The examples really helped."

The flow of the process was unclear to participants in the first iteration. One of them asked: "How should I fill this in?". Therefore in the following prototypes the sections were shown one by one. This led to satisfaction among participants: "I like that it is step by step". Also the lead scrummaster from Digital Transformation agreed on this: "To be taken by the hand, through the process was really nice".

During the sessions, the value of interactions was clear. A good example of how peers can help each other learn is an interaction between two participants in the third iteration. A participant replied to an interest of the other: "I read an interesting article on that last week, I'll send it to you".

In the third iteration the setup was slightly different than in the previous sessions. Participants were asked to sit down in pairs while doing the exercises. Also they were given additional external incentives to interact by means of specific instruction to discuss their answers. The amount of interaction during the process increased in this third iteration.

Interests Section

Regarding the input for the interests section, often recollection of this content required some time and effort. A participant in the first iteration told: "I just haven't read anything interesting the last few weeks". However, in the end all participants were able to provide interesting content.

In the first iteration I did not set requirements for the input of the interests section. However, participants only provided work-related contents, because they expected this to be the intention. As a participant said: "I was thinking about what would be expected of me". Therefore in the next prototypes participants were specifically asked to list work- and not work-related contents.

Participants showed difficulty connecting not work-related interests to their ambitions. A participant told: "I need to connect these parts in my ambition, but these parts are not at all connected". In the third iteration, plotting the interests and competences on relevance helped them to differentiate in their approach to different outcomes. The person from Digital Transformation was enthusiastic about this mapping as well, saying: "Very interesting how you mapped them on relevance".

Competences Section
Various approaches have been tested for generating input for the competences section. In the first two sessions with users, they were asked to write down relevant skills without support. Since, they clearly struggled with this, in the third session of the first iteration, participants were given a list with skills to use for inspiration. Although this simplified the assignment for the participants, it eliminated any own input. To try a middle way, in the second iteration participants were given images representing the skills on the list. However, the participants barely used the images. In the third iteration participants were asked to recollect moments of (in)competence rather than the competences itself. This helped participants to generate specific input. A participants said about this: "Because of the moments, I was thinking of things from last week instead of last month".

For the categorization of competences various approaches have been tested as well. First a distinction between breadth, depth and foundational skills was tested. This caused a lot of confusion as participants were not familiar with this distinction. One asked: "What are breadth skills, I don't know what I should think about". Then a distinction between soft and hard skills was tested. This still caused confusion, while not showing beneficial for the outcomes. In the third iteration no categorization of competences was used. This simplified the process for the participants, while it did not show to negatively impact the diversity of competences resulting form the process.

Future Context Section
For the future context section, participants in the first iteration had to draw from their own experience. This appeared to be difficult for the participants. Therefore in the second iteration they were provided with a trend canvas. They liked this approach, as one said enthusiastically: "This is a nice thing!". However, they needed additional explanation to understand the trends. In the third iteration a website with trends and their explanations was used. This worked well for the participants: "I must say that it helps quite well, those explanations".

The process of the future context section needed some refinement over the iterations. In the first two iterations participants did not understand all steps of the process. For exampla a participant asked: "What is the difference between Future Elements and Value Drivers?". After changes in the third prototype, participants did not ask question anymore and seemed well able to go through the process.

Although the participants in the second and third iteration were the same ones, they generated different outcomes. As one of them stated: "I've got very different things than last time". This shows the outcome of this section largely depends on the trend that is chosen. For this reason, the lead scrummaster from Digital Transformation suggested to make users choose a trend that is relevant for their job.

Ambitions Section
As explained before, participants barely experienced difficulty with the ambitions section: "This was really easy to do, after you filled in this".
However, from the results of the first two iterations, defining an overarching ambition over the objectives appeared to be a redundant. In the third iteration this step was removed and participants were still well able to define objectives.

The lead scrummaster from Digital Transformation suggested to add an extra step to the ambitions section. She claimed that for each personal story to do's must be composed. The reason she gave was that in this way to do's can be really specific and actionable, while the personal stories can be the bridge between objectives and to do's. The to do's can then be included in the work routine.

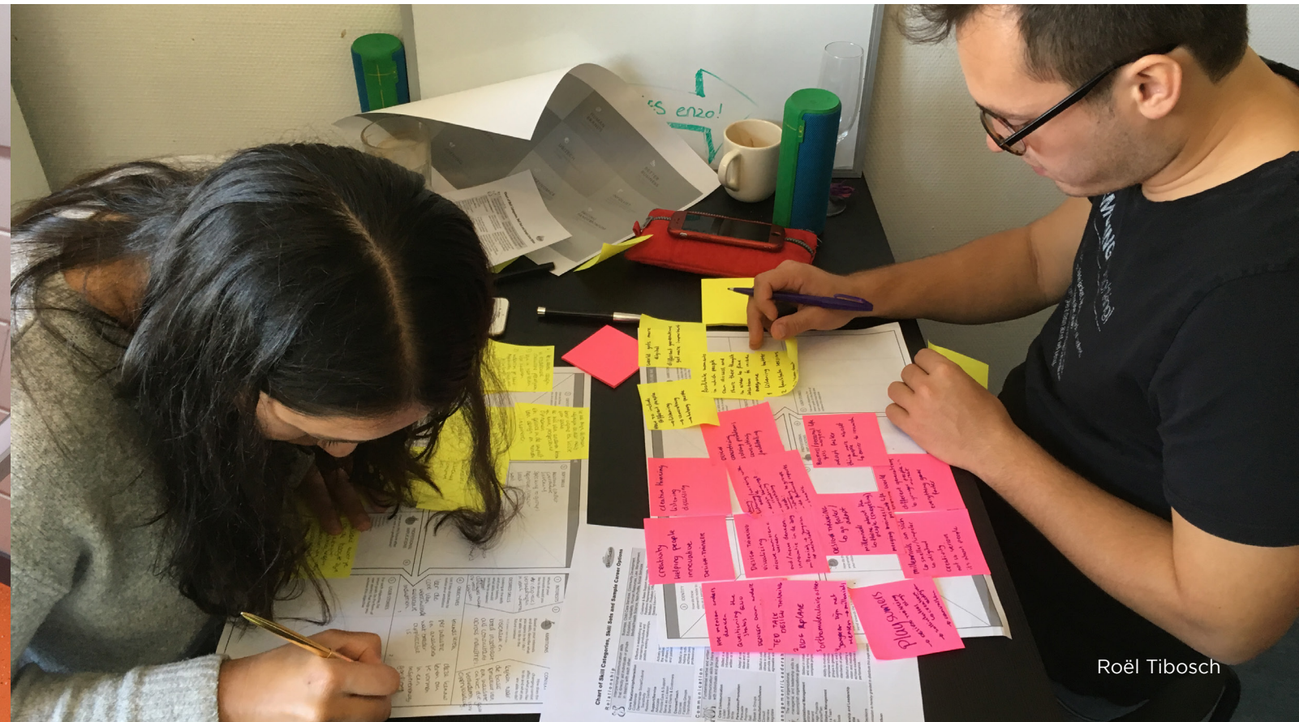
Finally, the participants told they did not want to incorporate the resulting personal stories in their sprint backlog. The main argument for this was that for the user stories applies that "anybody should be able to pick it up". Yet, the participants claimed that "in every sprint, there is time for this", referring to the execution of personal stories.

Form
In the first iteration I used one canvas for the entire process. Participants complained about a lack of space on the canvas, asking: "Where do I need to write?" and saying: "It really annoys me that my PostIts don't fit". The new format in the second iteration solved these problems. However, some participants told they prefer typing over writing: "I'm more of a typing person". The participants liked the digital form in the third iteration. One of them said: "I think the whole thing feels easier because of the typing".

The digital form is beneficial over a printed form because of the integration in the work routine as well. A participant explained that due to the digital form "you can just copy-paste the user stories to the backlog".

Concept
When discussing the concept, a couple or interesting remarks were made. Participants explained that they sometimes save or share interesting content. A participant said: "I do save stuff, sometimes I share things and sometimes I bookmark things". However, they did not use one specific tool to save or share the content. Therefore the content they save or share is spread over numerous applications. Regarding the moment of saving content a participant said: "If I save it, I save it right when I read it".

A Purposeful Way of Learning


Roël Tibosch

Regarding the regularity of reflecting, participants considered daily reflection too often. One said: “I think daily is too often”, on which the others in the room agreed. Weekly was considered fine.

The participant from Digital Transformation suggested a tool to add interesting content for the process anywhere and anytime. She suggested this just before I explained the concept. Hereby she showed a need for a solution like the personal library in which interesting content can be added anywhere and anytime.

Participants showed interest in connecting to peers. For example while still explaining the concept, a participant interrupted and said: “It would be cool to connect it to Meetup”. Also a participant showed the intention to connect to others: “I think I would meetup with people”. Yet another participant said when discussing the whole concept: “That community is really interesting”.

Finally, the feasibility of the concept was discussed with the participants, since they are experts in the field of software development. One of the participants stated: “I think you could do it in a week”. Another participant doubted this, but agreed that the concept was feasible.

Insights

Valuable Guidance

The guidance through a process of developing learning ambitions proved to be useful. Ambitions defined at the end of the process were more specific and elaborate than those prior to the sessions. Also elements of the process were represented in the ambitions, showing contribution of the steps in the process.

A Useful Tool

Throughout the iterations the tool has been improved based on user insights. The main insights are:

- Specificity is important for users to be able to generate input for sections
- Interesting ideas arise from relating interests, competences and future developments to the work environment
- Due to a step by step process, defining ambitions becomes an easy process

Comprehensive Insight

The sessions showed that different input highly affects the outcomes of the process. Therefore, more comprehensive input results in more reliable outcomes in terms of their fit to the person and context. Regular input can solve this and connects to the behavior of participants as they already save interesting content occasionally.

Interactions

The sessions showed the value of interactions. However, the quantity of those interactions was limited. Participants would like to connect to peers to share knowledge and learn from each other.

MYGROWTH PLATFORM

The final concept of this project is the KLM MyGrowth platform. The platform consists of three components: a personal library, an ambition tool and a learner network.

The ambition tool is the core component of the concept. Looking at the earlier presented conceptual framework in figure 38, the ambition tool involves the upward process of developing learning ambitions. It guides and supports employees through this process.

The personal library enhances the first part of the process of developing learning ambitions. Looking at the framework it improves the process of discovering the interests and competences of the learner. It enables them to save interesting content and reflections anywhere and anytime and conveniently organize it for later retrieval.

The learner network helps in improving the execution of the entire process; the discovery of the self and the context, the definition of the learning ambitions and the execution of the learning process. Looking at the framework, the learner network is in the learning context. It enables learners to connect to other learners or groups. Through interaction learners can then inspire or sharpen each others thinking in any step of the process.

In its entirety the platform helps employees to discover and develop their learning ambitions and therewith give direction to their personal development.

The platform can be used on any device: personal computers (e.g. laptops & desktop computers), portables (e.g. smartphones & tablets) and wearables (e.g. smartwatches, smart glasses & smart contact lenses).

The platform provides a comprehensive set of applications, but users are free in shaping their own way of using it. This means that users have the possibility to use the platform to its full extent and therewith value, but they can skip functionalities if they want to.

In the continuation of this report the platform and its argumentation are explained in more detail.

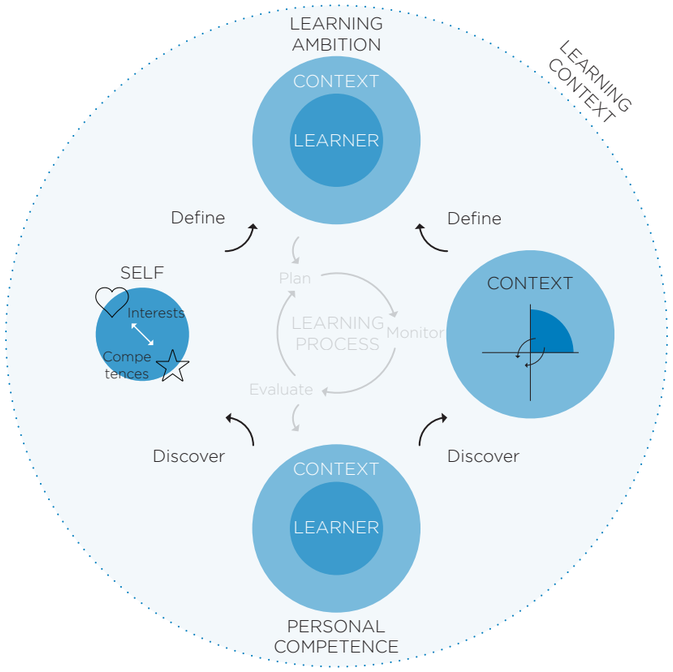


Figure 38.
The conceptual framework with a focus on the process of ambition development

Figure 39.
The personal library, ambition tool and learner network.

PERSONAL LIBRARY

The personal library is one tool for storing and retrieving all your interesting content and reflections, anywhere and anytime.

The personal library is created by users themselves and provides the user with an overview of themes of high interest and competence. Users can see how interested they are in the theme and how competent. Also they can see which of their specific interests and competences are included in the theme. If users select one of the themes, they get an overview of the specific contents and reflections that they added to the library, related to that theme. They can reaccess this content or share it with others.

Moreover, suggestions are provided of related content that might be interesting to the user. These suggestions are based on what content other users added to their library, within the same theme.

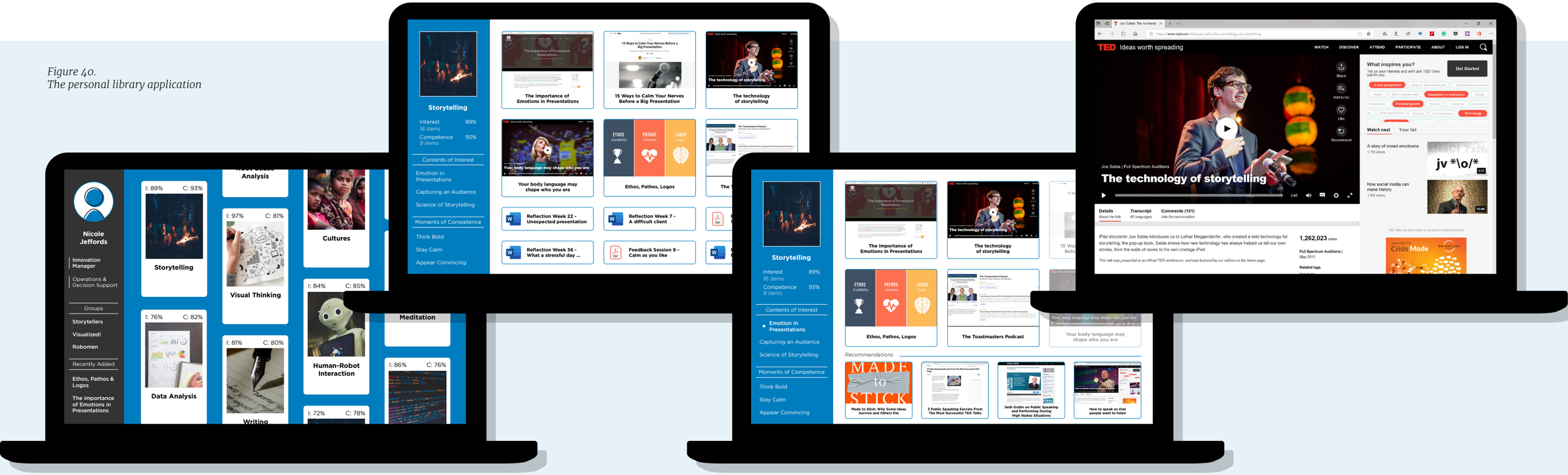


Figure 40.
The personal library application

CREATION OF THE LIBRARY

Capture Contents of Interest
Ideally, interesting material is captured right at the moment of perception. This material can be anything, from a sentence that is read, to a talk that is listened to, to an experience. By capturing it at the moment of perception, the loss or modification of potentially valuable information is reduced to a minimum. Using the personal library application, interesting content can be captured anywhere and anytime.

For example, if a user is listening to a podcast on his/her way home and considers it interesting, the user can store the whole podcast or a specific part of it in his/her personal library by using the application. Depending on the device that is used, speech, gestures or the user interface of the app can be used for this process.

Argumentation
As explained in the research section, knowledge of a person's interests should be considered in shaping ones ambitions. However, many people do not know what they love to do (Grant, 2019). People are not aware of all of their interests. By starting from specific contents of interests, users might discover latent interests and make them explicit.

Moreover, research shows that curiosity of employees enhances a company's performance by inspiring more creative solutions and improving engagement and collaboration (Gino, 2018; Nickisch, 2018). By saving contents of interests it is aimed to tap from the natural curiosity of employees and use it for work-related purposes.

Numerous social bookmarking applications exist nowadays. Examples are Pocket, OneNote, Evernote, Diigo and Pinterest. This shows a need for social bookmarking. However, none of these applications meet the requirements for the personal library. The bookmarking application must be usable across applications, have a convenient interface and must be interactive.

As explained in the results section, users already sometimes save or share content. However, none of them used a standard tool for this. In addition, if content was shared, it was shared in a specific group for which the participant expected it to be interesting. This entails two drawbacks. The first one is that the interesting contents that employees share, is spread across applications, so they do not have an overview of the contents. The second drawback is that by sharing it with a specific group of people, other people for whom it might be interesting as well are excluded. The personal library solves both these drawbacks.

Specify the Inspiration
When content is stored, the user is asked what elements in the content sparked the interest. The elements that are named by the user are used to label the content. Then for each of the labels, the user is asked to give a value from one to ten to quantify the interest in the element and to give a value from one to ten to quantify the competence in that element. All of this data is stored in the personal library.

To simplify this process, artificial intelligence algorithms are used. These provide suggestions for labels, enabling the user to go through the process smoothly.

Argumentation
This process was tested and refined in the three iterations of sessions with users and showed to be adequate.

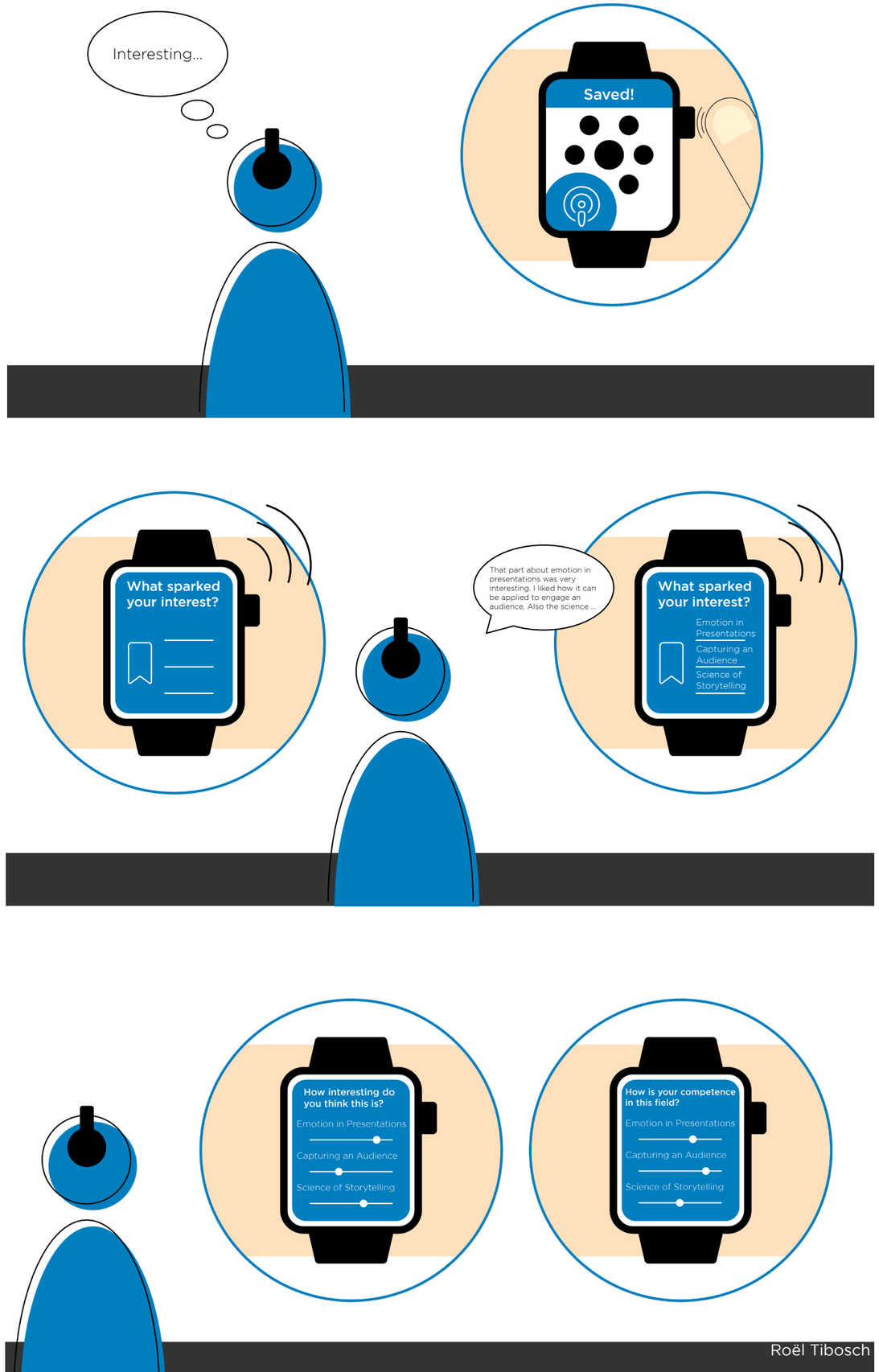


Figure 41. A storyboard showing how contents can be stored in the library. >>

Capture Moments of (In)competence

Besides contents of interest, also moments of (in) competence are captured in the library. Whenever a user is reflecting, specific situations of feeling competent or incompetent are recollected. These moments can be added to the library by shortly describing them in the application, using speech, written input or pictures. Also, in feedback sessions a user can save feedback that is provided to the library in a similar way.

For example, if a user at the end of the day is reflecting on his/her day, he or she can write it down or tell it verbally to the application to save it in his/her library.

The reflections or feedback that are added must be action oriented. Since competence is not something in possession, but something that is expressed through actions, these actions should be described. So you do not say: you are funny. Instead you say: you always make me laugh.

Argumentation

As explained in the framework, a person's competences should be considered in shaping ones desired situation. People should build on their strengths and manage around their weaknesses (Grant, 2019). This shift towards competence-driven development and evaluation is also described in the research section.

As explained in the learner insights section, various methods of generating input for the competences section showed to be inadequate. The sessions provided the insight that a step was missing before listing the skills. This step was added in the form of describing situations. Strengths or weaknesses are not just competences a person has, it are things a person does well or not in situations (Grant, 2019). Therefore they can be derived from situations. In the third iteration this approach was tested and appeared to be adequate.

Finally, as explained before, evaluation is a fundamental element of learning. By asking users to collect moments of (in)competence they inherently are forced to reflect on and evaluate their actions. This enhances the learning process.

Specify the Moments

For each moment, the user is asked to specify the skills and/or personality traits that were involved in that moment. These are the labels. Then the user is asked to value each label from one to ten, quantifying the competence. Also the person is asked to quantify the interest in each label in this way.

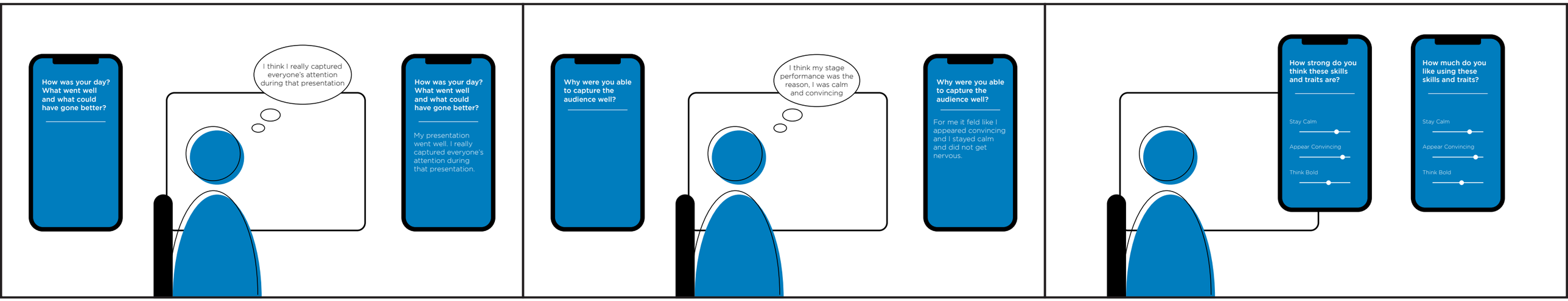
Just like with the interests, algorithms are used to enable a low effort process.

Argumentation

As explained in the research section with the example of the participant that started in the pharmaceutical industry and ended up working at KLM Digital Transform, competences that underlie work activities should be considered to discover a person's ambitions. This is aimed to be achieved through this process. The results from the third iteration indicate this aim to be achieved, as outcomes of the software developers were: "Flexibility", "Knowledge Sharing" and "Decision Making". These competences can be regarded underlying competences of software development.

As explained in the learner insights section, various forms of categorization of competences have been explored. However, the user sessions showed these categorizations caused confusion while not proving added value. Therefore, no imposed categorization is included in the final design.

Figure 42.
A storyboard showing how moments of (in)competence can be stored in the library.



Cluster Strengths & Weaknesses

An overview of the interests and competences resulting from the contents of interests and the moments of (in) competence is provided in the personal library. A user can cluster the interests and competences to create activity themes. The quantification of interest and competence for each item in a cluster is combined to determine a person's interest and competence in the theme. In this way an overview is created of the strengths and weaknesses of an individual. A strength is defined as an activity of high interest and high competence.

Half-Life of Data

To keep the strengths and weaknesses comtemporary, input data expires after a while. People's strengths and weakness develop over time. Therefore old input should not affect the degree of interest and competence in themes as much as new input. Therefore the degree to which the input is included in the calculation of the percentage of interest and percentage of competence gradually decreases until it is left out. The input will remain accessible in the library though.

Argumentation

The approach for the creation of the personal library can be compared to a research approach. In the previous actions, concrete input was analyzed. This final step is the synthesis of the data from the analysis. This synthesis helps to gain insights from the data.

The rationale of the definition of strengths is that a strength is an activity that strengthens you and a weakness is an activity that weakens you (Beard, 2019). If a person is competent in an activity, but dislikes it, the activity will probably deplete the person and which will cause a drop in performance. Therefore I do not consider it a strength.

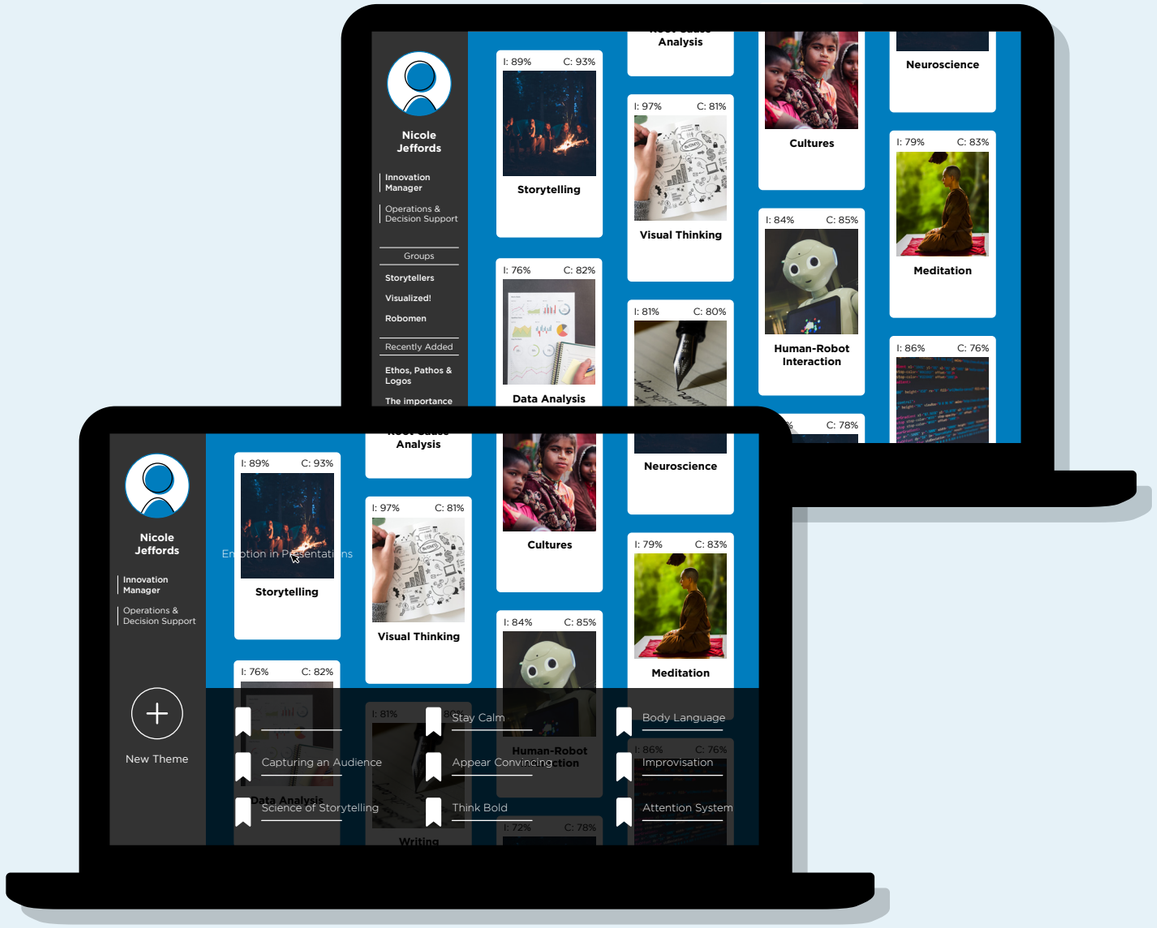


Figure 43.
Clustering the data in the personal library

Build Your Routines

As explained users can store interesting content and personal reflections anywhere and anytime. However, this does not naturally become a routine. Therefore the application helps users in shaping such routines. For the contents of interest and the moments of (in) competence, different approaches are adopted.

For shaping a routine of storing contents of interests, the key is in the storing part. Employees digest sufficient contents of interest. The behavior that is lacking meanwhile is storing these contents. Therefore the application structurally sends notifications to the user while one is browsing the internet or using specific applications. These are applications for which it is probable they are being used for consuming information. These notifications become more accurate as the system learns from the behavior of the user. A user is able to turn these notifications off or decrease the regularity.

For shaping a routine of saving moments of (in) competence, the evaluation of moments as well as saving these evaluations must be considered. Many users do not have a routine in which they regularly reflect upon their actions. Moreover, teams discuss biweekly during a retrospective what could have gone better in the process. However, they do not reflect and give feedback on individual performances. Therefore a routine in which users reflect and gather feedback regularly must be shaped.

In the application, users can choose how regular they want to reflect and gather feedback. Not just moments in time can be set, but also places. This means that one can for example choose to be reminded each Friday at 5 p.m., but also for example always while traveling. Then the application gives notifications to remind the user of providing input. In this way a routine can be shaped.

Not just individual, but also group routines can be shaped. Groups can be created and with these groups specific moments can be chosen for feedback sessions, just like for the individual reflection moments.

The minimum regularity for input regarding interests as well as competences is quarterly to ensure input is generated for the learning ambition tool. However, it is strongly recommended to have more regular input. In that way a more comprehensive image of a user's interests and competences is developed. The standard settings of the application are to send notifications for saving content each time an application is used, for reflecting weekly and for having group evaluations biweekly.

Argumentation

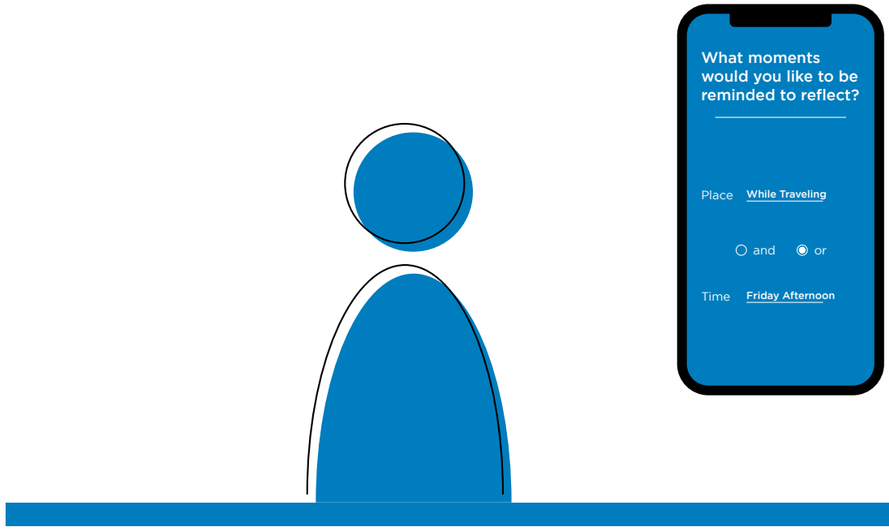
Research has shown that memories are reshaped each time we recall them (Schiller et al., 2010). Therefore it is valuable to build a routine of immediately storing contents when they are perceived. As described in the insights section, if digitals store or share content, they do so at the moment of perception. However, they store just a limited part of interesting content they come across.
The reshaping of memories also implies that reflection should take place sooner rather than later after an activity. So, one should reflect regularly. In the research section is explained that the participants currently did not do this.

Moreover, in the research section it was explained that habitual changes are an opportunity. Therefore this functionality aims to create a habit loop. A habit loop consists of a cue, routine and reward (Duhigg, 2012). The cue is given by the application in the form of notifications. The routine that must be shaped is providing input and the reward is the personal library and insights in yourself.

Also in the research section it was described that for shaping routines four aspects should be considered: who, what, when and where. These aspects are all considered in this functionality. The subject of the routine is either the individual or a specifically composed group. The routine is reflecting and storing it in the application. The moment and location can be set by the user.

The sessions with users showed the need for regular input as well. In all three iterations, some participants had difficulty recalling contents of interest. In the third iteration, participants were able to recall moments of (in)competence quickly. However, the given input were moments within a period of a week. So to gain a comprehensive image of the interests and competences regular input is desired.

Finally, in the research section is explained that multiple small effort are preferred over one large effort. In the user sessions this was confirmed, as a participant stated referring to input for the competences section: "I think six is a lot". This pain can be solved by spreading the effort through habitual use instead of providing input quarterly.



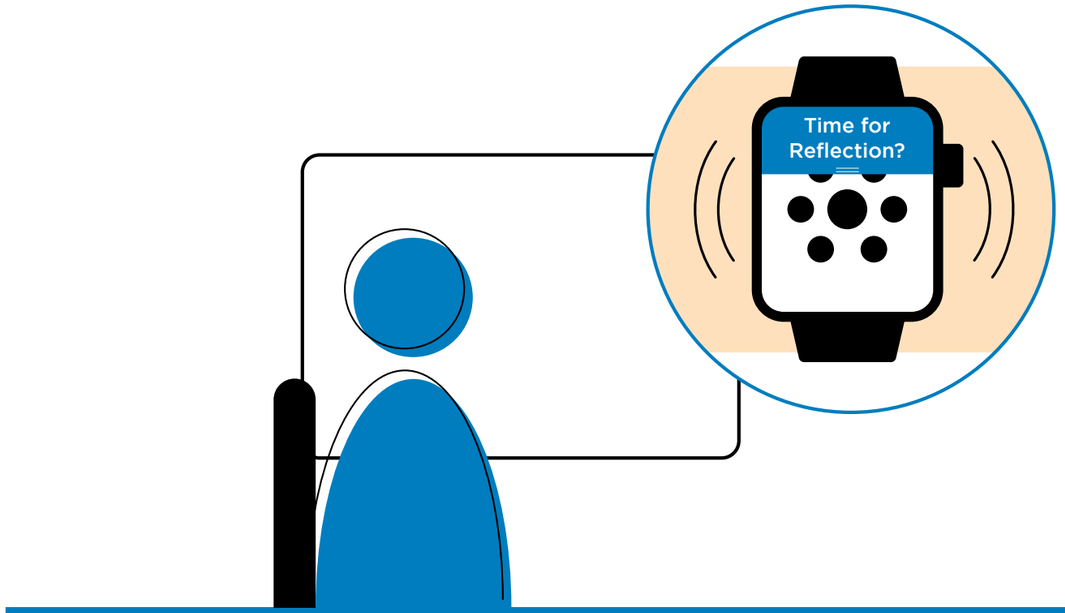


Figure 44.
A storyboard showing how the application can help shaping routines.

AMBITION TOOL

The ambition tool is the core of the concept. It guides employees through the process of developing learning ambitions and supports them along the way. The defined learning ambitions give employees direction in their personal development.

The process to define ambitions consists of three steps: know yourself, understand the future context and envision yourself in the future context. Due to these steps learning ambitions are defined that fit the individual as well as the future context.

The platform should be used periodically; at least quarterly, but it could be more often. In this way the sprint backlog stays sufficiently filled with personal development stories.

The process of the ambition tool has been tested with prototypes in the user sessions.

Know Yourself

The first step in the tool is to gain an overview of the interests and competences of an employee in relation to his or her job. To accomplish this an overview of the interests and competences from the personal library is shown. The user is asked to define the relevance of each item by giving it a value from one to ten. This results in a map showing the strength of each item and the relevance, like in figure 45.

Argumentation

According to Buckingham & Goodall (2019), people are better at improving strengths than in reducing weaknesses, because of two reasons. Firstly, people naturally grow more in areas of greater ability. Secondly, if attention is given to someone's strength, this catalyzes learning, while if attention is given to someone's weakness, this extinguishes learning. So people should mostly work from their strengths. The map that is created here provides an overview of the user's strengths, related to his or her job. This is valuable for a few reasons.

First of all, the user can quickly gain insight in to what extent he or she is working from his/her strengths. If not, one should take action as explained above.

Secondly, if strengths of a user are not relevant for one's work, this can be regarded an opportunity. Gurwin et al. (2018) showed an example of how seemingly unconnected disciplines can yield interesting value for each other. Although this is just an example, more of such cases are evident (Epstein & Gladwell, 2018). The quadrant in which irrelevant strengths are mapped is interesting for this purpose. It stimulates users to think about how they can use their strengths for their job, creating new relations that potentially yield value.

Besides theoretical evidence, the user sessions provide empirical support. As explained in the insights section, participants asked for context to assure relevance. However, instead of limiting the input and losing potentially valuable data, this map was added to distinguish between input. Participants seemed to be content with the solution. One participant said referring to the map: "Oh, I like that one".

Figure 45.
Mapping strengths on relevance to work.

Understand the Future Context

The environment changes continuously. Shaping an ambition for the current context would cause people to always lag behind, as the context has changed when the ambition is actualized. Therefore users have to think about how their role could change.

This process starts with an overview of current trends in the world. This overview is created by a KLM trend watching team or an external trend watching company. The user must pick one of the trends that appeals to him or her. Subsequently the user is asked to describe innovations that are in line with this trend. The personal library can be used for inspiration.

Then the user is guided in the analysis of the trend. This analysis is based on the design thinking circles (Brown, 2008). Innovation happens where human, business and technology meet. Therefore the user is asked to analyze the trend on these three aspects: How are the human needs developing, how is technology developing and how is business developing, creating this trend?

Finally, the user is asked to relate these developments to his/her own profession. By relating the developments to the profession of the user, it is stimulated to think about how the role of the user could change in the future.

Argumentation

In the research section, the need for future orientation is explained. The purpose of this element about the future context is to make people think and talk about how the world is changing and how it might affect their jobs. In this way future orientation is inspired.

Since the purpose is to stimulate thinking and conversation on how the world could change, rather than developing a holistic future vision, only one trend has to be chosen. As explained in the insights section, this causes a high variety in outcomes of the future context section. However, through regular use of the tool, eventually users shape a holistic vision.

In the research section is concluded that competence-driven ambitions should guide development. The value of specific competences might change due to developments in the world. By means of some trend watching employees can anticipate these changes.

As explained in the insights section, the process has been tested and refined over the iterations and showed to be adequate and valuable.

Figure 46.
The future context section of the ambition tool.

Envision Yourself in the Future Context

The final step is combining the insights in oneself and the insights in the future context to shape the learning ambitions. The outcomes of the two previous steps are shown in an overview. Users are asked to compose learning objectives. By means of some questions users are guided in their thinking, integrating the outcomes of the previous steps in the learning objectives.

The learning objectives must meet a couple of requirements. They must be:

- Specific and unambiguous
- Aspirational yet attainable
- Relevant

For each of the learning objectives, the user must draft personal user stories that help achieving the objective. Guidance is provided in drafting these stories by means of clear requirements for the format. The format is as follows:

I want to <learning activity>, to <learning outcome>, so that <learning goal>

Just like the learning objectives, the described personal stories must meet a couple of requirements. They must be:

- Specific and actionable
- Measurable
- Outcome-related

The personal stories are then stored in a personal backlog. This personal backlog is visible for others to enable conversation on the personal stories.

In each sprint planning (biweekly) is determined how much time a person gets to work on personal stories. By means of a strategic decision this amount of time could be standardized. Employees can choose which stories from their personal backlog, they want to include in the sprint, adding up to the available time. These personal stories are not added to the scrum board of the team, but only to an individual's personal version of the scrum board, to prevent confusion.

Argumentation

Throughout their careers, people develop their passions (Grant, 2019). So ambitions are shaped rather than followed. Therefore, they should be redefined regularly. This process helps employees shaping their learning objectives, based on their strengths and developments in their context. These objectives give users direction in their development. By doing this at least quarterly, they can regularly adapt their direction.

As explained in the research section, often a means-driven approach was adopted by employees regarding their development, while a goal-driven approach is more effective. By defining learning objectives and subsequently defining personal stories to reach those objectives, users are guided through a goal-driven approach. As explained in the insights section, the user sessions showed that this approach is effective.

As explained in the insights section, the format of the personal stories did not yet meet the criteria for effectiveness. Some practice and coaching is needed for users to compose effective personal stories.

One of the goals of the project was to create structural growth. Through integration of the personal stories in the work routine this is actualized. In the insights section is explained that integration in the team planning would be confusing, but that there is time for learning in every sprint. The personal sprint planning provides a suitable solution.

To ensure time is alloccated for involvement in personal stories, a reduction of the capacity of the team must be agreed upon. In this way, a set amount of time is available for personal objectives.
Biweekly, during retrospectives, it is validated if the time allocated to personal objectives was actually used for personal objectives.

Psychological safety is required for people to actually engage in learning (Nickisch, 2019). Formalizing learning through allocation of time and creating personal sprint plannings might support the feeling of safety regarding learning.

Finally, as explained in the insights section, this process has been tested and refined over the iterations and showed to be adequate and valuable.

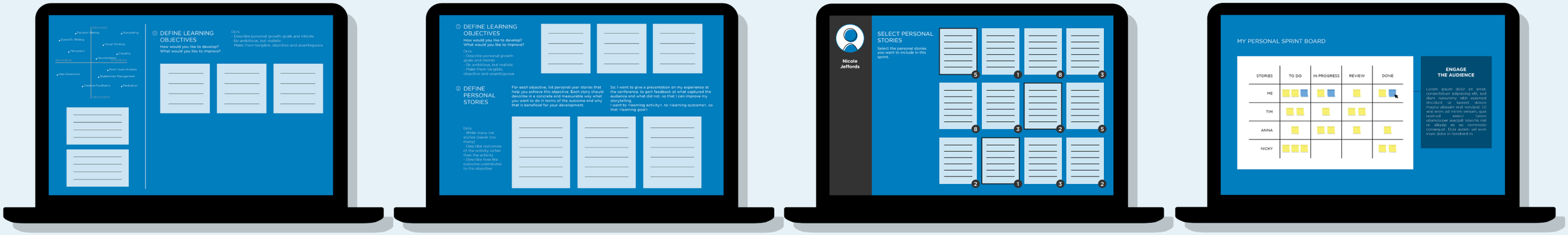


Figure 47.
The process of defining learning objectives and integrating them in a personal sprint planning.

LEARNER NETWORK

As explained before, interactions with others are important in learning. Therefore, using the platform employees can connect to other learners or groups. Through interaction learners can then inspire or sharpen each others thinking in the process of developing learning ambitions or collaborate to achieve those ambitions.

Employees develop connections on the platform in multiple ways.
First of all they can connect based on shared interests. They can see each other's interests and competences and based on that send a connection request. If a connection request is accepted, people can see each other's personal library. Within the library the contents of interests are visible for connections to enhance cross-pollination. However, the percentages that indicate someone's interest and competence are not visible. Also users have the option to keep certain contents private.

Through an algorithm the platform will provide suggestions for connections. These suggestions will be based on shared interests and on contrasting competences. Moreover, the aim of these suggestions will be to connect people from different departments. In this way users with shared interests, but possibly diverse perspectives due to their different backgrounds, will be connected.

Users will be given an incentive to start a conversation after connecting, by means of an overview of the shared interests and specific content from the other that might be interesting.

Another way in which employees connect is based on specific needs. Users can post a request for specific help. For example, a user can ask for someone that can teach him or her a certain programming language. Other users can reply to the request and meetings can be set up. In this way peers can directly help each other achieving their learning objectives.

Besides connecting with a person, also groups can be made. In this way KLM-wide communities of practice can be created, based on interests and competences. In such a group, employees can arrange meetings and share content. The content a person shares in the group is automatically added to the personal library as well.

There is a possibility to extend the community of practice beyond KLM. An option could be to allow the Schiphol Community to use the platform. A different approach could be to connect the platform to Meetup, so that users can create events with peers that are not part of the closed community as well.

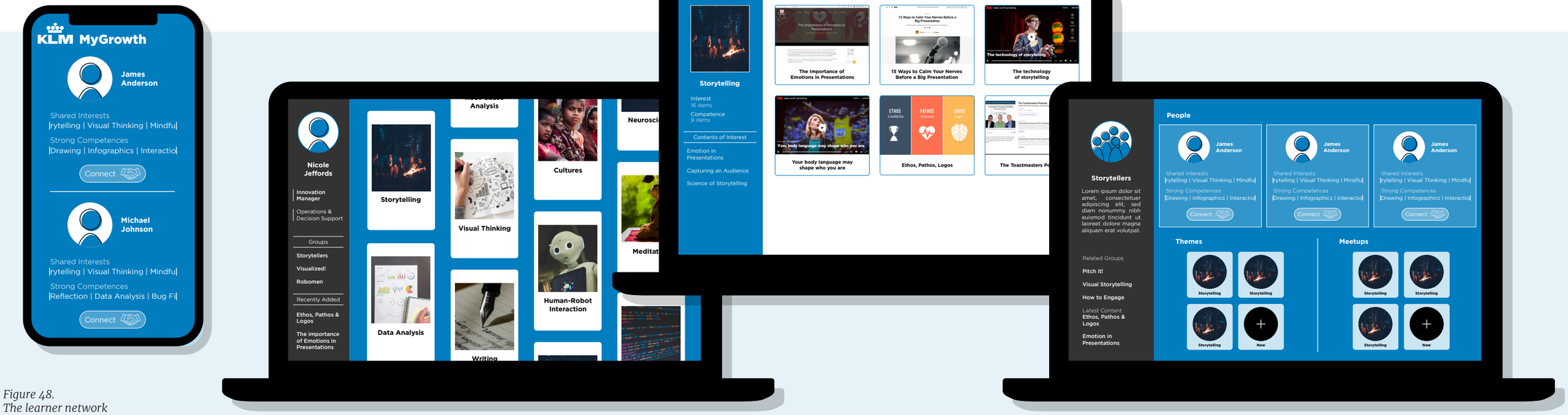


Figure 48.
The learner network

Argumentation
In the research section the situated nature of learning and the value of a diversity of perspectives are explained. Since other people have learned from other experiences in different situations, they can bring a lot of different knowledge and perspectives to the table to inspire or challenge ones thinking. Also, the theory of expansive learning (Engeström, 2018) describes how learning arises from contradiction in perspectives. Therefore, connecting people is conducive for their learning.

As explained in the research section, this was confirmed in interviews as participants mentioned the value of interaction with peers. Besides seeing the value, as explained in the user insights section, users also showed the intention to connect to peers. Taking this broader than the KLM context, the number of users of Meetup is an example showing that there is a need to build connections based on interests.

Besides this, participants already showed sharing behavior. As explained in the insights section, users explained how they already share interesting content sometimes using various media and during the session they actually shared content while discussing an interest.

As explained in the learner insights section, even though the interaction improved in the third iteration, it was limited during the sessions. Participants needed an external incentive to interact. By means of this application people connect based on intrinsic motivation to interact on a theme, because it is their interest. In this way it is aimed to develop more interaction. Platforms like Meetup have shown that there is an opportunity for such ways of connecting.

Building connections based on mutual interest and different competences yields a couple of benefits. First of all, a study showed that networking for the sake of building a professional network makes people feel dirty (Casciaro, Gino & Kouchaki, 2014). This platform offers an alternative way to build a network, shifting the focus to the common interests.

Additionally, the reciprocity principle is also effective with regard to networking (Grant, 2019). So if a person has something to offer for the other person, in this case competences the other does not have, this helps him or her to connect with that person. So if users have different competences, they both have something to offer, possibly resulting in a mutually beneficial relationship.

IMPLEMENTATION & VALIDATION

In this section the relation of the concept to the existing projects at the various department will be described. In this way insights are given in how the concept can be implemented using the existing developments as anchoring points. Moreover, the main stakeholders of the departments involved in this project have been interviewed for a final validation on the desirability, feasibility and viability of the developed solution and its implementation. These stakeholders are listed in figure 49.

Complementing Cornerstone

Currently the Learning & Development department is implementing a new learning management platform, called Cornerstone. This platform enables employees to manage their own learning. The three pillars of the platform are learning management, learning experience and content anytime. Learning management concerns data-driven monitoring of ones learning. Learning experience concerns the user interface of the platform allowing for convenient access to learning content. Content anytime refers to the content that is offered on the platform.

Cornerstone offers a formal learning solution, offering employees a wide variety of learning content. The concept that I propose in this report is complementary to this solution as it offers an informal learning solution. Rather than providing content it supports employees in shaping their own ways of learning. Therefore by adding the functionalities of this concept to Cornerstone, a more holistic solution is offered to employees, supporting formal as well as informal learning.

ROLE	DEPARTMENT
Manager Learning & Development	Learning & Development
Manager Digital Frontend	Digital Frontend
Lead Scrummaster	Digital Transformation

Figure 49.
The main KLM stakeholders for the project.

Besides the stakeholders described how the platform could cause a mindset change regarding learning. It empowers employees to be active learners. As the manager Learning & Development said: “You put the employee in the driving seat”. The manager Digital Frontend noted this as well, stating: “It causes a shift of ownership of the learning”. He added to this that “It is much more organic learning, which is easier to manage”.

Moreover, the personal library enables cross-pollination. In Cornerstone the learning content is offered by the platform, not seizing the opportunity of all knowledge people gather themselves. Integration of the personal library in Cornerstone enables people to learn from content that others gathered and considered interesting. This does not replace the current content offer of Cornerstone, but adds a significant amount of knowledge to it.

Besides, looking at the earlier discussed basic framework in figure 50, Cornerstone provides a solution for the learning process. However, for effective development employees must know first what they want to learn, their learning ambition. The concept I propose helps employees developing their learning ambitions, allowing for goal-directed learning behavior. So the ambition tool enables more effective use of the learning contents provided on the Cornerstone platform.

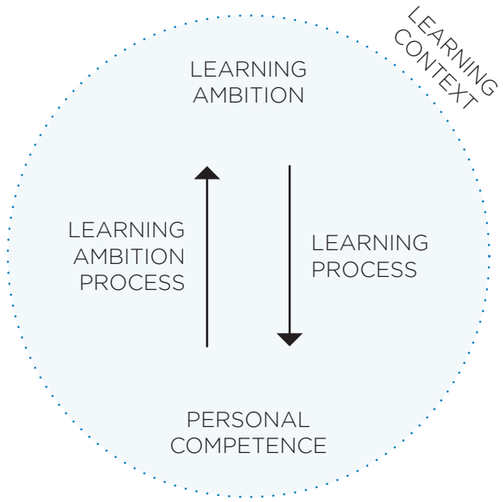


Figure 50. A basic representation of the competence development process, serving as a basis for the conceptual framework.

The Cornerstone platform, there is a Cornerstone Connect feature. This feature allows users to collaborate, share knowledge and communicate across teams. This offers a good starting point for the learner network to elaborate on. The main additions of the learner network as opposed to the current Connect feature is in how connections are build and subsequently exploited.

Connections are build based on shared interest and contrasting competences. In this way users have each other something to offer in the form of competences, which is critical for meaningful relations. Moreover, users have an incentive to connect with peers as this will grant them access to their personal library.

Due to the learning objectives defined using the ambition tool, users have an incentive to exploit the connections as well, because they can help them achieving their objectives.

In conclusion the concept of the KLM MyGrowth platform fits well the Cornerstone platform that is currently being implemented. They complement each other, providing formal as well as informal solutions. Moreover, the MyGrowth platform improves the use of the Cornerstone platform as it enables goal oriented use of the Cornerstone learning content.

The Digital Transformation and the Digital Frontend departments are good examples of how the platform creates value in different departments with different needs.

Hook to OKR’s at Digital Transformation

In the context section is explained that at Digital Transformation OKR’s are implemented. The MyGrowth platform supports these OKR’s and elaborates on them.

In figure 51 is schematically depicted how the ambition tool relates to the OKR’s. As is illustrated, employees must compose four objectives in three different topics. The ambition tool helps them to define personal objectives. By relating the personal objectives to the community of practice and to ones job, an employee can define the remaining objectives. In this way the employee is the starting point of the learning objectives rather than the community of practice or the content.

The ambition tool is a supportive tool to the OKR’s. It makes it easier for employees to compose OKR’s and helps improving their quality. Besides enhancing the composition process, it also improves integration of the OKR’s in the work routine. Currently the OKR’s are an isolated concept. The ambition tool enables integration by building the bridge from objectives to personal stories in the sprint backlog.

At Digital Transformation employees gather in communities of practice based on their expertise.These communities of practice are a good starting point for the learner network. The learner network empowers individual employees to create communities of practice and organize knowledge sharing events. Moreover, employees can share knowledge, learn from each other and start projects together on an individual level. In this way meaningful connections are built in an organic way through individual empowerment.

In conclusion the MyGrowth platform can be implemented in relation to the OKR’s. Starting from the direct need for support with the OKR’s, the applications of the platform can gradually gain traction.

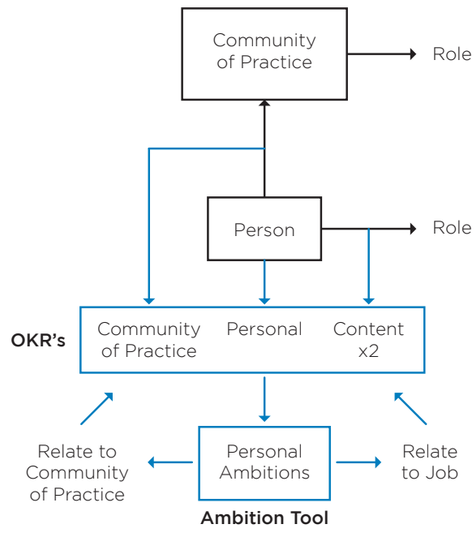


Figure 51. A schematic overview of the relation between the ambition tool and the OKR’s

Hook to T-Shaping at Digital Frontend

As explained in the context section at Digital Frontend there is a need for T-shaping, but a lack of a structured approach to learning. The MyGrowth platform offers this structured approach to learning. The ambition tool helps employees defining learning objectives and ensures time for actualization through integration in the work routine.

Moreover, formal learning solutions are often obsolete for Digital Frontend. They are working with the newest technologies for which no formal learning solutions are available yet. Therefore they have to learn from internet, experts in the field or exploration. An informal learning solution like the platform can support them in this.

Finally, at Digital Frontend four times a year a meetup is organized for which external experts are invited. The goal of these meetups is to share knowledge and learn from each other. Just like at the Digital Transformation department this is a good starting point for the learner network. The learner network takes such meetings to an individual level and enables regular involvement in knowledge sharing.

Validation

First of all, the manager Learning and Development explained the pioneering value of the project by stating: “This concept shows a direction on how we can support learning & development in a different way”. This can serve as starting point for more informal learning support.

The manager Digital Frontend explained the value of such informal learning support. He explained that formal learning solutions are often obsolete for his employees: “We are ahead of the formal learning offerings”. He sees value in this informal approach as “it has a shorter lead time than formal learning”.

Besides, the stakeholders described how the platform could cause a mindset change regarding learning; Employees become active learners rather than passive. As the manager Learning & Development said: “You put the employee in the driving seat”. The manager Digital Frontend noted this as well, stating: “It causes a shift of ownership of the learning”. He considered this “much more organic learning”.

Additionally the manager Digital Frontend valued the low threshold of using the platform: “It is very accessible”. He described that the threshold of formal learning solutions often is high, which keeps employees from applying for them: “There are always to less requests for learning in my opinion”.

Connecting to this accessibility, the integration of learning in the work routine was mentioned by the lead scrummaster from Digital Transformation. She said: “It’s really good that you make the connection to the backlog”. This does not just lower the threshold of learning, but makes it part of the work routine. The manager Digital Frontend confirmed this value as he said: “Learning is also part of the job”.

The manager Learning & Development explained that thinking about learning ambitions is often difficult for employees. She notices a need for help and “this provides support in the process”. Also the lead scrummaster from Digital Transformation confirmed this value: “Instead of writing all kinds of random things, now you are guided towards your objectives”.

Besides, the stakeholder from Digital Transformation like the fact that it is an employee-centered process. She explained how this could lead to business value: “Employees develop in the direction of their strengths, so are more motivated, productive, etcetera”.

Finally, the value of the learner network was highlighted by the manager Digital Frontend. He claimed that “there is a lot of knowledge within the company” and employees could learn from each other. He stated: “There is a lot of latent knowledge which is not visible. This helps making that knowledge visible.” The lead scrummaster from Digital Transformation endorsed the learner network as well, stating that it could help improve the way the communities of practice are currently organized.

EVALUATION & RECOMMENDATIONS

DISCUSSION

Implications on Practice

The Learning & Development department at KLM offers a wide variety of learning solutions to KLM employees. However, these solutions are generally formal learning solutions. In the introduction the spending/outcome paradox of learning was explained, showing the value of informal learning solutions. This project explored how informal learning can be supported by the Learning & Development department.

The platform concept shows a way in which the Learning & Development department can support informal learning. An important insight in this is that to support informal learning the focus must be shifted to the learning process, rather than the learning content, drawing from the tremendous amounts of knowledge that is already available through sources like the internet.

Moreover, in this project the focus was shifted from the actualization of learning to the development of learning ambitions. The concept showed how guiding employees in defining their learning ambitions helps giving direction to their learning and therewith results in purposeful learning.

Also, the employee is at the heart of the development process. This means that rather than developing employees to fit a job, the strengths of the employee are taken as a starting point and related to the work environment to exploit those strengths to its fullest.

One of the goals of this project is enabling self-driven development. This concept is a first step in the process of effectuating a mindset change from passive to active learners. Employees are stimulated to take ownership of their own development. They are shown that they can learn whenever, wherever and whatever they want and are not depending on a support department like Learning & Development.

Currently working and learning are two separate elements. However, learning is part of the job as well, because employees need to keep learning to be capable for their jobs. This study suggests a method of integrating learning in the work routine.

Implications on Theory

A wide variety of studies have been conducted on learning. However, these studies generally focus on the learning process. Emperical research showed a need for research on development of learning goals prior to the learning process. This study provides insights in this development of learning goals to achieve purposeful learning.

Various incentives for learning processes have been described in literature. According to Schön (2017) it starts from a problem, according to Miettinen (2000) from disruption of routine and according to Engeström (2001) from a contradiction of needs. These approaches to learning are all driven by incidents. With my conceptual framework I propose a structured approach for initiation of learning.

Besides, in theories on organizational learning, such as double loop learning (Argyris, 1977), the practical application is the starting point for learning. I propose a different approach, by putting the personal development at the heart. Rather than deriving learnings from and for experience, in my approach the purpose of the experience is to learn. These approach are both valuable and complement each other.

Also, in this study I took an individual perspective. I studied individual learning and applied that to the professional environment. This is a new approach as opposed to theories on learning cultures in organizations such as the learning organization (Senge, 1990).

Theories on self-directed learning, rooted in the work of Candy (1991) describe requirements for self-directed learning. This study builds upon those theories and builds a bridge to practical application by proposing a solution to support people in their self-directed learning.

RECOMMENDATIONS

Limitations

In the literature study I touched upon the topics of learning, work performance and routines. These are topics people dedicate their entire professional lifes too. Therefore, only a grasp of the available literature has been included in this study and potentially insightful information might have been missed.

Through interviewing a combination of internal and external experts and members of the target group a comprehensive image of the learning needs and behaviors of digitals was aimed to shape. However, the size and diversity of the groups of participants in the study is limited. Further validation across a larger group of participants and more departments is needed to validate the findings.

The concept has been tested only with digitals from the Digital Frontend department. It must be validated with digitals across multiple departments to draw conclusions on the wider applicability of the concept.

The designed platform is a strategic concept. It is a visionary platform and shows a new direction of how learning can be supported. However, for the platform to be directly implementable, further research, development and validation is needed.

This study was conducted in the context of KLM. Therefore the findings should be interpreted in this context. Additional validation is needed to apply findings from this study to other contexts.

Recommendations

In this study the personal development of individuals was targeted. However, individual development does not necessarily result in collective development. Therefore further research must be conducted to gain insights in how individual development can be managed and exploited for collective benefit.

During the first design sprint a team canvas was developed (see appendix NUMBER). This canvas was a first take on connecting individual development to team development. Due to the scope of this project this direction was not further elaborated on, but further research in this direction is recommended.

The role of the superiors in shaping a learning culture is significant. Employees must feel psychological safety to invest time in their personal development. Therefore managers should be educated on the importance of personal development and how they can support it.

The purpose of the concept is visionary, showing a new direction. Therefore, the concept needs further development and testing. The main principles and assumptions underlying the concept have been validated, but the practical implementation must be further developed. Mainly the personal library and the learner network need some further validation.

For the process of creating the personal library the sweet spot between ease of use and data gathering must be further explored. Currently users can decide for themselves if they answer the questions asked by the system when they store items to the personal library. However, whether they provide this information affects the comprehensiveness of the library. Further research must determine which information is necessary for a fruitful personal library and which information is additional.

In the process of shaping an image of the future context one trend is taken as starting point. This results in a very limited worldview. However, regular involvement in this process gradually results in a more comprehensive worldview. To bridge the period until a comprehensive worldview is created, a worldview created by a trend watcher should supplement individual worldviews.

For the implementation of the concept, it is recommended to make one person responsible. This person must educate employees on the new way of learning that is empowered by the platform. Also this person could facilitate sessions for the first use of the ambition tool to guide them through the process.

Additionally, the integration of learning in the work routine is critical. First managerial support is needed to allocate time for learning. If this support is in place, the personal development stories resulting from the ambition tool can be integrated in the work routine. The person responsible for implementation can monitor this integration in its early phase.

Due to the scope of this graduation project it was decided to focus on the development of learning ambitions rather than the learning process. The proposed concept is designed to give direction to the development of employees. A successive project could focus on actualization of learning ambitions by teaching employees how to be effective learners.

CONCLUSION

This project was executed in the context of KLM and focused on the main research question:

How can digitals be supported in their personal development through informal learning solutions that are integrated in their work routine?

Through literature review, expert interviews and target group interviews insights were gained in the learning ambitions, processes and routines of digitals.

These insights showed that Digitals experience a need for growth in their professional role and their personal competence. However, currently the learning is reactive and driven by incidental opportunities. A structural and purposeful approach to learning is lacking.

Based on the insights I developed a conceptual framework to draft a structural and purposeful approach to personal development. The emphasis in this framework is on the development of learning ambitions to give direction to a purposeful learning process. In the process of developing learning ambitions an individual's interests and competences are projected in the future context.

Using the conceptual framework as a basis, a platform is designed that supports digitals in shaping their learning ambitions. This platform entails three applications. A personal library helps digitals discover their interests and competences. In the ambition tool these interests and competences are related to the work environment and future developments to shape learning ambitions. A learner network connects digitals to inspire and sharpen each other's thinking and collaborate to realize the ambitions.

To achieve integration of learning in the work routine, connection must be established to that work routine. Therefore learning objectives and work objectives are both integrated in one personal sprint planning. In this way learning activities are formalized.

The platform shows a new direction for the Learning & Development department, shifting the focus from the actualization of learning ambitions to the development of learning ambitions and from formal learning to informal learning. Moreover, digitals are put in the driving seat of their own personal development, supported by the platform.

In conclusion, digitals are supported to achieve structured, human-centered and purposeful personal development. An informal learning solution provides this support and attempts to push integration of learning in the work routine.

PERSONAL REFLECTION

This graduation project has been an interesting and educational journey. I learned a lot about my graduation topic, a corporate environment and myself. The useful learning experiences and gained knowledge will help me in my career as a strategic designer. Alos, I think the project really shows my identity as a strategic designer.

I approached my graduation project as an opportunity to delve into a topic that I wanted to learn about. Therefore I spent some time to define my own graduation project. This entailed a couple of challenges.

First of all, my prior knowledge in the field of learning was very limited. I underestimated the complexity of all theory available and therefore was not specific enough in defining the scope of my research. In a next research project I would put more effort in clearly defining the frame of reference. I think support of someone with experience in the field of research is desirable.

Moreover, because of my limited prior knowledge I had to develop basic knowledge as well during the project. This resulted in an overwhelming amount of research. This might have been at the expense of some more depth.

Another challenge in my approach was that I started from a vision rather than a problem. Because I did not start from a specific problem experienced by the target group, but a vision on how things at work could be better, it was more difficult to gain commitment. I continuously had to convince stakeholders in the process that my solution would be beneficial for them to gain commitment. I think it is more difficult to show people that average can be good than to show them that a problem can be solved. To anticipate this I framed my vision differently for each department to create links to problems they experienced.
I believe in the approach to start from a vision, because it enables you to be ahead of others while by just solving problems you are always lacking behind. However, I need to be wary of developing solutions to problems nobody experiences.

The client of the project was the Learning & Development department. However, my target group were employees from different departments. I had to gain commitment at these departments as an external employee, which is time consuming and sometimes frustrating in a large corporation like KLM. Especially, because I did not have managerial support at those department when I started. Therefore, I learned a lot about lobbying to create commitment. Yet, I would not recommend graduating for a support department within an organization unless commitment of target groups is arranged at the start of the project.

During the process I think my stakeholder management should have been better. I could have involved them more in the process to create engagement and exploit their expertise. This requires regular communication. My way of working is underlying this problem. During the process I dedicate all of my time to developing a solution that is as good as possible. However, I should build in some moments in the process to document my process and findings so I can engage stakeholders in my process. In this way I also spread the effort of documentation.

I think during the design sprint I lost myself too much in the details. I zoomed in on the process of developing ambitions whereby I did not see the bigger picture at some point. Due to a reflection moment I recovered, but I lost valuabe time for testing the main assumptions underlying the concept. Especially because I want to be the person with the bigger picture in mind, this was a useful experience for me.

The final concept that I created is more of a visionary concept and new direction for L&D than a directly implementable solution. I believe as a vision the concept is strong, but to implement the solution more validation and development is needed. I think this represents well the strategic designer I want to be. However, the further development and implementation are critical for the impact of a concept as well.

In conclusion I learned a lot about project management as a consultant in a corporate. In a possible future job as consultant this experience will be useful. Also, there are some points of improvements which I am aware of, so I can improve on them future projects.

REFERENCES

Azevedo, R., & Cromley, J. G. (2004). Does training on self-regulated learning facilitate students' learning with hypermedia?. Journal of educational psychology, 96(3), 523.

Bandura, A. (1982). Self-efficacy mechanism in human agency. American psychologist, 37(2), 122.

Bateson, G. (1972). Steps to an Ecology of Mind. Ballentine Books New York.

Beard, A (Producer). (2019, April). What Managers Get Wrong About Feedback [Audio podcast]. Retrieved from https://hbr.org/ideacast/2019/04/what-managers-get-wrong-about-feedback

Beck, K., Beedle, M., Van Bennekum, A., Cockburn, A., Cunningham, W., Fowler, M., ... & Kern, J. (2001). Manifesto for agile software development.

Billings, D. (2004). Teaching learners from varied generations. The Journal of Continuing Education in Nursing, 35(3), 104-105.

Bloom, B.S. (Ed.), Engelhart, M.D., Furst, E.J., Hill, W.H., & Krathwohl, D.R. (1956). Taxonomy of educational objectives: The classification of educational goals. Handbook 1: Cognitive domain. New York: David McKay.

Blumberg, P. (2000). Evaluating the evidence that problem-based learners are self-directed learners: A review of the literature.

Breckler, S. J. (1984). Empirical validation of affect, behavior, and cognition as distinct components of attitude. Journal of personality and social psychology, 47(6), 1191.

Brown, T. (2008). Design thinking. Harvard business review, 86(6), 84.

Brown, T., & Katz, B. (2011). Change by design. Journal of product innovation management, 28(3), 381-383.

Bruner, J. S. (1990). Acts of meaning (Vol. 3). Harvard University Press.

Bucher, S., & Langley, A. (2016). The interplay of reflective and experimental spaces in interrupting and reorienting routine dynamics. Organization Science, 27(3), 594-613.

Casciaro, T., Gino, F., & Kouchaki, M. (2014). The contaminating effects of building instrumental ties: How networking can make us feel dirty. Administrative Science Quarterly, 59(4), 705-735.

Chan, L. L., Shaffer, M. A., & Snape, E. (2004). In search of sustained competitive advantage: the impact of organizational culture, competitive strategy and human resource management practices on firm performance. The International Journal of Human Resource Management, 15(1), 17-35.

Conboy, K., & Fitzgerald, B. (2004, November). Toward a conceptual framework of agile methods: a study of agility in different disciplines. In Proceedings of the 2004 ACM workshop on Interdisciplinary software engineering research (pp. 37-44). ACM.

Cross, J. (2011). Informal learning: Rediscovering the natural pathways that inspire innovation and performance. John Wiley & Sons.

Csikszentmihalyi, M. (2014). Toward a psychology of optimal experience. In Flow and the foundations of positive psychology (pp. 209-226). Springer, Dordrecht.

Davis, B. (2012). Agile practices for waterfall projects: Shifting Processes for Competitive Advantage. J. Ross Publishing.

Deci, E. L., & Ryan, R. M. (2010). Intrinsic motivation. The corsini encyclopedia of psychology, 1-2.

Design Council (2007). A study of the design process. Retrieved from https://www.designcouncil.org.uk/sites/default/files/asset/document/ElevenLessons_Design_Council%20(2).pdf

Deutsch, J. A., & Deutsch, D. (1963). Attention: Some theoretical considerations. Psychological review, 70(1), 80.

Dinsmore, D. L., Alexander, P. A., & Loughlin, S. M. (2008). Focusing the conceptual lens on metacognition, self-regulation, and self-regulated learning. Educational Psychology Review, 20(4), 391-409.

Dittrich, K., Guérard, S., & Seidl, D. (2016). Talking about routines: The role of reflective talk in routine change. Organization Science, 27(3), 678-697.

Dittrich, K., & Seidl, D. (2018). Emerging intentionality in routine dynamics: A pragmatist view. Academy of Management Journal, 61(1), 111-138.

Dove, R. (1991). The 21s Century Manufacturing Enterprise Strategy. Iacocca Institute. Lehigh University.

Drury, M., Conboy, K., & Power, K. (2012). Obstacles to decision making in Agile software development teams. Journal of Systems and Software, 85(6), 1239-1254.

Duhigg, C. (2012). The power of habit: Why we do what we do in life and business. Random House.

Elkjaer, B. (2004). Organizational learning: the 'third way'. Management learning, 35(4), 419-434.

Elkjaer, B. (2009). Pragmatism: A learning theory for the future. In Contemporary theories of learning (pp. 82-97). Routledge.

Engeström, Y. (2001). Expansive learning at work: Toward an activity theoretical reconceptualization. Journal of education and work, 14(1), 133-156.

Engeström, Y., Miettinen, R., & Punamäki, R. L. (Eds.). (1999). Perspectives on activity theory. Cambridge university press.

Epstein, D., & Gladwell, M. (2018). The Temin Effect.

Ertmer, P. A., & Newby, T. J. (1993). Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective. Performance improvement quarterly, 6(4), 50-72.

Eurostat. (n.d.). Adult learning statistics - characteristics of education and training. Retrieved from https://ec.europa.eu/eurostat/statistics-explained/index.php/Adult_learning_statistics_-_characteristics_of_education_and_training

Fox, E., & Riconscente, M. (2008). Metacognition and self-regulation in James, Piaget, and Vygotsky. Educational Psychology Review, 20(4), 373-389.

Gardner, H. (2011). Frames of mind: The theory of multiple intelligences. Hachette UK.

Garrison, D. R. (1997). Self-directed learning: Toward a comprehensive model. Adult education quarterly, 48(1), 18-33.

Garrison, J. (2001). An introduction to Dewey's theory of functional" trans-action": An alternative paradigm for activity theory. Mind, culture, and activity, 8(4), 275-296.

Grant, A (Producer). (2018, March). Your hidden personality [Audio podcast]. Retrieved from https://www.ted.com/talks/worklife_with_adam_grant_is_your_personality_more_flexible_than_you_think?language=en&referrer=playlist-worklife_with_adam_grant

Grant, A (Producer). (2019, March). Networking for people who hate networking [Audio podcast]. Retrieved from https://www.ted.com/talks/worklife_with_adam_grant_networking_for_people_who_hate_networking?language=en&referrer=playlist-worklife_with_adam_grant_mar_2019

Grant, A (Producer). (2019, March). The perils of following your career passion [Audio podcast]. Retrieved from https://www.ted.com/talks/worklife_with_adam_grant_the_perils_of_following_your_career_passion?language=en&referrer=playlist-worklife_with_adam_grant_mar_2019

Grant, A (Producer). (2019, March). When strengths becomes weakness [Audio podcast]. Retrieved from https://www.ted.com/talks/worklife_with_adam_grant_when_strength_becomes_weakness?language=en&referrer=playlist-worklife_with_adam_grant_mar_2019

Gurwin, J., Revere, K. E., Niepold, S., Bassett, B., Mitchell, R., Davidson, S., ... & Binenbaum, G. (2018). A randomized controlled study of art observation training to improve medical student ophthalmology skills. Ophthalmology, 125(1), 8-14.

Harackiewicz, J. M., Barron, K. E., & Elliot, A. J. (1998). Rethinking achievement goals: When are they adaptive for college students and why?. Educational psychologist, 33(1), 1-21.

Hatch, N. W., & Dyer, J. H. (2004). Human capital and learning as a source of sustainable competitive advantage. Strategic management journal, 25(12), 1155-1178.

Hilgard, E. R. (1980). The trilogy of mind: Cognition, affection, and conation. Journal of the History of the Behavioral Sciences, 16(2), 107-117.

Hutchins, E. (1995). Cognition in the Wild (No. 1995). MIT press.

Ikehara, H. T. (1999). Implications of gestalt theory and practice for the learning organisation. The Learning Organization, 6(2), 63-69.

Illeris, K. (2018). A comprehensive understanding of human learning. In Contemporary Theories of Learning (pp. 1-14). Routledge.

Jerome, N. (2013). Application of the Maslow's hierarchy of need theory; impacts and implications on organizational culture, human resource and employee's performance. International Journal of Business and Management Invention, 2(3), 39-45.

Johnson, S. A., & Romanello, M. L. (2005). Generational diversity: teaching and learning approaches. Nurse educator, 30(5), 212-216.

Kajko-Mattsson, M., Lewis, G. A., Siracusa, D., Nelson, T., Chapin, N., Heydt, M., ... & Snee, H. (2006, September). Long-term life cycle impact of agile methodologies. In 2006 22nd IEEE International Conference on Software Maintenance (pp. 422-425). IEEE.

Kim Jean Lee, S., & Yu, K. (2004). Corporate culture and organizational performance. Journal of managerial psychology, 19(4), 340-359.

Kotter, J. P. (2008). Corporate culture and performance. Simon and Schuster.

Krathwohl, D. R. (2002). A revision of Bloom's taxonomy: An overview. Theory into practice, 41(4), 212-218.

Loyens, S. M., Magda, J., & Rikers, R. M. (2008). Self-directed learning in problem-based learning and its relationships with self-regulated learning. Educational Psychology Review, 20(4), 411-427.

Maggioni, L., & Parkinson, M. M. (2008). The role of teacher epistemic cognition, epistemic beliefs, and calibration in instruction. Educational Psychology Review, 20(4), 445-461.

Maslow, A. H. (1943). A theory of human motivation. Psychological review, 50(4), 370.0

Mayer, R. E. (2002). Multimedia learning. In Psychology of learning and motivation (Vol. 41, pp. 85-139). Academic Press.

Mayer, R. E., & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. Educational psychologist, 38(1), 43-52.

Miettinen, R. (2001). Artifact mediation in Dewey and in cultural-historical activity theory. Mind, Culture, and Activity, 8(4), 297-308.

Miettinen, R. (2006). Epistemology of Transformative Material Activity: John Dewey's pragmatism and cultural-historical activity theory. Journal for the Theory of Social Behaviour, 36(4), 389-408.

Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. Journal of personality and social psychology, 75(1), 33.

Nickisch, C (Producer). (2018, October). The Power of Curiosity [Audio podcast]. Retrieved from https://hbr.org/ideacast/2018/10/the-power-of-curiosity

Nickisch, C (Producer). (2019, January). Creating Psychological Safety in the Workplace [Audio podcast]. Retrieved from https://hbr.org/ideacast/2019/01/creating-psychological-safety-in-the-workplace

Nonaka, I. (2008). The knowledge-creating company. Harvard Business Review Press.

Olson, C. B., & Land, R. (2007). A cognitive strategies approach to reading and writing instruction for English language learners in secondary school. Research in the Teaching of English, 269-303.

Pavlov, I. P., & Gantt, W. (1928). Lectures on conditioned reflexes: Twenty-five years of objective study of the higher nervous activity (behaviour) of animals.

Pentland, B. T., & Feldman, M. S. (2005). Organizational routines as a unit of analysis. Industrial and corporate change, 14(5), 793-815.

Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In Handbook of self-regulation (pp. 451-502). Academic Press.

Porter, M. E. (1989). How competitive forces shape strategy. In Readings in strategic management (pp. 133-143). Palgrave, London.
Rigby, D. K., Sutherland, J., & Takeuchi, H. (2016). Embracing agile. Harvard Business Review, 94(5), 40-50.

Ryan, R. M., & Deci, E. L. (2017). Self-determination theory: Basic psychological needs in motivation, development, and wellness. Guilford Publications.(Stolurow, 2006)

Sadri, G., & Bowen, C. R. (2011). Meeting employee requirements: Maslow's hierarchy of needs is still a reliable guide to motivating staff. Industrial engineer, 43(10), 44-49.

Sanders, E. B. N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. Co-design, 4(1), 5-18.

Sanders, E. B. N., & Stappers, P. J. (2012). Convivial toolbox: Generative research for the front end of design. Amsterdam: BIS.

Schiller, D., Monfils, M. H., Raio, C. M., Johnson, D. C., LeDoux, J. E., & Phelps, E. A. (2010). Preventing the return of fear in humans using reconsolidation update mechanisms. Nature, 463(7277), 49.

Schmidt, H. G. (1983). Problem-based learning: rationale and description. Medical education, 17(1), 11-16.

Schwaber, K. (1997). Scrum development process. In Business object design and implementation (pp. 117-134). Springer, London.

Serrador, P., & Pinto, J. K. (2015). Does Agile work?—A quantitative analysis of agile project success. International Journal of Project Management, 33(5), 1040-1051.

Shapiro, H. (2010). John Dewey's reception in "Schönian" reflective practice. Philosophy of Education Archive, 311-319.

Siemens, G. (2004). Connectivism. A Learning Theory for the Digital Age. In eLearnSpace.

Skiba, D. J., & Barton, A. J. (2006). Adapting your teaching to accommodate the net generation of learners. Online Journal of Issues in Nursing, 11(2), 15.

Skinner, B. F. (1963). Operant behavior. American psychologist, 18(8), 503.

Stalk, G. (1990). Competing against time: How time-based competition is reshaping global mar. Simon and Schuster.

Sweller, J. (1994). Cognitive load theory, learning difficulty, and instructional design. Learning and instruction, 4(4), 295-312.

Sweller, J. (2011). Cognitive load theory. In Psychology of learning and motivation (Vol. 55, pp. 37-76). Academic Press.

Sweller, J., Ayres, P., & Kalyuga, S. (2011). The Redundancy Effect. Cognitive Load Theory,141-154. doi:10.1007/978-1-4419-8126-4_11

Thomas, J. W. (2000). A review of research on project-based learning.

Tidd, J., & Bessant, J. R. (2018). Managing innovation: integrating technological, market and organizational change. John Wiley & Sons.

Von Ehrenfels, C. (1988). On "gestalt qualities.". B. Smith (Ed. & Trans.), Foundations of Gestalt theory, 82-117.

Watson, J. B. (1913). Psychology as the behaviorist views it. Psychological review, 20(2), 158.

Winters, F. I., Greene, J. A., & Costich, C. M. (2008). Self-regulation of learning within computer-based learning environments: A critical analysis. Educational Psychology Review, 20(4), 429-444.

Appendices

APPENDIX A

INTERVIEW GUIDE (HR Expert)
GRADUATION PROJECT
ROËL TIBOSCH

Research topic: A learning rhythm that supports personal development at work

Main research question: How can companies support learning at work?

Checklist for start

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-
-
-
-
-

Introductory script (optional)

What is your field of expertise?
What does your job look like currently?
What is your experience in the topics of work performance and personal development?

Subtopic 1:

Learning Rhythm

Opening question:

How is personal development currently addressed at work?

Follow-ups/probes:

- How does work performance fluctuate during the week? What are the factors affecting these fluctuations? (Time of day, day in the week, attention capacity, time-on-task, type of tasks & competence, …)
- How can performance be more efficient (same performance, less time)?
- How much time is allocated for personal development? Which moments are employees occupied with learning?
- What would the work and learn rhythm look like ideally?
- How can learning be integrated in the rhythm of work, with limited decrease in productivity?

Subtopic 2:

Learning Subject

Opening question:

How do employees determine what to learn?

Follow-ups/probes:

- How do you support and inspire them in this?
- How do you align the interests of the employee and the company?
-
-

Subtopic 3:

Learning Method

Opening question:

How do employees gain the skills and knowledge they want to?

Follow-ups/probes:

- What methods are used by employees to learn? And what media?
- What are currently used methods to support the learning process of employees?
- What are effective learning activities? (Individually, for teams, for departments)
- What learning theory are these activities based on?
-
-

Subtopic 4:

Learning Trajectory

Opening question:

What does a learning trajectory currently look like?

Follow-ups/probes:

- What are the phases in the trajectory?
- How is this trajectory monitored and supported?
- How long does a trajectory take?
- How do you evaluate personal development?
-
-
-

Checklist for closure

- Do you have any additional advice or information which you believe is interesting to share with me?
- Do you know interesting literature for me to include in my research?
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List of generic probes (optional)

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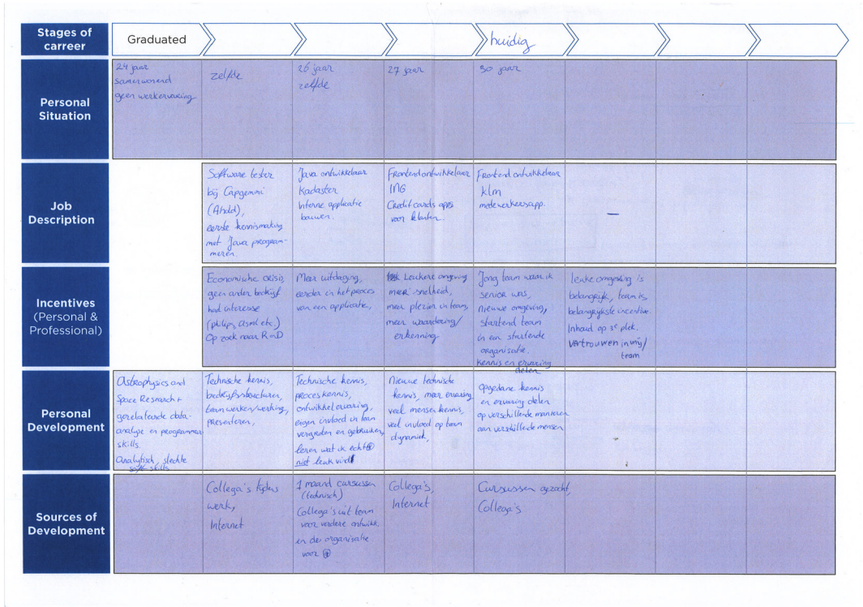
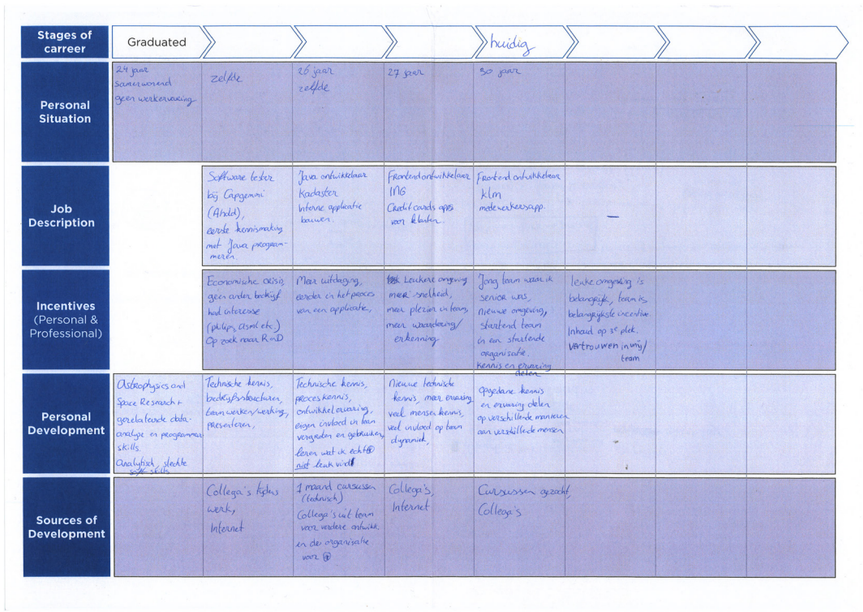
APPENDIX B


Stages of carreer
Graduated
huidig
Personal Situation
Job Description
Incentives (Personal & Professional)
Personal Development
Sources of Development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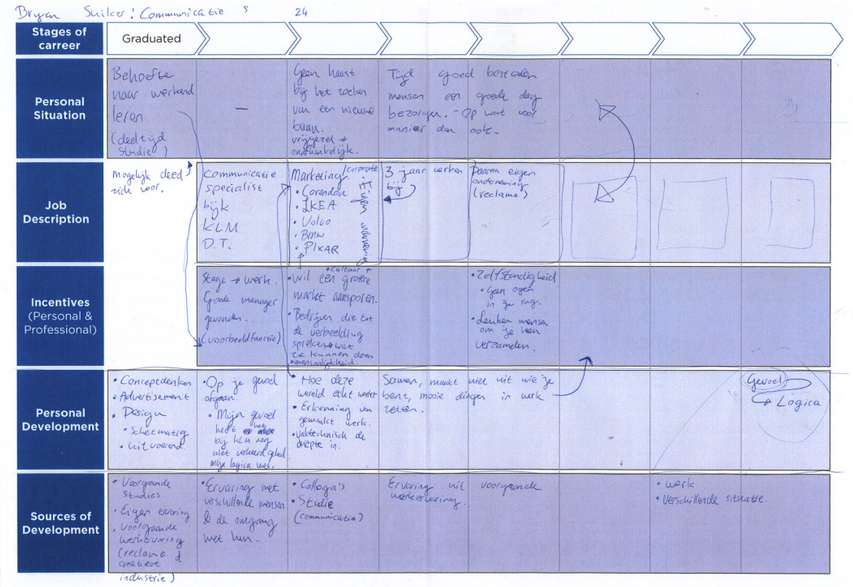
Incentives (Personal & Professional)
Personal Development
Sources of Development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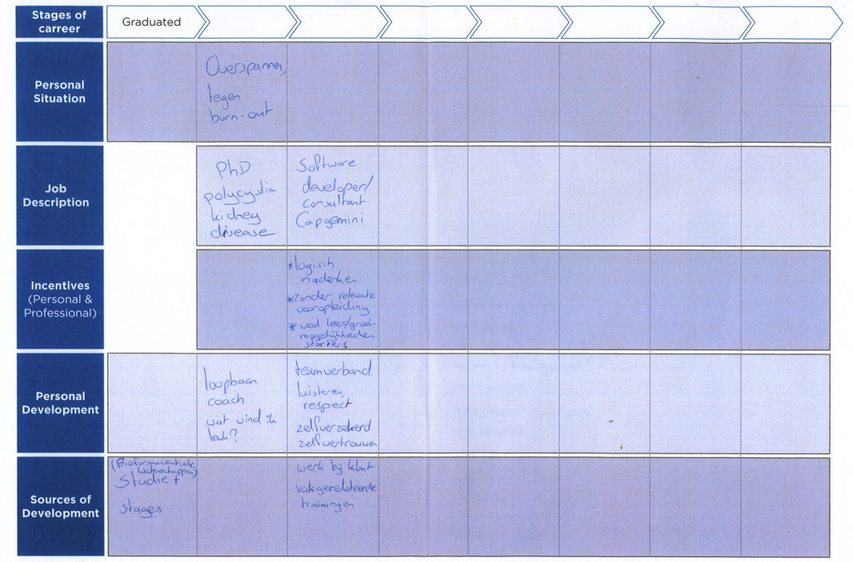
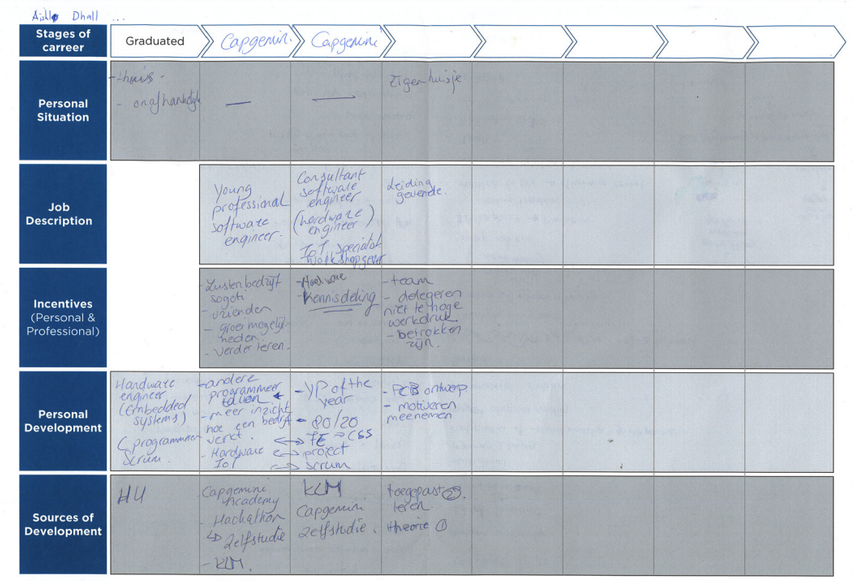
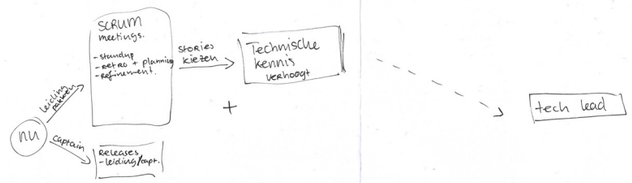
Graduated
Personal Situation
Job Description
Incentives (Personal & Professional)
Personal Development
Sources of Development


Stages of carreer
Graduated
Personal Situation
Job Description
Incentives (Personal & Professional)
Personal Development
Sources of Development


Stages of carreer
Graduated
Capgemini
Capgemini
Personal Situation
Job Description
Incentives (Personal & Professional)
Personal Development
Sources of Development

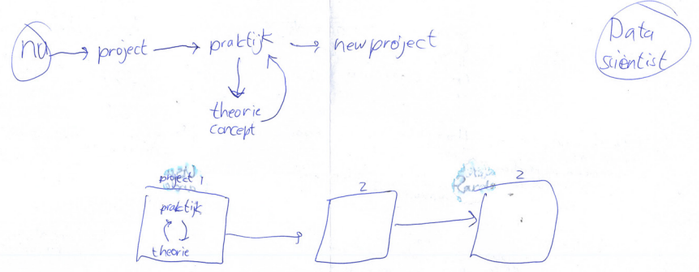
Stages of carreer	Graduated						
Personal Situation	I wanted to start working as a software developer.	Finding a job was not that easy back then. I took the chance.	The company closed the project. I started to search a new job.	I quit my job due to the obligatory military service. Found another one after the service	I formed my own company	Financially not happy. Left own company. Found an employer	
Job Description		Web developer: Responsible for both front-end and back-end development		More specialized on front-end development	Back to full stack development	To catch up with front-end community and do more structured programming	
Incentives (Personal & Professional)			- Improve my language skills - Have a vision about my profession, how it is done in abroad - Continue in web developer career path	- To focus on one programming topic	- To grow as a company and teach young people how to code.		
Personal Development	- Creating designs - Web development basis	- JavaScript - PHP - MySQL / SQL - Business communication	- Web development skills improved - Business comm. in English	- Front-end knowledge is improved. - Leading or having an important role in meetings	- Programming skills - Customer relations	- Leading skills - Front-end skills improved	
Sources of Development	- Bachelor degree in Computer Sciences	Internet and trial and error	- Trainings - Own research	- Trainings - Using programming websites	- Having customers - Side-bought	- Trainings - Side projects	

Speaking Dutch ⟹ Took course at UVA Talen ⟹ Level A2 ⟹ Take Intermediate course to level B2 ⟹ Speak Dutch with your colleagues daily



Stages of carreer	Graduated	KLM	Toekomst.
Personal Situation	Snel veranderende tech wereld & hier deel van uitmaken. Beginners achtergrond, maar sleutt met aan op hierboven. Studie Digitale Business → kruising tussen business / IT	Werken binnen omgeving van developers.	
Job Description		Informatie analyse (User Stories uitwerken zodat developers hiermee aan de slag kunnen → afhankelijkheden in kaart zetten (met andere partijen). Ontwikkelen front-end / engineer.	Data scientist: analyseren en blootleggen van inzichtbare / relaties en patronen in ~~textuur~~ grote hoeveelheid data. Dit kunnen omzetten naar applicaties en/of werken hiervoor in waarschijnlijk innovatieve sector.
Incentives (Personal & Professional)		Stap proberen binnen een corporate. Kans om als trainee engineer te beginnen. Vrijheid in invullen van mijn eigen rol.	Innovatieve sector: sluit aan bij snel veranderende wereld en persoonlijke wens om hierin mee te gaan. ~~Corporate~~. Vrijheid om te kunnen ontwikkelen in richting die ik uit wil. Collega's moeten als vrienden aanvoelen.
Personal Development	Algemene business processes in kaart brengen. Programmeren in Python. Brug communicatie vraag kant IT/business.	Hard skills van programmeren. Inzicht in e2e van de website/applicatie. Stakeholder management/ communicatie.	Meesteren van algoritmes schrijven in code. → enabler. Visualiseren van patronen in data zodat anderen dit kunnen gebruiken.
Sources of Development	Universitaire opleiding Doctoraat / externe cursus Groepswerken tussen versch. opleidingen. Programmeren Bootcamp.	Zelf rondzoeken in code en ~~be~~ documentatie. Knowledge Sharing Sessions van ervaren developer. Werkzaamheden. Online courses voor theoretische kennis.	Zelf leren: online tutorials, persoonlijke projecten, eigen websites opzetten. Jaar ervaring KLM.

Stages of carreer	Graduated	2e jaarscontract KLM	Vast contract KLM	Promotie tech lead			
Personal Situation	Afstuderen bij KLM. Bij webdevelopment. Op kamers in Amstelveen.	Studio in Amsterdam. Designtraject in Parijs (6-8 wkn).	Verhuist naar Utrecht.				
Job Description		Frontend Developer in de instap school.	Na half jaar 2 school omhoog.	MEER verantw. en meer uitdaging.			
Incentives (Personal & Professional)		Luchtvaart interessant + stage goed bevallen. Nieuwe technologien.					
Personal Development	Bachelor of Science Richting informatica HAN Arnhem. Webdevelopment → sociale skills waren goed.	Product van hogere kwaliteit. Tests schrijven etc.	AMT training (leiderschap).	Betere programm. kennis.			
Sources of Development	Bureau 302 in Arnhem → webdevelopment naast studie. 2011 - 2014. + informatica opleiding.	Angular 2+ leren. (nieuw framework).	Graphql (summit)	KLM breede domein kennis.			



APPENDIX C

How does this fit your identity?

Curious person
Explaining things to others
Social

② SPARKS

What inspired you in this content?

→ To know exactly how something works
→ Applying the knowledge ~~from~~ which I (recently) gained for something else
→ Learning from experts/

BREADTH SKILLS

What foundational skills do you consider important for you?

communication
cooperation
Presentation skills

What breadth skills do you consider important for you?

→ Understanding ~~the~~ what the client needs, how it's gained

What foundational skills are expected of you by the team?

(See Team Capabilities & Ambition)

What breadth skills are expected of you by the team?

(See Team Capabilities & Ambition)

⑥ INTERESTS

What are your interests evolving from the inspiration and your identity?

→ Understanding the world around me
→ Helping others/making life easier for others
→ Discipline
→ keeping an eye out for the other team members
→ knowing how things affect others
→ Explaining things
→ Logical
→ Biological phenomena

DEPTH SKILLS

What depth skills do you consider important for you?

→ ~~Wasting more energy than~~ necessarily
→ Understanding the relevance of a research
→ Seeing connections with other researches
→ Seeing/communicating the essence of a project

What depth skills are expected of you by the team?

(See Team Capabilities & Ambition)

④ TALENTS

What are your talents and weaknesses in your professional role?

→ ~~loosing the~~ losing sight of the big picture
→ Insecurity
→ Too focussed on other details
→ Taking too much on me
→ Need for appraisal/appreciation

① INSPIRATION

What pieces of content inspired you lately?

Inspiration of other people
Used paper on web pages
Weight's mechanics
Efficient photosynthesis
Health & daily life

What content inspired you looking at the future?

Role of engineering
~~Biological~~ technological solutions
~~medical~~ health issues
→

② EXAMPLES

What are examples of innovations in line with this content?

→ Personal medication
→ Efficient ~~medical~~ applications

⑤ FUTURE VISION

How do these developments and emerging needs shape your vision towards the future?

→ More efficient treatment
→ Better medication (less side effects)
→ More focus on human side in engineering. e
→ ~~Apply~~ More interfield courses in ~~program~~ university

③ NEEDS

Which emerging human needs do these innovations fulfill?

→ More humane/better treatment
→ Better guidance
→ Cooperation between different fields to improve quality of life

④ VALUE DRIVERS

What developments in the world are driving these changes?

→ Better cooperation between doctors & engineers
→ More knowledge on (effects of) diseases

⑥ PROFESSIONAL IMPLICATIONS

How does this future affect your role as a professional?

→ Jobs in the profession I'd like to practice
→ A job where I work/meet with people from different backgrounds

FUTURE SITUATION

FUTURE ME

① INTERESTS

List your main interests.

③ AMBITIONS

In 2 years I aim to be ...

~~academic~~
researching diseases
while working
together with
different people to
improve quality of
life

FUTURE CONTEXT ②

Describe your future context.

Cooperation with people from different fields/backgrounds to improve quality of life

DESIRED SKILLS

List the skills that you would like to acquire/improve.

EXPECTED SKILLS

List the skills that your team would like you to acquire/improve.

④ OBJECTIVES

List 3 key objectives to realize your ambitions

1	2	3
Realizing from what angle I want to look at diseases	learning how to do research	Finding a job where I can practice this ambition

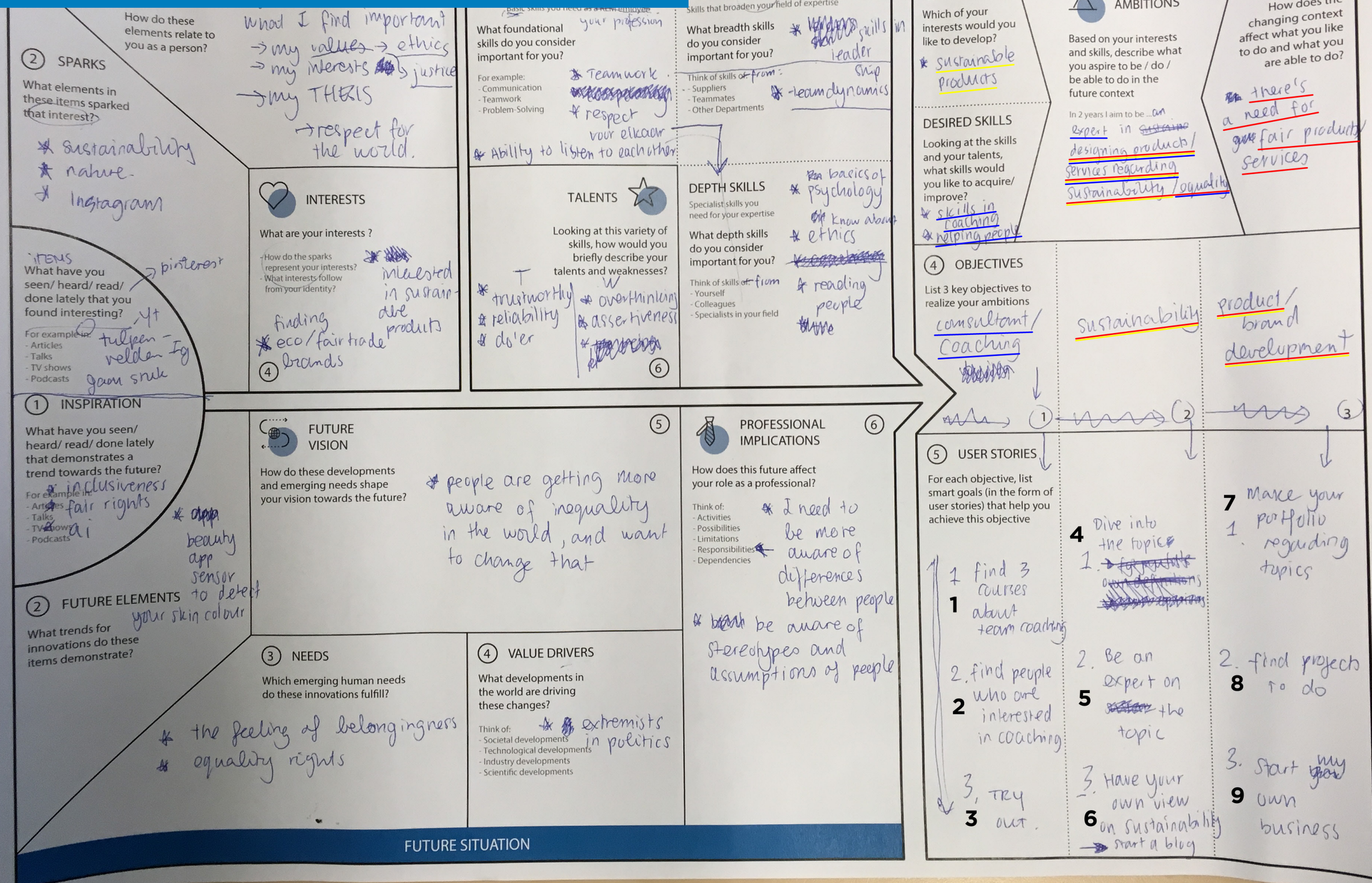
⑤ USER STORIES

For each objective, list smart goals (in the form of user stories) that help you achieve this objective

1	2	3	4
• Reading 2 articles/~~boards~~ on diseases a week	• Doing an internship • learn how to work independently/coming up with own ideas		• Ask people I know for tips

Roël Tibosch

APPENDIX D



Roël Tibosch

ME

③ IDENTITY
How do these elements relate to you as a person?
- curious
- actie kindness
- broadening my knowedge and horizon.

② SPARKS
What elements in these items sparked that interest?
- give new perspectives
- learn new things
- unexpected kindness

INTERESTS
What are your interests ?
- How do the sparks represent your interests?
- What interests follow from your identity?
- AI ethics
- Sociale interacties
- Leadership inspiration
- Learning

⑤ FOUNDATIONAL SKILLS
Basic skills you need as a KLM emloyee

What foundational skills do you consider important for you?

For example:
- Communication
- Teamwork
- Problem-Solving

- Creative Problem solving
- Open-mindset
- Structured mentality
- Bulldog

BREADTH SKILLS
Skills that broaden your field of expertise

What breadth skills do you consider important for you?

Think of skills of:
- Suppliers
- Teammates
- Other Departments

- Public speaking
- process design
- AI skills
- Leadership
- Coaching.

TALENTS
Looking at this variety of skills, how would you briefly describe your talents and weaknesses?

Talent
- Resourcefull
- Fast learning
- Connecting
- Creative Reframing.

weakness
- over opportunistic
- chaotic
- writing

DEPTH SKILLS
Specialist skills you need for your expertise

What depth skills do you consider important for you?

Think of skills of:
- Yourself
- Colleagues
- Specialists in your field

- AI ethics
- Trendscore casting
- Strategic decision making
- creating opportunities

① INSPIRATION
What have you seen/ heard/ read/ done lately that you found interesting?

For example in:
- Articles
- Talks
- TV shows
- Podcasts

② FUTURE ELEMENTS
What trends for innovations do these items demonstrate?

- AI ethics
- Design Thinking
- Design Doing
- Sustainable Future
- Morality Recoded.

FUTURE VISION
How do these developments and emerging needs shape your vision towards the future?

- use design for incorporating ethics.
- more use of Design in new disciplines
- Need for more technology skills

③ NEEDS
Which emerging human needs do these innovations fulfill?

- Moral needs
- a Sustainable future
- Fun
- Transparency
- Trust

④ VALUE DRIVERS
What developments in the world are driving these changes?

Think of:
- Societal developments
- Technological developments
- Industry developments
- Scientific developments

- Demand for transparency
- Lack of appropriation

PROFESSIONAL IMPLICATIONS
How does this future affect your role as a professional?

Think of:
- Activities
- Possibilities
- Limitations
- Responsibilities
- Dependencies

- Co-creating with a variety of disciplines
- Add disciplines to new roles
- Lack tech skills
- new responsibilities

FUTURE SITUATION

FUTURE ME

① INTERESTS
Which of your interests would you like to develop?
- Public speaking
- AI ethics
- Strategic design making

DESIRED SKILLS
Looking at the skills and your talents, what skills would you like to acquire/ improve?
- Public speaking
- Creative reframing
- Leadership

③ AMBITIONS
Based on your interests and skills, describe what you aspire to be / do / be able to do in the future context

In 2 years I aim to be ...
- inspire others in AI ethics and design by public speaking
- by proving "measurable" results AI ethics

FUTURE CONTEXT ②
How does the changing context affect what you like to do and what you are able to do?

④ OBJECTIVES
List 3 key objectives to realize your ambitions

⑤ USER STORIES
For each objective, list smart goals (in the form of user stories) that help you achieve this objective

	1	2	3
	1 Cource public speaking (10u) **1**	1 ~~Start offering~~ Find teams (10u) **4**	1 ~~Cource~~ Agile coaching Beginner (1y) **7**
	2 go to events to speak (30) **2**	2. Start offering (200) **5**	2 Agile intermediate **8**
	3 Enlarge network (50) **3**	3 develop a way to measure result (300) **6**	

Roël Tibosch

ME

① INSPIRATION
What have you seen/ heard/ read/ done lately that you found interesting?

For example in:
- Articles
- Talks
- TV shows
- Podcasts

sleep
deep work
ted talk

What have you seen/ heard/ read/ done lately that demonstrates a trend towards the future?

For example in:
- Articles
- Talks
- TV shows
- Podcasts

graduation

② SPARKS
What elements in these items sparked that interest?

Having enough good sleep is important

③ IDENTITY
How do these elements relate to you as a person?

when I am well rested I perform the best and have the most energy to take on challenges

④ INTERESTS
What are your interests ?

- How do the sparks represent your interests?
- What interests follow from your identity?

- Digitalisering in zorg
- Team dynamics
- Travel
- photography

(wie ben ik)

⑤ FOUNDATIONAL SKILLS
Basic skills you need as a KLM emloyee

What foundational skills do you consider important for you?

For example:
- Communication
- Teamwork
- Problem-Solving

- communication
- team dynamis
- self reflection
- independent

⑥ TALENTS
Looking at this variety of skills, how would you briefly describe your talents and weaknesses?

- communication something lacking

(wat kan ik)

BREADTH SKILLS
Skills that broaden your field of expertise

What breadth skills do you consider important for you?

Think of skills of:
- Suppliers
- Teammates
- Other Departments

- ~~interactie basis zorg~~

DEPTH SKILLS
Specialist skills you need for your expertise

What depth skills do you consider important for you?

Think of skills of:
- Yourself
- Colleagues
- Specialists in your field

- interviewing
- qualitative research
- strategic decision making
- conceptualization
- trendwatching

FUTURE SITUATION

① FUTURE ELEMENTS
What trends for innovations do these items demonstrate?

- personalized treatment
- crowdsourcing care

② FUTURE VISION
How do these developments and emerging needs shape your vision towards the future?

- a more interoperable health care system
- move from care user to a care contributor
- patient centered design

③ NEEDS
Which emerging human needs do these innovations fulfill?

- personalized care
- more time for patients
- value driven care

④ VALUE DRIVERS
What developments in the world are driving these changes?

Think of:
- Societal developments
- Technological developments
- Industry developments
- Scientific developments

- crowdsourcing, things
- AI & Blockchain
- UBHC concept

⑤ PROFESSIONAL IMPLICATIONS
How does this future affect your role as a professional?

Think of:
- Activities
- Possibilities
- Limitations
- Responsibilities
- Dependencies

- new ways of designing products / services
- increase in design work in health care
- collaboration with new sector
  - experience/cope with new culture.

FUTURE ME

① INTERESTS
Which of your interests would you like to develop?

Team dynamics

DESIRED SKILLS
Looking at the skills and your talents, what skills would you like to acquire/ improve?

better communication

③ AMBITIONS
Based on your interests and skills, describe what you aspire to be / do / be able to do in the future context

In 2 years I aim to be ...

a person who is able to manage design projects ~~in~~ with non-designers ~~and~~ ~~to~~ ~~work~~ ~~with~~ ~~them~~ ~~to~~ ~~get~~ ~~the~~ ~~best~~ ~~out~~ ~~of~~ ~~them~~ • public speaker • host workshops

② FUTURE CONTEXT
How does the changing context affect what you like to do and what you are able to do?

work together with new disciplines

④ OBJECTIVES
List 3 key objectives to realize your ambitions

1 2 3

⑤ USER STORIES
my roadmap

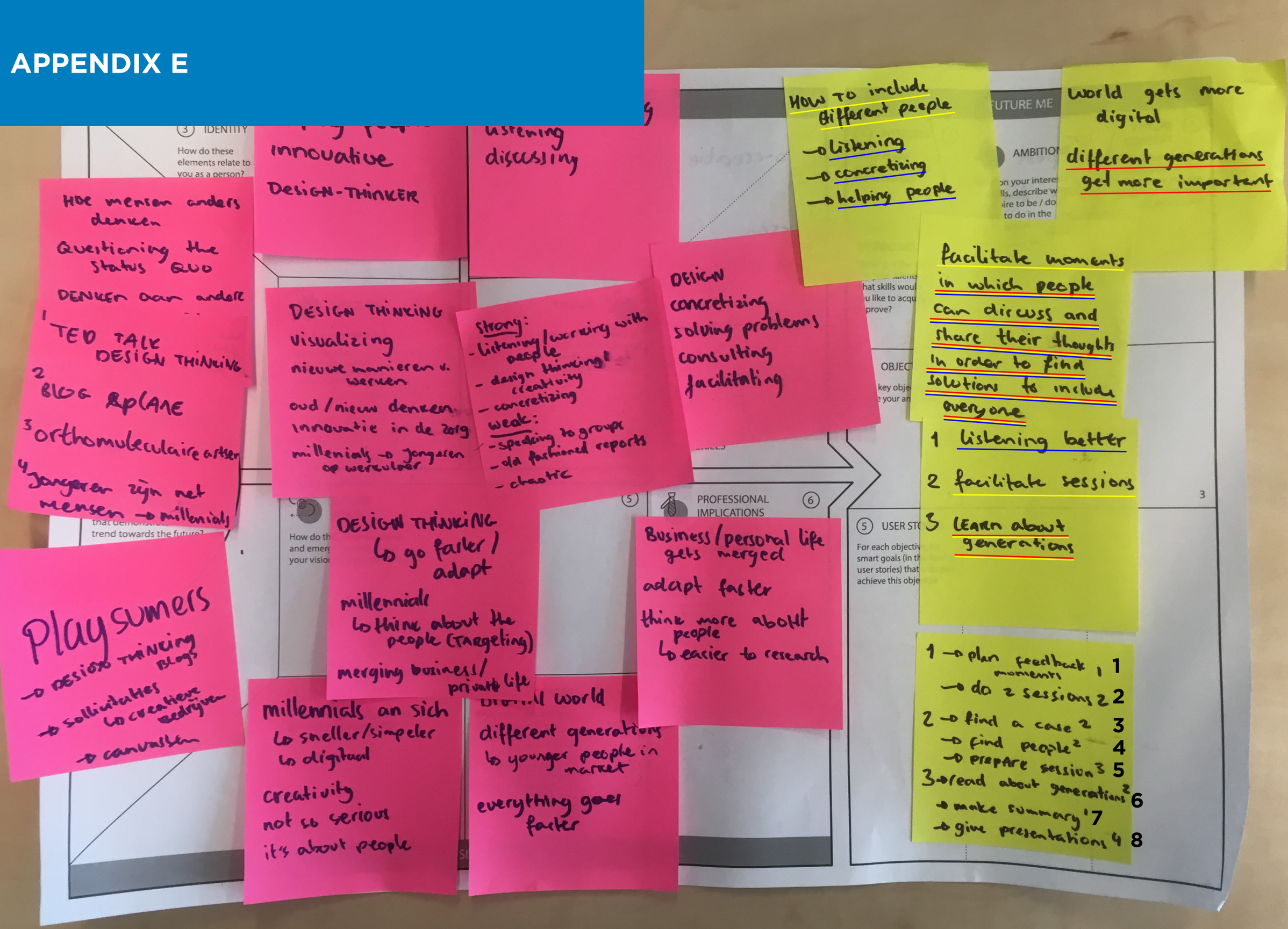
For each objective, list smart goals (in the form of user stories) that help you achieve this objective

1.
2x
3x
1
2
3

Tip
- goed om skills/interesses op te breken
- handvaten

Tip
- concrete vervolgstap
- documenteren

APPENDIX E


innovative
Design-thinker
listening
discussing
How to include different people
→ listening
→ concretizing
→ helping people
World gets more digital
different generations get more important
Hoe mensen anders denken
Questioning the status quo
Denken aan andere
1 TED talk design thinking
2 blog &plane
3 orthomoleculaire artsen
4 Jongeren zijn net mensen → millenials
Design thinking
Visualizing
nieuwe manieren v. werken
oud / nieuw denken
innovatie in de zorg
millenials → jongeren op wereldvlak
Story:
- listening/werking with people
- design thinking/ creativity
- concretizing
weak:
- speaking to groups
- old fashioned reports
- chaotic
Design
concretizing
solving problems
consulting
facilitating
facilitate moments in which people can discuss and share their thoughts in order to find solutions to include everyone
1 listening better
2 facilitate sessions
3 learn about generations
Playsumers
→ design thinking blogs
→ solicitudes
→ creatieve zeedrijven
→ canvassen
Design thinking
Go faster / adapt
millennials
→ thing about the people (targeting)
merging business/ private life
Business/personal life gets merged
adapt faster
think more about people
→ easier to research
millennials an sich
→ sneller/simpeler
→ digitaal
creativity
not so serious
it's about people
different generations
→ younger people in market
everything goes faster
1 → plan feedback moments 1 1
→ do 2 sessions 2 2
2 → find a case 2 3
→ find people 2 4
→ prepare session 3 5
3 → read about generations 2 6
→ make summary 1 7
→ give presentations 4 8
IDENTITY
How do these elements relate to you as a person?
PROFESSIONAL IMPLICATIONS
USER ST
For each objectiv
smart goals (in th
user stories) that
achieve this obje
AMBITIO
FUTURE ME
3

FUTURE ME

1 INTERESTS

Which of your interests would you like to develop?

(digitale) veranderingen in versch. industrie.

DESIRED SKILLS

Looking at the skills and your talents, what skills would you like to acquire/ improve?

analyses maken op verschillende casussen

3 AMBITIONS

Based on your interests and skills, describe what you aspire to be / do / be able to do in the future context

In 2 years I aim to be ...

VISIONAIR en breed inzetbaar als consultant across industries

persoonlijk niveau.

FUTURE CONTEXT 2

How does the changing context affect what you like to do and what you are able to do?

kijken naar de basis structuur van een industrie en hoe die gaat veranderen i.v.m. opschaling.

4 OBJECTIVES

List 3 key objectives to realize your ambitions

leer de core van verschillende relevante industrien 1

trends leren per industrie en analyseren wat breder applicable is 2

deze kennis leren om te vormen in een inspirerend goedlopend verhaal/pres. 3

5 USER STORIES

For each objective, list smart goals (in the form of user stories) that help you achieve this objective

- lees FD dagelijks 1
- analyseer business case achter artikel 2

- lees trend research over industries van project 3
- kopper trend aan FD artikel 4
- maak een map van industrien en link aan relaties 5

- presenteer 1x per week 6
- maak een pres dagelijks 7

5 SOFT SKILLS

~~Resolving~~ conflict
Coordinate.
listening.
Speaking to groups
Negotiate / consult
Lead
Sell

Analyze
Budget
Compute / forecast
Facilitate groups.

HARD SKILLS

6 PROFESSIONAL IMPLICATIONS

How does this future affect your role as a professional?

Think of:
- Activities
- Possibilities
- Limitations
- Responsibilities
- Dependencies

- Constant moet je op de hoogte zijn van nieuwe ontwikkelingen
- samenwerken, van elkaar leren.
- blijven leren

2 FUTURE ELEMENTS

For example in:
- Articles
- Talks
- TV shows
- Podcasts

FUTURE VISION

How do these developments and emerging needs shape your vision towards the future

De wereld verandert, hoe kunnen we dat embracen waarbij we waarborgen dat dat op goede en humane manier gebeurt.

3 IDENTITY

How do these elements relate t... you as a person?

1) De waarde design in traditionele consulting praktijken
2) kijk in het leven van anderen
3) waarom je naar Afganistan gaat als je zo angst bent (wereld is belangrijker)
4) mensen die alles laten vallen om dromen na te jagen

- waar kamermeisje ziet maar niet vertellen
- ontvoering zwanger vr. in Afganistan
- Floortje einde de wereld.

Ik wil mijn dromen nastreven en dat mag best ergens ten koste van gaan.
Ik wil van anderen leren en hun perspectieven opnemen en geloof in de impact van design en mensen inspireren

- Andere culturen opvallende
- Business perspectieven
- inspirerende persoonlijke verhalen / levens lessen
- veranderende wereld.

Strengths.
- Speaking to groups
- consult
- lead
- analyze

Weaknesses
- listening.
- compute
- sell

Remapped

Driving Pandemonium
1) Fintech, insecurity of banks.
2) startups dopping everywhere making corporate weak

4) alles kan sneller makkelijker
2) transparantie want ik wil zien hoe het werkt
3) ik wil het nieuwste en snelste en dat is niet van een 10 jaar oud bedrijf.

1) faster chips / processors computing power
2) info exessibility
3) globalization.
4) connectedness.

STATUS SEEKERS

The relentless, often subconscious, yet ever-present force that underpins almost all consumer behavior

BETTERMENT

The universal quest for self-improvement

HUMAN BRANDS

Why personality and purpose will mean profit

BETTER BUSINESS

Why 'good' business will be good for business

YOUNIVERSE

Make your consumers the center of their YOUNIVERSE

LOCAL LOVE

Why 'local' is, and will remain, loved

UBITECH

The ever-greater pervasiveness of technology

INFOLUST

Why consumers' voracious appetite for (even more) information will only grow

PLAYSUMERS

Who said business had to be boring?

EPHEMERAL

Why consumers will embrace the here, the now, and the soon-to-be-gone

FUZZYNOMICS

The divisions between producers and consumers, brands and customers will continue to blur

PRICING PANDEMONIUM

Pricing: more fluid and flexible than ever

HELPFULL

Be part of the solution, not the problem

JOYNING

The eternal desire for connection, and the many (new) ways it can be satisfied

POST-DEMOGRAPHIC

The age of disrupted demographics

REMAPPED

The epic power shifts in the global economy

APPENDIX F

INTERESTS

What are your interests ?

TALENTS

What are your talents and weaknesses?

FUTURE CONTEXT

What will your future professional environment be like?

AMBITIONS

Based on your interests and skills, describe what you aspire to be / do / be able to do in the future context

I would like to become a Senior Software developer who mentors / helps others. While keeping KLM as Dutch as possible without being ignorant to other countries / cultures.

OBJECTIVES

List 3 key objectives to realize your ambitions

Become a better software developer with the technical and functional (klm) knowledge to be able to transfer this to others

Develop a way to help / coach others so it's also a good / valuable experience for themselves. This has to do with communication and being able to give "good" feedback.

I like to travel / see and learn about new cultures. This helps to understand how others work and think. That will help within AFKL as BlueWeb alone already has 15+ $ nationalities.

ME STORIES

For each objective, list smart goals (in the form of user stories) that help you achieve this objective

1
- Keep up to date with the latest software / framework updates.

2
- Make sure to pick up hard or challenging user-stories to be able to learn new stuff.

3
- Ask for feedback after I have tried to explain something.

4
- Learn by doing: f.e. the talk we're going to give at NG - Malaysia this year.

5
- Keep traveling to meet new people and cultures.

6
- Be open minded and respect other cultures.

Mark ..... 's Personal Ambitions Canvas

KLM

INTERESTS

What are your interests ?

TALENTS

What are your talents and weaknesses?

FUTURE CONTEXT

What will your future professional environment be like?

AMBITIONS

Based on your interests and skills, describe what you aspire to be / do / be able to do in the future context

Learn more about AI and machine learning data science and how to apply this as a front end developer to give our clients a better experience.

OBJECTIVES

List 3 key objectives to realize your ambitions

Learn about data science and machine learning

Find ways ML to apply this in my day-to-day job.

Apply machine learning within the BW project

ME STORIES

For each objective, list smart goals (in the form of user stories) that help you achieve this objective

1
learn about data since

2
learn about machine learing

3
learn about machine learing in javascript

4
Research use cases which can be improved with machine learning

5
Create awareness within the project

6
Create an example of something to show people the possibilities

UGO8 ....'s Personal Ambitions Canvas

KLM

INTERESTS

What are your interests ?

TALENTS

What are your talents and weaknesses?

FUTURE CONTEXT

What will your future professional environment be like?

AMBITIONS

Based on your interests and skills, describe what you aspire to be / do / be able to do in the future context

Be an active open-source contributer without trying to be perfect on the first try. Contribute and make it better after.

OBJECTIVES

List 3 key objectives to realize your ambitions

- Contribute on open-source projects that you use in your job
- Share your contribution
- Investigate other peoples contributions and learn from them

ME STORIES

For each objective, list smart goals (in the form of user stories) that help you achieve this objective

- ○ choose an open-source project to contribute 1
- ○ look at the issues which needs to be fixed 2
- ○ look at the other contributers' solutions and undestand how they solved it 3
- ○ select an issue to fix 4
- ○ try to fix it 5
- ○ propose a solution 6
- ○ take feedbacks 7
- ○ make it better 8
- ○ have your contribution included in the project 9
- ○ share your journey 10

APPENDIX G

Develop Your Ambition | Workbook

KLM

"Intelligence without ambition is a bird without wings"

- Salvador Dalí -

INTRODUCTION

This workbook is developed to help you in the process of defining your ambitions. In this process we'll start from who you are and what you can. Then we'll have a look at the future. Finally you can combine your findings about yourself and your future context in the personal ambitions canvas, to define your ambitions.

On each page in this workbook you'll find short exercises. It is explained why, how and what you should do.

Good luck and enjoy!

TALENTS

WHY
Your talents should be used.

HOW
Determine what skills you consider relevant for you, to define your talents and weaknesses in personally relevant skills.

WHAT
Follow the three steps on the right. For the first two exercises you can use the provided skill cards as inspiration for determining your own skills.

1 MY CORE

What soft skills do you consider important for you?

List at least five skills

For example:
- Communication
- Collaboration
- Creativity
- Critical Thinking
- Flexibility

2 MY SPECIALIZATION

What hard skills do you consider important for you?

List at least five skills

For example:
- Product Design
- Data Analysis
- English
- Programming
- Qualitative Research

3 MY TALENTS

Looking at this variety of skills, how would you briefly describe your talents and weaknesses?

1

3

2

INTERESTS

WHY
Your personal interests should be at the core of what you're doing.

HOW
Be aware of what inspires you in daily life to become aware of your interests.

WHAT
Follow the three steps on the right.
For the first exercise you can use the inspiration you gathered as input.

1 INTERESTING, ...

What have you seen/ heard/ read/ done lately that you found interesting?

List at least one work-related and one not work-related example

For example in:
- Articles
- Talks
- TV Shows
- Podcasts
- Social Media

2 ..., BUT WHY?

Why were you interested in this? What elements in these items sparked that interest?

Describe this per item you listed in the previous step

3 MY INTERESTS

What interests can you derive from these descriptions?

1

3

2

FUTURE CONTEXT

WHY
You're moving forward, and so is the world.

How
Find the patterns in the developments you see around you, to imagine your future environment.

WHAT
Follow the six steps on the right. For the first exercise you can use the provided trend canvas.

1 TREND

Pick a megatrend from the canvas.

2 EXAMPLES

What examples do you know of innovations representing this trend?

List at least 3 innovations

3 HUMAN NEEDS

What human needs are fulfilled by these innovations?

4 CHANGE DRIVERS

What developments in the world are driving these innovations?

Think of:
- Societal developments
- Technological developments
- Industry developments
- Scientific developments

5 MY FUTURE VISION

How do these developments and emerging needs shape your vision on the future?

6 MY FUTURE PROFESSION

How does this future affect your role as a professional?

Think of:
- Activities
- Possibilities
- Limitations
- Responsibilities
- Dependencies

1

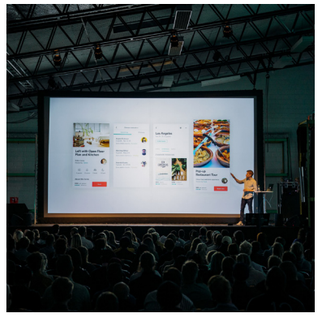
3

5

2

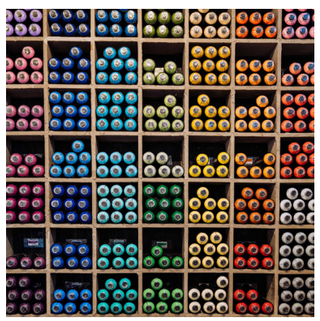
4

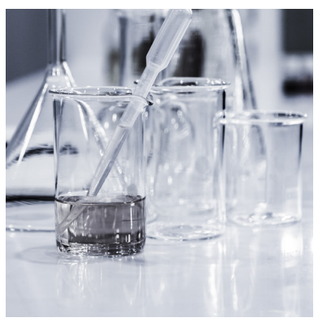
6

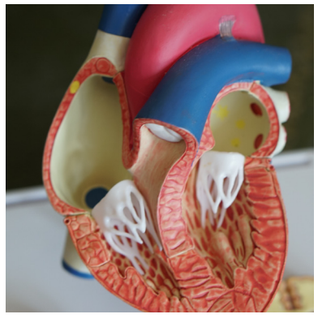


TEAM
RUBICON

FINDING A BIKE
CONVENIENCE
LOCATION
SAFETY
DENSITY
HYGIENE

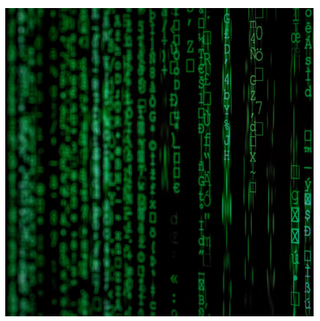






Google
Google Search

GOAL REVIEW
ASSESS
PLAN
WRITING SESSION
ARTICLES PUBLISH

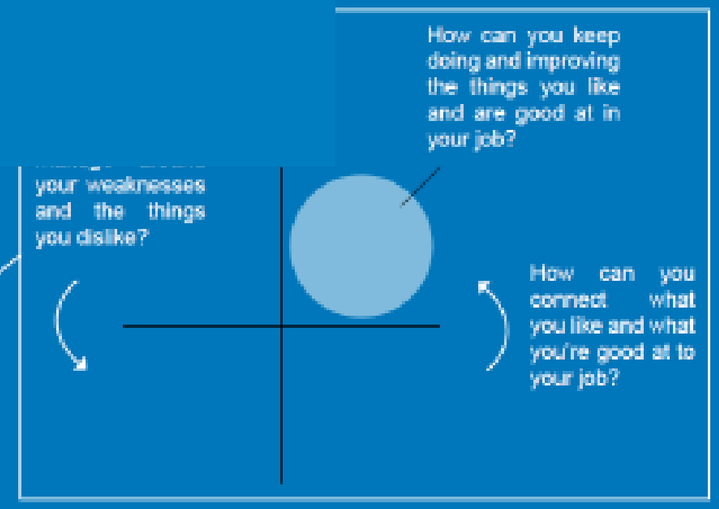


APPENDIX H

1	sportiveness	●	9		
2	Root cause analysis	●	10		
3	handling feedback	●	11	Traveling	●
4	agility / flexibility	●	12	The unknown	●
5			13	gaining technical knowlegde (la	●
6			14	software development	●
7			15	sports / competition	●
8			16		

I think it's not impacting only my role as a professional, but everyone who is working in a office. You really have to be aware on how much you move and what you eat. You're not working physically so burning less calories.
I do think that these days companies are more and more aware of this and are trying to get their staff to move. ●

The "older" I will get the more important it is to keep moving. Now I'm still young so it's easier then when I would have kids or something. ●



+ **FUTURE CONTEXT**

① DEFINE LEARNING OBJECTIVES

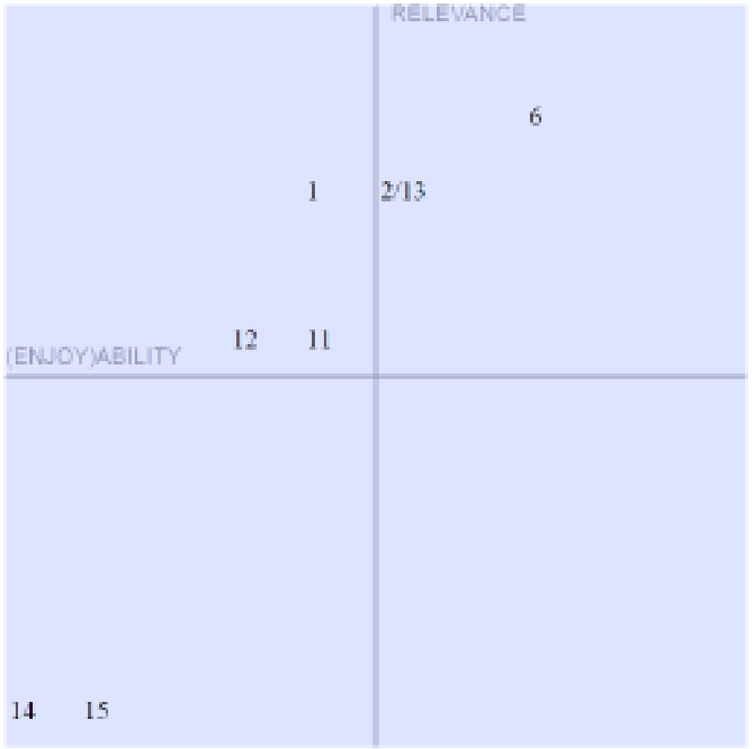
How would you like to develop?
What would you like to improve?

Do's:
- Describe personal growth goals and intents
- Be ambitious, but realistic
- Make them tangible, objective and unambiguous

As a software developer I always want to keep learning. And I want to become a better software developer both technical and on functional (KLM) level. Also traveling will help me to develop myself and learn more about other cultures. ● ●

Next to learning myself, I would also like to teach others. And that me teaching them is a nice experience for both parties. This has to do with the way you communicate / hand over knowledge. ● ●

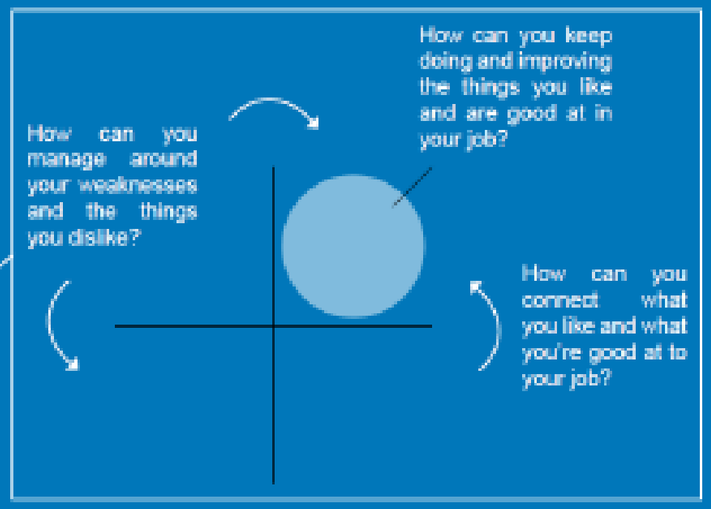
Last I want to keep fit / healthy as a human, there is nothing as important as your personal health. (both physical and mentally). ● ● ●



1	Work with pressure	●	9		
2	Software programming	●	10		
3			11	Machine Learning	●
4			12	Artificial Intelligence	●
5			13	Software Engineering	●
6	Knowledge sharing	●	14	Scratching	●
7			15	Mixing	●
8			16		

Software Engineers will need to learn machine learning and other AI related techniques to keep up with the working field and to stay attractive to companies. ●

It will allow me to build smarter solutions which should be easier to use for customers. ●



+ **FUTURE CONTEXT**

① DEFINE LEARNING OBJECTIVES

How would you like to develop?
What would you like to improve?

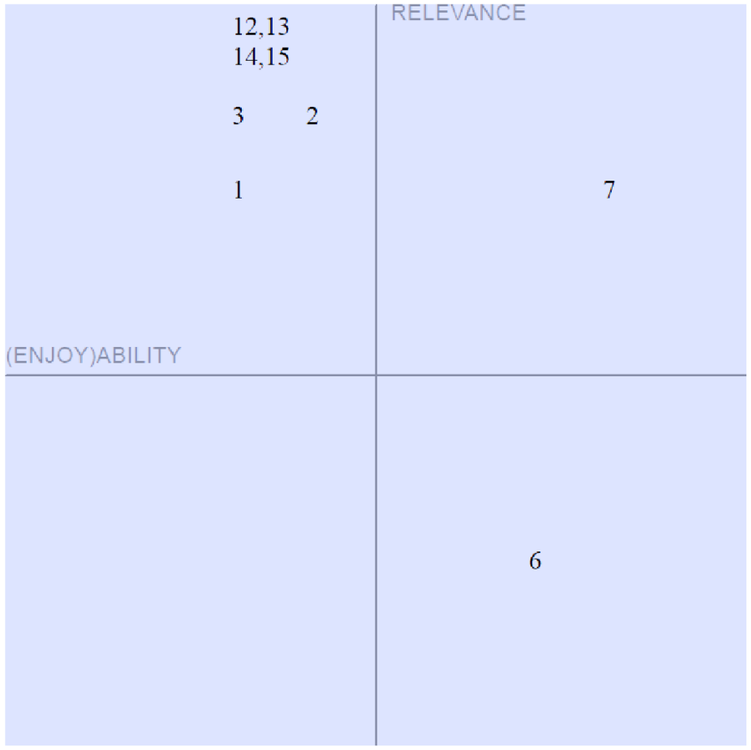
Do's:
- Describe personal growth goals and intents
- Be ambitious, but realistic
- Make them tangible, objective and unambiguous

I'd like to learn machine learning. ● ● ●

Find ways to apply machine learning my day-to-day job. ● ● ●

Apply machine learning in the BlueWeb project. ● ● ●

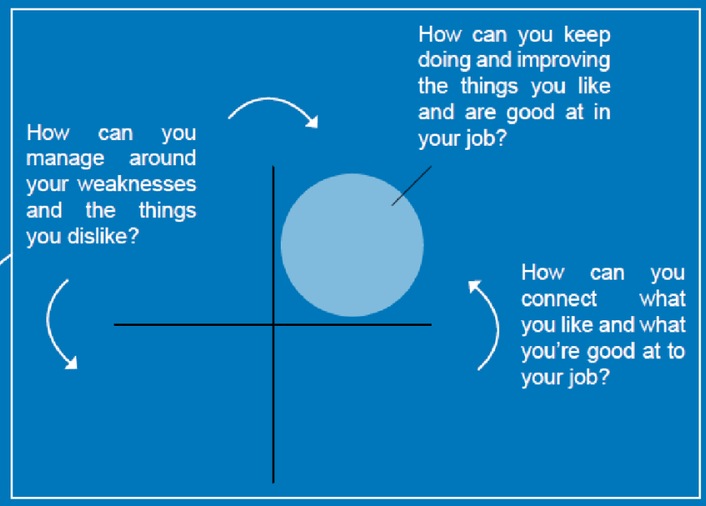
Roël Tibosch



1	self confidence	●	9	
2	decision making	●	10	
3	stress control	●	11	how stress affects our decision
4			12	how to deal with stress
5			13	how confidence level of your k
6	humour	●	14	positive and negative effects of
7	being honest	●	15	does confidence help dealing st
8			16	

It will help me to deliver more robust softwares ●

I can focus on more on the parts of the applicatons which needs my expertice ●



+ **FUTURE CONTEXT**

① DEFINE LEARNING OBJECTIVES

How would you like to develop?
What would you like to improve?

Do's:
- Describe personal growth goals and intents
- Be ambitious, but realistic
- Make them tangible, objective and unambiguous

be better on decision making ● ● ●

increase self confidence ● ●

deal better with stress ● ●

Roël Tibosch

1 Learn about data science

2 learn about machine learning

3 Learn about machine learning in javascript

4 Research use cases for machine learning which can be improved

5 Create awareness within the project

6 Create an example of something to show people the possibilities

1 -take a topic that you want to have a decision on

2 -chose one option and proceed with it
3 -after everything is done think about the other option and what could happen if you have had chosen that option like a thought experiment

4 -find a topic that you don't feel comfortable doing

5 - practice to make it better

6 -compare your experience after your excercises

7 - when a stressful event occures stop thinking what is going to happen

8 - take 10 minutes to yourself and do breathing excercises

9 - try to find possible solutions to the stressful event

APPENDIX I

① RECOLLECT SPARKS

What have you seen/ heard/ read/ done lately that you found interesting?

List at least two work-related and two not work-related examples

Possible Sources
- Articles
- Talks
- TV Shows
- Podcasts
- Social Media

② GET TO THE CORE

Why were you interested in this? What elements in these items sparked that interest?

Describe this per item you listed in the previous step

Categories
- Specific knowledge
e.g. The process of photosynthesis
- Specific skills
e.g. Storytelling

CONTINUE

② GET TO THE CORE

Why were you interested in this? What elements in these items sparked that interest?

Describe this per item you listed in the previous step

Categories
- Specific knowledge
e.g. The process of photosynthesis
- Specific skills
e.g. Storytelling

③ FIND YOUR INTERESTS

What interests can you derive from these descriptions?

List at least 5 interests

Example
The influence of plants on human health
Derived from:
Photosynthesis & influence of plants on air quality

CONTINUE

① RECOLLECT MOMENTS OF FLOW

What activities do you remember in which you feld you did great?
What activities do you remember which you could have done better?

List at least 6 activities (including step 2)

Examples
- Capturing the audience during my presentation
- Getting to the core of the problem

② GATHER TIPS & TOPS

What activities did others mention that you did great?
What activities did others mention that you could do better?

List at least 6 activities (including step 1)

Examples
- Capturing the audience during my presentation
- Getting to the core of the problem

CONTINUE

③ LIST YOUR ABILITIES

What abilities of you made you thrive in these moments?
What lacking abilities made activities difficult?

List at least 1 competence per activity

Examples
- Root cause analysis
- Storytelling
- Stakeholder management

CONTINUE

④ MAP YOUR INTERESTS & ABILITIES

You have defined what you like and what you're good at. Now map these outcomes in the matrix.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

RELEVANCE

ABILITY / ENJOYABILITY

CONTINUE

1 PICK A TREND

Pick one of the trends described here

2 THINK OF EXAMPLES

What examples do you know of innovations representing this trend?

List at least 3 innovations

Example
Trend: Data Era
Innovations:
- Netflix personal recommendations
- Cookies on websites
- Moneyball

CONTINUE

4 DERIVE TECHNOLOGICAL DEVELOPMENTS

What technological developments enable these innovations?

List as many as possible

Examples
Better algorithms
Large-scale and continuous data collection
Increasing computing power

CONTINUE

5 DERIVE BUSINESS DEVELOPMENTS

What developments in business enhance these innovations?

List as many as possible

Examples
Data becomes revenue
Data-driven decision-making
As-a-service business models

CONTINUE

6 DESCRIBE CHANGES IN YOUR ROLE

How does this future affect your role as a professional?

Think of:
- Activities
- Possibilities
- Limitations
- Responsibilities
- Dependencies

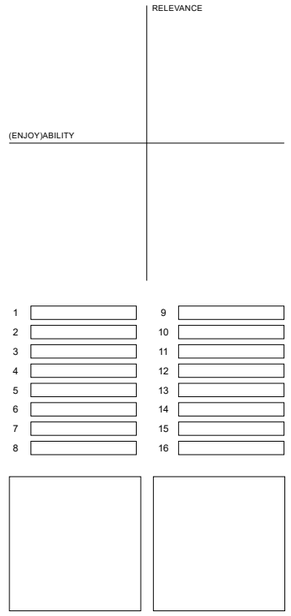
CONTINUE

7 DESCRIBE CHANGES IN YOUR WORK CONTENT

How does this future affect the work you deliver?

Think of:
- Different types of solutions
- New directions for solutions
- Different (internal/external) clients

CONTINUE



1 DEFINE YOUR AMBITION

Combining the elements on the left, what do you want to be doing in a year?

Think of:
- Activities
- Possibilities
- Limitations
- Responsibilities
- Dependencies

Describe what you want to do / be able to do (talents X context) in which field of interest (interests X context)

2 CONCRETIZE THROUGH OBJECTIVES

What objectives can help you achieving this ambition?

Think of:
- Activities
- Possibilities
- Limitations
- Responsibilities
- Dependencies

Your Ambition

Objectives
List 3 key objectives to realize your ambitions

User stories
For each objective, list smart goals (in the form of user stories) that help you achieve this objective

APPENDIX J

1st Iteration

First session:

Value
From the canvas can be concluded that the interests and competences as well as the vision on the future context are included in the ambition. These elements are represented in the objectives as well.

In the table below it is categorized which user stories meet which criteria:

Specific and actionable: 1
Measurable: 1
Outcome-related: -
Relevant to the objective: 1, 2, 3 & 4

From this can be concluded that the content of the stories could contribute to achieving the learning objectives, but the format of the user stories is not specific, measurable and outcome-related.

Content
In general, a lot of explanation and examples from the facilitator were needed for the participant to understand what to do. This was due to the terminology in combination with a lack of explanation and examples in the canvas. If she knew what to do, she was well able to execute the assignments.

The input of the various section was not a significant bottleneck for the participant. She needed to be guided by some more explanation and examples, but was well able to come up with input. Only the input for the talents section was difficult. The problem was mainly the understanding of foundational and breadth skills. So said the participant: "What are breadth skills, I don't know what I should think about."

The process of the interests section caused difficulty as well. The terminology was unclear appeared from statements like "What are sparks?" and "What do you mean with identity?".

The process of the future context section was experienced to be easier. The participant suggested this to be caused by the fact that it is not about yourself: "The bottom part is way easier, because it is not about yourself".

The ambition section went smooth. The participant was well able to combine the outcomes of the various sections in the ambition and objectives.

Finally, the participant saw the value of the canvas. She declared the canvas was insightful for herself. An example is something she said during the process: "Quite confronting that everything I fill in has nothing to do with my current study".

Form
From the canvas can be concluded that there clearly is insufficient space for answers. At some places, the participant used symbols to refer to text somewhere else on the canvas, because of insufficient space to write there.

Also, quite some scratching is visible on the canvas. This reduces the space to write even more and at some places makes the canvas unclear.

No specific comments of the participant were noted regarding the format.

Second session:

Value
From the canvasses can be concluded that for all three participants some interests, competences and future context elements are represented in the learning ambitions. One of the participants did not finish the canvas, so no conclusions can be drawn for that participant regarding the representation of those elements in the objectives as well. For the other participants, the elements are also integrated in the learning objectives. One of those two participants defined the learning objectives by drawing arrows from specific parts of the ambition to the area for objectives.

In the table below it is categorized which user stories meet the defined criteria for participant 1 (Jill):

Specific and actionable: 1, 3
Measurable: 1, 3
Outcome-related: 1, 2, 5, 8
Relevant to the objective: 1, 2, 3, 4, 5, 6, 7, 8, 9

In the table below it is categorized which user stories meet the defined criteria for participant 2 (Dasha):

Specific and actionable: -
Measurable: -
Outcome-related: 4, 7, 8
Relevant to the objective: 1, 2, 3, 4, 5, 6

For participant 3 (Joris) this analysis could not be executed, because no user stories were listed.

From the analysis a few conclusions can be drawn. First of all, user stories mostly contribute to the objectives. This shows goal-directed behavior. Secondly, the vast majority of user stories lack specificity and are not measurable. Besides, the user stories are not independent. Both participants defined user stories that should be executed in sequence. Finally, although almost half of the user stories was outcome related, these outcomes mostly were not a valuable outcome itself, but needed a consecutive action. An example is "Find 3 courses about team coaching". If this outcome is realized, it needs consecutive action in the form of participation and completion of a course.

Content
A short explanation of the purpose of the template was given before using the template. However, this was not sufficient for the participants. They told they wanted to understand the process and its value. A participant stated: "I want to know why I am doing this".

The overall setup of the canvas was unclear to participants. A participant asked right away: "Where do I start?". Also it was unclear to them what the sequence of the activities was. For example a participant asked: "How should I fill this in?".

Besides the general flow, it was also not clear that the template consisted of separate parts. It was suggested to use different templates for the various parts to create a clear separation.

The input of the various parts was a bottleneck for the participants. The inspiration for the interests as well as the future context part required significant time, explanation and examples for the participants to be able to recollect inspiration. One participant said: "I just haven't read anything interesting the last few weeks". For the input of skills, participants suggested using a list of skills to provide support in coming up with skills.

In the process of defining interests the step regarding identity felt odd to participants. A participants suggested first defining interests and them relating to ones identity: "I would do identity after interests, it feels next level compared to interests".

The categorization between different types of skills, foundational skills, depth skills and breadth skills caused confusion. Participants asked several questions to clarify what was meant with each of these categories.

The process towards a future vision appeared to be difficult. The main bottleneck was the assignment regarding value drivers. A participant asked: "What is the difference between Future Elements and Value Drivers?". Confusion was not only caused by the naming of the assignment, but also the content, as significant explanation and examples were needed to create understanding.

The transition from the interests, talents and future context to the learning ambition was unclear. It was unclear to the participants that this part continued on the outcomes of the other parts. Furthermore a participant asked a question about the difference between ambition and objectives. Another participant answered: "The ambition is more abstract than the objective I think".

As stated before, participants defined consecutive user stories. They also suggested to use this approach in the template.

During the process participants needed significant explanation and examples. This was caused by a lack of specificity and unclear terminology. Three improvements were suggested by participants. First of all they wanted to know the number of answers that was expected. Secondly, they told examples helped understanding assignments. Finally, they suggested to use more simple and likable titles.

While reflecting on the process afterwards, participants told that for some elements they would like some more context. Also they suggested to link the process to existing KLM initiatives.
Finally, participants were positive about the separation of interests and talents. A participants said: "I really like that you separated the interests and talents".

Form
On the canvas there is a lack of space for writing, especially for the inspiration. A participant asked referring to the inspiration task: "Where do I need to write?".

As explained the transition to ambition was unclear. This might be solved using a different medium than a template.

Finally, as explained participants suggested separation of the parts. For the interests part, a participant referred to the School of Life Interest Cards. If the parts are separated, different forms could be used for different parts.

Third session:

Value
In the third session participants were asked to write down their learning ambition and three objectives before the sessions. These are compared to the learning ambition and objectives created during the session.

Participant 1 (Leroy)

Ambition before:

"In two years I want to be able to independently give in depth advice to clients within digital transformation."

Ambition after:

"Visionary and versatile as consultant across industries. Personal level."

Objectives before:

- Industry specific knowledge/trends
- Consulting soft skills
- Competence to execute analyses fast

Objectives after:

- Learn the core of different relevant industries
- Learn trends per industry and analyze what is wider applicable
- Learn to transform this knowledge in a inspiring, smooth story/ presentation

Participant 2 (Milou)

Ambition before:

"Helping people through co-creation, design tools and creative sessions."

Ambition after:

"Facilitate moments in which people can discuss and share their thoughts in order to find solutions to include everyone."

Objectives before:

- Facilitating better
- More experience in client cases
- Elaboration of my knowledge in the field of design tools

Objectives after:

- Listening better
- Facilitate sessions
- Learn about generations

From comparing the ambitions and objectives a few conclusions can be drawn. While for participant 1 the ambition became broader, for participant 2 the opposite is true. Participant 1 includes more industries in his ambition at the end of the process. Participant 2 is more specific in what kind of sessions she wants to facilitate.

Regarding the objectives, for both participants these became more specific. Moreover, three new learning objectives were defined post-session compared to pre-session.

From the canvasses can be concluded that for both participants some interests, competences and future context elements are represented in the learning ambitions. Moreover, the elements are integrated in the learning objectives as well. For one of the participants a part of the ambition and one objective, both marked black, are not related to the selected interests, competences and future context. However, they are retraceable to information in the canvas.

In the table below it is categorized which user stories meet the defined criteria for participant 1:

Specific and actionable: 1, 3, 4, 5, 6
Measurable: 1, 3, 5, 6, 7
Outcome-related: -
Relevant to the objective: 1, 2, 3, 4, 5, 6, 7

In the table below it is categorized which user stories meet the defined criteria for participant 2:

Specific and actionable: 7, 8
Measurable: 1, 2, 3, 4, 7, 8
Outcome-related: 3, 4
Relevant to the objective: 1, 2, 3, 4, 5, 6, 7, 8

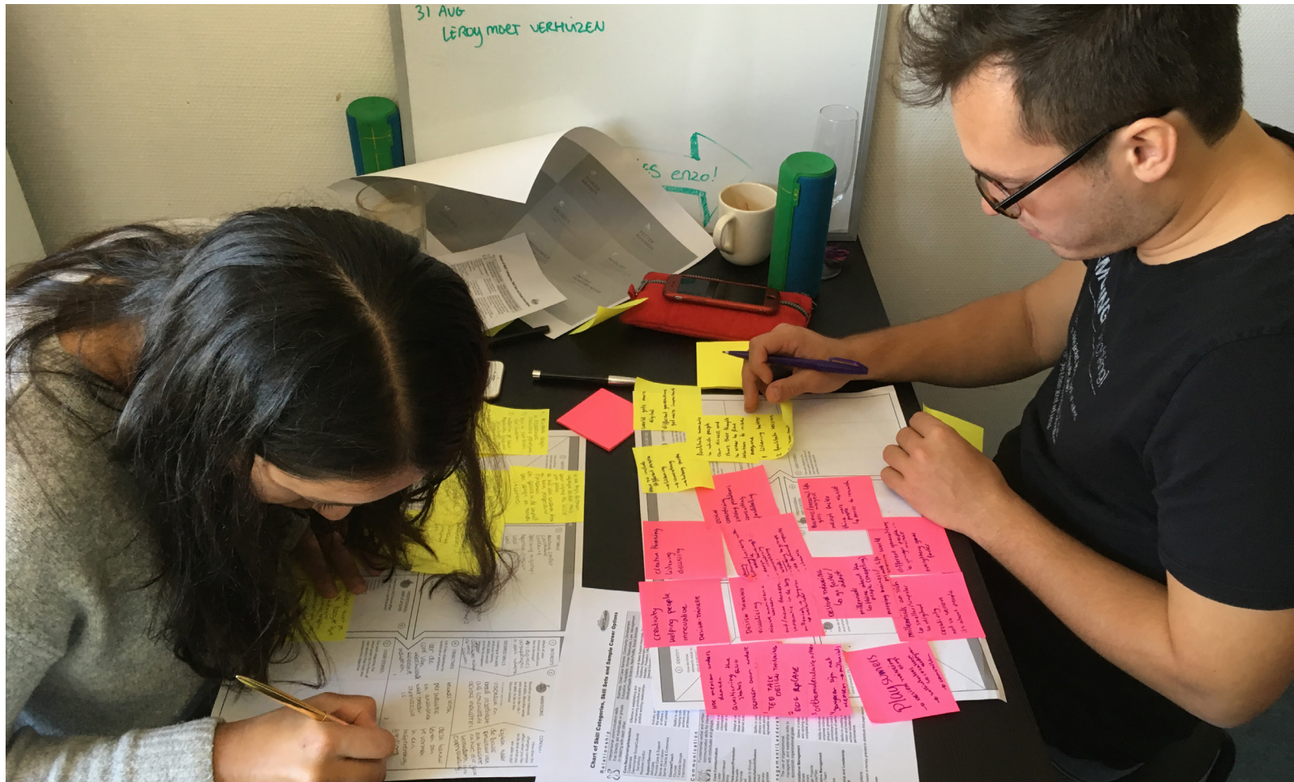
Just like in the previous session, participants defined user stories that contribute to achieving the objectives. Also the majority of user stories are measurable. Additionally the majority of user stories of participant one are specific and actionable to the extent that is possible regarding the content of the user stories. The user stories of participant 2 on the other hand lack this specificity. Finally nearly all user stories are not outcome-related, but describe an action. Since both participants defined consecutive user stories, this outcome could be derived from the consecutive user story.

Content
After a short introduction the participants started filling in the template. However, the participants did not consider the introduction sufficient. They asked questions on the relationships between interests, talents, future and ambitions. These answers were not provided. Still, at the end of the session the participants understood the purpose of the process. One of them stated: "Ah, now I understand what you're doing".

During the session, the presence of a facilitator appeared useful. A significant amount of questions were asked, which could now be answered by the facilitator. This value was also confirmed by the participants.

At the end of the session, a participant declared that for the interests section she first limited the input to profession-related input. She said: "I was thinking about what would be expected of me". Later on the added input that was not profession-related. Still she told she would not have dared to do this in a work environment. The other participant then suggested to add the requirement that two work-related and two not work-related items must be mentioned.

The input for the competences section appeared to be no bottleneck for the participants. For the input of the competences section, the participants were provided with a list of skills in this session. This enabled them to generate input fast, but diminished the individual input; participants did not actively think of skills themselves anymore, but just selected skills from the list.



For the future context section, participants were provided a trend canvas. This seemed to be useful, as participants filled in the first two exercises relatively fast. Also they liked the canvas: "This is a nice thing!"

Some of the exercises in the process caused confusion. When a participant reached the 'interests' exercise in the interests section, he asked: "What is the difference with this one?", pointing at the 'sparks' exercise. It turned out he noted his interests for that exercise already.

The differentiation between soft and hard skills also needed additional explanation. After mentioning a few examples this differentiation was better understood. However, the use of it was still questioned.

Finally, at the end of the session a participant claimed she saw a connection between the user stories and the inspiration: "Inspiration and user stories are connected"

Form
Regarding the format the participants complained about a lack of space. They disliked the fact that sticky notes did not fit in the boxes. One of them said: "It really annoys me that my PostIts don't fit". Also, due to the use of sticky notes, the titles and descriptions were not visible anymore, which makes the canvas unclear.

2nd Iteration

In this session were four participants. However, one of them was not able to fill in the ambition template. Therefore only three ambition templates are included in this analysis.

At the start of the session, participants were asked to write down their learning ambition. These ambitions are compared to the learning ambitions created during the session.

Participant 1 (Tom)

Ambition before:

"I would like to have a senior developer role within Air France – KLM (e.g. tech lead)."

Ambitions after:

"I would like to become a senior software developer who mentors/ helps others. While keeping KLM as Dutch as possible without being ignorant to other countries/ cultures."

Participant 2 (Mart)

Ambition before:

"Share knowledge with other developers"

Ambitions after:

"Learn more about AI and machine learning, data science and how to apply this as a front end developer to give our clients a better experience."

Participant 3 (Ugur)

Ambition before:

"I would like to share my experience/ knowledge in conferences as a speaker"

Ambitions after:

"Be an active open-source contributor without trying to be perfect on the first try. Contribute and make it better after."

Based on the comparison of the ambitions can be concluded that the ambitions defined during the session are more specific and more elaborate. For one of the participants the ambitions defined before and during the session are completely different.

From the canvasses can be concluded that for two out of three participants interests, competences as well as future context elements are represented in the learning ambitions and objectives. One participant did not include the outcomes of the interests part in the learning ambition and objectives.

In the table below it is categorized which user stories meet the defined criteria for participant 1:

Specific and actionable: 2, 3, 4
Measurable: 3, 4, 6
Outcome-related: 6
Relevant to the objective: 1, 2, 3, 4, 5, 6

In the table below it is categorized which user stories meet the defined criteria for participant 2:

Specific and actionable: 4, 5, 6
Measurable: 5, 6
Outcome-related: -
Relevant to the objective: 1, 2, 3, 4, 5, 6

In the table below it is categorized which user stories meet the defined criteria for participant 3:

Specific and actionable: 1, 2, 3, 4, 5, 6, 8, 10
Measurable: 1, 2, 3, 4, 6, 8, 9, 10
Outcome-related: 9
Relevant to the objective: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Without exception the user stories that are defined are relevant to the objective. About half the user stories meet the criteria of being specific and actionable and being measurable. Almost no user stories are outcome-related. These results are comparable to the results of the third session of the first iteration.

Content

The participants were asked to define their learning ambition at the start of the session. The asked questions about what was expected of them and it took them relatively long to write down their ambitions.

During the execution of the exercises it was silent in the room. Participants barely discussed the answers with each other. They talked in between exercises and asked for clarification is elements were unclear.

The input for the various sections were no bottleneck for the participants. They were well able to come up with input for the interests. For the competences section they were provided with images of competences. However, they did not use these to generate input. For the future context section they were provided a trend canvas. A participant told about this: "I've never seen something like this before". They liked the canvas, but needed explanation regarding the trends to be able to use them.

Regarding the processes, mainly the future context process caused difficulty. The exercise entitle 'Change Drivers' raised questions and needed explanation and examples for the participants to understand what to do. Also it was difficult for them to define a future vision from the data they generated. The 'Professional Implications' exercise did not raise questions from the participants. However, it appeared to be multi-interpretable. Where some participants described expected changes of their professional role, other participants described expected changes in the solutions for the customers.

An interesting moment during the session showed a need for a stimulus to challenge participants' thinking. A participant said after filling in the interests section:

- "Ha, it's funny, because I already see a problem"
- So I said: "Ok, perfect. What do you see?
- He said: "Well, I need to connect these parts in my ambition, but these parts are not at all connected"

Then I asked him a couple of 'why' questions about his answer to find out the underlying interests. In this way he went from engine technology to speed. This interest could be connected to other elements.

The process to define ambitions, objectives and personal user stories was perceived as easy. A participant said about it: "This was really easy to do, after you filled in this".

On the ambition canvas, the boxes for the interests, competences and future context remained empty. Participants preferred looking answers back in the booklet over copying the answers.

When reflecting on the session afterwards, participants had a couple or remarks. Participants told for some exercises they needed a scope, because without that context answers could be irrelevant for the job. The example a participant mentioned was one of the interests he wrote down: "DJ'ing".

Also a participant said: "I got a new idea for a project, but is was by luck". This idea for a new project originated from combining the trend with his work. He claimed is was luck, because he could have chosen a different trend.

The participants indicated they liked the session. A participant stated: "I like it because it is different from what I'm usually doing". Another participant said referring to the booklet: "I like that it is step by step". To enable a smoother process, participants wanted more examples: "The examples really helped."

Finally, the participants were doubtful if the user stories could be implemented in their sprint planning. They explained integration could be actualized in multiple ways. The scrum master said about this later: "Now it's just a matter of management agreements".

Form

The participants had mixed opinions on the form. One participant told: "I liked writing, because on my laptop I would get distracted 75 times in the past hour". Also they claimed that writing forces you to think. Another participant on the other hand said: "I'm more of a typing person".
Also the transition to the backlog requires additional effort due to the format. Participants have to retype what they wrote to include it in the backlog.

3rd Iteration

In this session were four participants. However, one of them was not able to fill in the ambition section, because he had to leave the session early. Therefore only three ambition sections are included in this analysis. One of those three participants did not finish the personal stories due to a lack of time. The approximate time participants got to fill in the canvas is 45 minutes.

From the canvasses can be concluded that for the participants that finished the process, interests, competences as well as future context elements are represented in the learning ambitions and objectives.

In the table below it is categorized which user stories meet the defined criteria for participant 2 (Mart):

Specific and actionable: 4, 5, 6
Measurable: 5, 6
Outcome-related: -
Relevant to the objective: 1, 2, 3, 4, 5, 6

In the table below it is categorized which user stories meet the defined criteria for participant 3 (Ugur):

Specific and actionable: 2, 3, 4, 8
Measurable: 1, 2, 6, 8
Outcome-related: 4
Relevant to the objective: 1, 2, 3, 4, 5, 6, 7, 8, 9

Without exception the user stories that are defined are relevant to the objective. The specificity and measurability of the stories still leave significant room for improvement. Almost no user stories are outcome-related. These results show a that the process of defining personal stories does not result in the required format for effective stories. A positive remark is that the participants defined informal learning activities.

Content

First of all, 45 minutes was too short for going through the process. Participants did not have sufficient time to go through the whole process and discuss outcomes of the different parts with their peer.

While filling in the PDF it was mostly silent in the room, but at the end of a component, peers discussed their content. This discussion proved valuable. A participant said to his peer when discussing the interests of his peer: “I read an interesting article on that last week, I’ll send it to you”. Although the discussions helped for inspiration and knowledge sharing, it did not directly show to be helpful for refining the provided answers. A participant said about this: “I think interests are always a bit global”. They did not challenge each other to be more specific.

The participants claimed they liked the process. One told: “I like the way you set up the PDF”, while another said: “I like the buildup”. However, they did not like the approach to work in pairs. They explained they preferred to go through the process in a session with a facilitator, at least the first time the process is gone through.

The input of the various sections did not appear to be a bottleneck. Participants were well able to generate input. Regarding the input for the competences section, the participants considered mentioning six moments of (in)competence too many. One said: “I think six activities is a lot”. The others complied to this statement.

Regarding that same input, a participant expressed well the result of the different approach as opposed to the second iteration: “Because of the moments, I was thinking of things from last week instead of last month”.
For the input of the future context section a different source was used for the trends. Participants indicated this was an improvement: “I must say that it helps quite well, those explanations”.

Because participants chose different trends as input for the future context section, this section yielded totally different results than in the previous session. This was acknowledged by participants as well, as one stated regarding the future context section: “I’ve got very different things than last time”.

One participant provided an interesting example to show a value of the process. After finishing the interests section, he said: “One of my outcomes is sports, but that is not relevant for KLM”. After which he toned down his statement: “Although, health at work is becoming more of an issue”. Finally, he ended up composing a learning objective regarding health at work, based on the interest in sports.

After finishing the process it was discussed whether the personal stories could be integrated in the sprint backlog. Participants declared they preferred keeping the stories separate. The main argument for this was that for the user stories applies that “anybody should be able to pick it up”. Yet, the participants claimed that “in every sprint, there is time for this”, referring to the execution of personal stories.

When discussing the concept, a couple or interesting remarks were made. Participants explained that they sometimes save or share interesting content. A participant said: “I do save stuff, sometimes I share things and sometimes I bookmark things”. However, they did not use one specific tool to save or share the content. Therefore the content they save or share is spread over numerous applications. Regarding the moment of saving content a participant said: “If I save it, I save it right when I read it”.
Regarding the regularity of reflecting, participants considered daily reflection too often. One said: “I think daily is too often”, on which the others in the room agreed. Weekly was considered fine.

Participants showed interest in connecting to peers. For example while still explaining the concept, a participant interrupted and said: “It would be cool to connect it to Meetup”. Also a participant showed the intention to connect to others: “I think I would meetup with people”. Yet another participant said when discussing the whole concept: “That community is really interesting”.

Finally, the feasibility of the concept was discussed with the participants, since they are experts in the field of software development. One of the participants stated: “I think you could do it in a week”. Another participant doubted this, but agreed that the concept was feasible.

Form

The form of the tool was considered an improvement. A participant said about this: “I think the whole thing feels easier because of the typing”. Besides, a digital document allows for more convenient preservation of data than a written document.

Regarding the connection to the backlog a participant explained: “You can just copy-paste the user stories to the backlog”. This is still not optimal, but an improvement as opposed to retyping the stories in the backlog.

APPENDIX K

LEARNING PARADIGMS

Knowledge about the psychology of learning has been significantly extended over the years. The developments can be divided into several paradigms. The first conceptions regarding learning have resulted in the emergence of behaviorism. The behaviorists reviewed learning as an external process, affecting behavior through conditioning (Watson, 1913; Pavlov & Gantt, 1928; Skinner, 1963;).

In response to the behaviorism, a movement emerged explaining the role of cognition: cognitivism. This movement shifted the focus from the stimulus to the mental processing, therewith acknowledging the active role of the learner in constructing knowledge (Ertmer & Newby, 1993). Individual differences in reception, organization, storage and retrieval of information through internal processes were now regarded.

Both behaviorism and cognitivism reviewed knowledge being objective, external of the learner (Ertmer & Newby, 1993). A new movement emerged criticizing this assumption: Constructivism. This movement pointed out the role of the learner as creator of meaning from experiences, thus claiming the subjectivity of knowledge (Bruner, 1990).

Finally, Siemens (2004) suggested a new paradigm which he called the connectivism. He argued that learning could not be reviewed as something happening in individuals but suggested a more collective approach. According to connectivism, knowledge is in networks of people and technology.

Influential Approaches

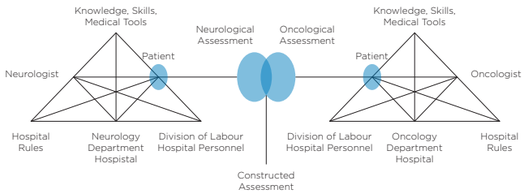
Socio-cultural activity theory, rooted in the works of Vygotsky, and American pragmatism, rooted in the works of Dewey, are two influential approaches to learning consider contemporary (Illeris, 2018). Their understanding developed over the years and are in their recent form promoted by Engeström and Elkjaer.

The theories have been compared before several times to develop an integrated approach (Engeström & Miettinen, 1999; Garrison, 2001; Miettinen, 2001). Their similarities and differences are a good starting point for developing understanding of how learning arises.

Activity Theory

Activity theory evolved through three generations of research, initiated by Vygotsky, developed into a second generation by Leont'ev and evolved in the third generation by Engeström (1995).

The basic idea of the theory is that there is a subject that applies mediating artifacts (skills, knowledge, tools) to an object, resulting in an outcome. This activity takes place in a community, where certain rules apply, and a certain division of labor applies. Multiple of these activity systems exist, providing different perspectives on the object, together shaping a new object.



To make it more concrete an example is used to illustrate the theory. In this example a patient (Objects 1) visits a neurologist and oncologist. Both perform medical examination, using their knowledge, skills and tools, in the context of the hospital department. This results in a medical assessment (Objects 2). It becomes interesting when these assessments are combined. The gaps and overlaps provide an opportunity for new understanding, a mutually constructed assessment (Object 3).

Based on activity theory and inspired by Bateson's (1972) Learning III, Engeström developed his theory of expansive learning (Engeström, 2001). In expansive learning the aim is not to learn within the context of the prevailing activity system, but to construct an alternative context by changing the activity system.

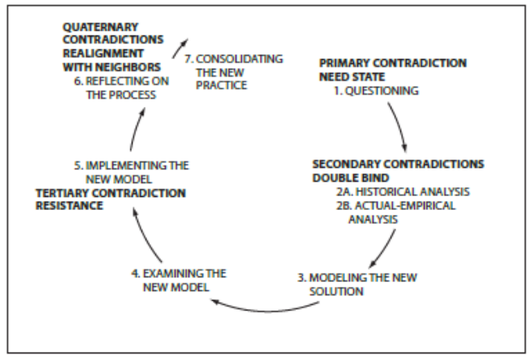
In his approach an activity system, in its network of activity systems, is taken as a unit of analysis. Contradictions within or between activity systems are the genesis of the learning process. Then, based on analysis regarding the multiple voices within the community and the history of the activity system a new solution is modeled and tested. This process is depicted in the figure on the right.

In this expansive learning process, internalization of information and creative externalization of knowledge are interactively adopted.

Pragmatism

Pragmatism was popularized by the writings of Dewey. The concept focuses around his notions of experience and inquiry. Elkjaer (2009, 2018) explains this notion of experience as being existential, present in the continuous transaction between individuals and environment. Moreover, he explains how experience is future oriented as past experiences and attained knowledge shape an individual's next experience. So, the focus is on the next experience and how this is shaped by previous experiences.

From this understanding of experience the notion of inquiry can be explained. The process of inquiry starts with a situation disrupting the habitual. The individual applies knowledge to imagine consequences of possible solutions to the situation. Based on these expected experiences the most suitable solution is chosen and tested in action. Reflection upon this action produces new understanding.



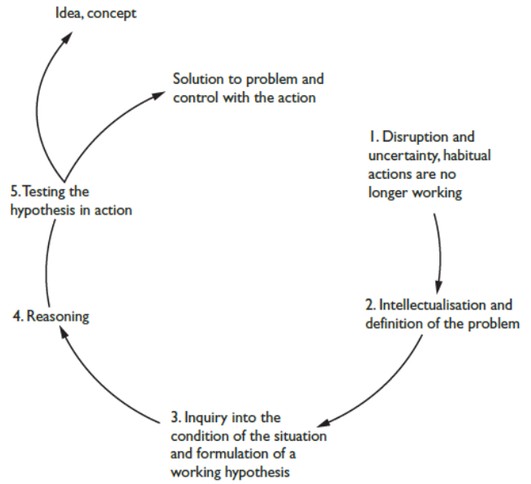


Figure 5.2 After Dewey's process of inquiry (Miettinen, 2000: 65).

APPENDIX L

ATTENTION CAPACITY

To perform cognitive tasks an individual must invest cognitive energy, attention, from a finite internal source. A combination of external and internal factors affects the amount of attention that is allocated for a specific task. Three influential developments can be distinguished.

The first development in attentional research resulted in two models of selective attention. These models suggest the presence of a bottleneck, indicating that only one input can be processed at a time, in the process from stimulus to response. The selective filter theory, suggested by Broadbent (1958), suggests this bottleneck to be present between sensory registration and perception, while Deutsch and Deutsch (1963) suggest that this bottleneck is situated between perception and response.

The second large development was the capacity theory of attention (Kahneman, 1973). The essence of his theory is that our system allocates attentional resources dynamically, continuously adapting to the demanded resources for cognitive tasks.

So, the three main elements of this ongoing process are a momentary attention capacity, a demand for attention from cognitive tasks and a regulatory system. These elements are affected by other processes. The attention capacity of an individual is affected through arousal caused by a wide variety of possible sources, like anxiety, anger and excitement. The demand of a cognitive task is affected by task variables, like the complexity of the task (+), person variables, like the competence of the individual (-) and context variables, like distracting stimuli (+). The regulatory system is affected by voluntary processes like the momentary intention as well as involuntary processes like external stimuli.

Wickens (2008) elaborated on the previous work and developed the multiple resources model. In this model he made a segregation of subsystems each having their own attention capacity. He distinguished between stages of processing, modalities of perception and codes of processing (see figure NUMBER). He suggested that if tasks demand effort from different subsystems, they do not compete for attention.