

DOCTORAL THESIS



UCAM

UNIVERSIDAD CATÓLICA
DE MURCIA

INTERNATIONAL DOCTORAL SCHOOL

Doctoral Programme in Social Sciences

The performance of German Innovation Labs.
Are they able to improve the Capacity for Innovation?
Which key success factors are measurable?

Author:

Oliver Andreas Meschkat, MBA

Supervisors:

Prof. Dr. Dr. habil. Eric Frère

Prof. Dr. Eva López González

Prof. Dr. Oliver Koch

Murcia, August 2024

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THESIS SUPERVISORS' AUTHORISATION FOR THESIS SUBMISSION

Prof. Dr. Dr. habil. Eric Frère, Prof. Dr. Eva López González and Prof. Dr. Oliver Koch, as Supervisors of the Doctoral Thesis 'The performance of German innovation labs. Are they able to improve the capacity for innovation? Which key success factors are measurable?' by Mr. Oliver Andreas Meschkat, MBA, in the Doctorate Programme of Social Sciences, **authorise its submission**, given that it meets the required conditions for its defence.

Which I hereby sign in compliance with Spanish Royal Decree 99/2011, of 28 January, in Murcia, on August 23, 2024.

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ABSTRACT

This dissertation aims to analyse whether and how Innovation Laboratories can provide benefits for users and organizations.

The deductive research approach is based on a qualitative exploratory design, including three consecutive qualitative studies: Expert Interviews, Group Opinion Poll, Qualitative Real-Life Experiment, followed by a Survey with 94 participants in a newly created Education Innovation Laboratory in a German education centre. The participants of the third study completed newly created one-week, full-time courses in marketing, sales and agile project management.

Primary data collection was carried out.

The studies show, that providing a modern education infrastructure and using methods from education 4.0 research can benefit users, in this case, learners.

The studies found that, on one hand, providing a flexible and pleasant educational infrastructure with elements such as modern technical equipment, writable and magnetic walls, mobile sofas and seating sets, flexible ergonomic chairs and tables could support interactivity and collaboration. The coordinated use of colour concepts, flexible and warm lighting, and even plants could enhance learners' sense of well-being. These factors could support their ability to learn efficiently, while promoting future-oriented skills such as creativity, analytical thinking and problem-solving.

The studies found that, on the other hand, conducting a Game-Based Learning and Design Thinking approach could support interactivity, collaboration, product- and marketing innovation. The coordinated and target group-oriented use of Lego Serious Play could enhance learners' sense of well-being, joy and their ability to learn efficiently, while also promoting future-oriented skills such as creativity, analytical thinking and problem-solving.

These approaches could be cost-effective and are in line with the principles of Education 4.0.

RESUMEN

Esta tesis pretende analizar si los Laboratorios de Innovación pueden aportar beneficios a los usuarios y a las organizaciones, y de qué manera. El enfoque deductivo de la investigación se basa en un diseño exploratorio cualitativo, que incluye tres estudios cualitativos: Entrevistas a expertos, Encuesta de opinión grupal, Experimento cualitativo de la vida real, seguido de una Encuesta con 94 participantes en un Laboratorio de Innovación Educativa de reciente creación en un centro educativo alemán. Los participantes en el tercer estudio realizaron cursos a tiempo completo de una semana de duración, de nueva creación, sobre marketing, ventas y gestión ágil de proyectos. Se llevó a cabo una recopilación de datos primarios.

Los estudios muestran que proporcionar una infraestructura educativa moderna y utilizar métodos de la investigación sobre educación 4.0 puede beneficiar a los usuarios, en este caso, a los alumnos. Los estudios constataron que, por un lado, proporcionar una infraestructura educativa flexible y agradable con elementos como equipos técnicos modernos, paredes grabables y magnéticas, sofás y conjuntos de asientos móviles, sillas y mesas ergonómicas móviles podría favorecer la interactividad y la colaboración. El uso coordinado de conceptos cromáticos, una iluminación flexible y cálida e incluso plantas podría aumentar la sensación de bienestar de los alumnos. Estos factores podrían favorecer su capacidad de aprender eficazmente, al tiempo que fomentarían aptitudes orientadas al futuro, como la creatividad, el pensamiento analítico y la resolución de problemas.

Por otra parte, los estudios concluyeron que la aplicación de un enfoque de aprendizaje basado en juegos y pensamiento de diseño podría favorecer la interactividad, la colaboración y la innovación en productos y marketing. El uso coordinado y orientado al grupo destinatario de Lego Serious Play podría mejorar la sensación de bienestar y diversión de los alumnos y su capacidad para aprender de forma eficaz, al tiempo que fomentaría habilidades orientadas al futuro como la creatividad, el pensamiento analítico y la resolución de problemas.

Estos enfoques podrían ser rentables y están en consonancia con los principios de la Educación 4.0.

KEY WORDS

Innovation Management, Change Management, Design and Operation of an Education Innovation Laboratory, Education 4.0, Educational Infrastructure, Design Thinking, Real-Life Experiment, Mixed Methods Research, Social Sciences, Way of Teaching and Learning, Game-Based Learning, Lego Serious Play

PALABRAS CLAVES

Gestión de la Innovación, Gestión del Cambio; Diseño, Operación y Factores de Éxito de Laboratorios de Innovación, Educación 4.0, Infraestructura Educativa, Experimento de la Vida Real, Estudios Cualitativos, Educacion Superior, Metodologia Sociologica, Pedagogia, Sociologia Educativa, Sociologia Experimental, Teoria y Metodos Educativos, Ciencias Economicas, Analysis de Datos, Analysis de Actividades

ACKNOWLEDGEMENTS

Two of my favorite experts on innovation management have recommended something very wise for innovation projects: if you want to change something, you should be clear about what you expect of others. After completing this dissertation, I might add: this also applies to the changer himself. You must want it, learn it, do it and then you have to be able to be happy. And you can't do it alone.

Therefore: A big thank you to my family and friends. That was tireless and very patient support. A professional hug to my supervisors, without them it wouldn't have been possible. They gave me ideas that I could never have even dreamed of. I would like to thank the organizers of the doctoral program in Spain and Germany. Thanks a lot to my interview experts and my study participants. Thank you very much to the many researchers out there who are looking forward and working to benefit all of us.

For Angela and Julius with deep love.

“Anyone who wants to innovate successfully should be clear about what they expect of those affected.”

Hauschildt and Salomo
2011.

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ACRONYMS AND ABBREVIATIONS

Innolab	Innovation Laboratory
Education Innolab	Education Innovation Laboratory
GBL	Game Based Learning
LSP	Lego Serious Play
BCG	Boston Consulting Group
MBA	Master of Business Administration
RTL	Radio Television Luxemburg
ZDF	Zweites Deutsches Fernsehen
GII	Global Innovation Index
BMI	Business Model Innovation
VUCA	Volatility, Uncertainty, Complexity, Ambiguity
CRM	Customer Relationship Marketing
M&A	Mergers and Acquisitions
R&D	Research and Development
EQ or EI	Emotional Intelligence
OKR	Objectives and Key Results
DBR	Design Based Research

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I – INTRODUCTION

I - INTRODUCTION

1.1. MOTIVATION, PRACTICAL AND SCIENTIFIC RELEVANCE

This dissertation deals with the success factors of "Innovation Labs" (Innolab for short) based on a real-life experiment, which the author conducted over a period of around 10 months. In this case, the Innolab is an Education Innolab.

It is located in an educational centre for training and further education in Nuremberg, Germany. The practical, direct benefits for those affected and involved motivated the author to carry out this experiment and to substantiate it scientifically. "Qualitative research is characterized by the fact that it is empirical, systematic, flexibly adapted to the object of research and focuses on the reconstruction of meaning" (Hussy et al. 2013, 186).

The scientific contribution of the dissertation is to investigate whether innovation labs can significantly increase the innovative capacity of people and thus of the organizations in which they work. How should this lab be designed? How should it be operated? Which methods and techniques are effective and efficient from the point of view of shareholders and stakeholders? Which resources are useful? What obstacles have been encountered and how can they be overcome?

This dissertation deals with these topics:

- 1) The science-based design, creation, and operation of an Education Innolab.
- 2) The transformation of the educational infrastructure towards Education 4.0 for testing and evaluation purposes.
- 3) Changing the way of teaching towards Education 4.0 for testing and evaluation purposes.
- 4) A qualitative real-life experiment in this newly created Innolab.
- 5) Recommendations for practical action and further research.

The aim is to find out which success factors can be measured.

A survey of the consulting firm BCG shows that nearly 80% of 1023 surveyed companies worldwide named innovation as a top-three priority, while two-thirds of ready companies ranked it as top priority (Manly et al. 2023, 2). In the various companies in which the author was and is active, the development and implementation of innovations was and is neglected. Innovations are often rejected, be it out of fear of change, ignorance, or convenience. Be it due to a lack of or inadequate leadership or habit. Be it due to a lack of knowledge about innovation and change management or the simple non-application of this knowledge (Vuori et al. 2016).

Overcoming this resistance is a major challenge. Especially as new market players are attacking the company's business model through digitalization, for example (Meschkat 2012, 2). "Ready companies use a wide array of strategic tools to strengthen their innovation platforms and practices. They access capabilities and expertise from outside their own walls, and they have systems in place to leverage these tools for value. These companies are (...) targeting innovative technologies or processes or acquiring leaders and employees with a demonstrated ability to innovate. They are also more likely to involve innovation experts in target analysis and selection" (Manly et al. 2023).

During the MBA program in Berlin, Milano and New York City, the author chose to specialize in innovation management, change management and digital economics. His final thesis dealt with recognizing and dealing with disruptive innovations vis-à-vis television broadcasters in Germany. As a television journalist at RTL Group and media manager and management consultant at ZDF German Television, he was affected himself.

After the research work, the author recognized a need for further research. Namely, how innovations could be promoted, discovered, created and (economically) implemented effectively and efficiently. The author was and still is a university lecturer in public and private universities, as well as a management trainer and management consultant in the private sector. The target groups ranged from Bachelor's or Master's students or trainees to the managing director of a company.

He has held hundreds of seminars since 2010 - in various subjects: law, economics, marketing, sales management, presentation, moderation and rhetoric, negotiation, teambuilding, business model innovation and transformation, new product development, change management, trend management, online and social media marketing, leadership, and development of competences.

The author became a university lecturer during his MBA studies. He has now seen and worked in hundreds of seminar rooms in public and private universities, academies, companies, and hotels. He has also had the opportunity to teach in or visit innovation labs. As a law student, MBA student and doctoral student, he has experienced the classes, seminars, and workshops of numerous teachers. As a management consultant and lecturer in the private sector, he has experienced numerous fellow lecturers. Every room was different, every workshop was different, and every lecturer was different. In each case with varying degrees of learning and teaching success.

The author has been trying to bring his media experience with regard to mass communication, reception and target group-oriented content into seminar rooms for years. His motivation is also to merge this knowledge with modern teaching and to innovate it. The media is always about striking a balance between information and entertainment - depending on the topic, relevance, target group and their goals.

This is the parallel to teaching. Teaching is about conveying knowledge, methods and techniques in a way that is appropriate for the target group. It is about imparting and implementing professional and social skills. When designing and implementing seminars and courses, the challenge is to determine which knowledge and which methods should be conveyed to the respective target group in a pedagogically effective and efficient manner.

1.2. OBJECTIVES OF THE PROJECT

1. Why is this research required?

Scientific investigation has not yet conclusively determined the design, operation, and success factors of innovation labs. Research gaps exist, particularly in the area of Education Innolabs and their design and operation. The aim of this study is to examine the design, operation, and success factors of innovation labs, specifically Education Innolabs.

2. What is the focus of this research?

The objective of this dissertation is to determine the factors that contribute to the success of an innovation lab, using the newly created Education Innolab in Germany as an example. The research focuses on the success factors of this Education Innolab, which involves changes to both the educational infrastructure and teaching methods in line with Education 4.0 principles.

3. How is the research designed?

This is done through 3 qualitative consecutive studies and by means of a real qualitative experiment over a period of 10 months - in a newly created Education Innolab with 124 seminar participants. They completed one-week newly designed seminars in marketing and sales under real conditions. During this seminar week, techniques and methods from Education 4.0 research are applied: in particular a Game-Based Learning approach with Lego Serious Play.

1.3. PROBLEM SCOPE AND RESEARCH QUESTIONS

Learning success depends on many parameters. "Digitalization and Industry 4.0 are proving to be important topics of the fourth industrial revolution and are therefore particularly in the focus of vocational training. Teaching and learning are responsible for acquiring the skills needed in the area of digital transformation (Oswald et al. 2018, 7 ff.), both now and in the future. Furthermore, training prepares students for an increasingly flexible and agile work culture" (Wilbers 2017, 69). Information searches and thus consumer behaviour have changed. Thanks to the internet and digitalization, learners have more diverse, faster, and cheaper options for obtaining, comparing, sharing and discussing learning knowledge via social networks (Spieß 2013, 126 ff.).

Further parameters:

- ⇒ Scientific findings from Education 4.0 research.
- ⇒ The dramaturgy, i.e., the sequence and preparation of the content and methods and the objective of the training.
- ⇒ The professional and social skills of the teachers.
- ⇒ The extrinsic and intrinsic motivation of learners and teachers.
- ⇒ Metatrends such as digital transformation or energy transition.
- ⇒ Global changes and personal effects on teachers and students due to covid 19, the war in Ukraine and the energy transition.
- ⇒ Shortage of skilled workers and changing working conditions and habits due to covid: work life balance.
- ⇒ The way of teaching and learning.
- ⇒ The atmosphere in the learning community and mutual exchange and support.
- ⇒ The learning environment (educational infrastructure) so that participants can make optimum use of their professional and social skills and feel comfortable while learning (Hussin 2018, 92 ff.).

During the conception and implementation of innovation workshops for the joint new product development of ZDF in Germany and several book publishers, the author made the experience that people in innovation processes should have many competencies: including self-motivation, flexible thinking, expertise, ambition, organizational talent, judgment, analytical skills, problem-solving skills, creative thinking and many more.

For this dissertation, the author had been waiting for the opportunity to conduct a qualitative real-life experiment and to accompany it scientifically. He wanted to design and transform an innovation lab for education and conduct innovation workshops and lessons for various subject areas such as business administration, law, technology, and skills development. Due to the lockdown during covid 19 and the delays, he was only able to carry out this experiment in real life at his new employer from fall 2022.

Since October 2022, the author has been Head of the Business Management Department at the Chamber of Crafts of Middle Franconia, Nuremberg, Germany. He is responsible for the training and further education of business administrators, business economists, master craftsmen in various disciplines such as carpentry, carpentry electrical engineering, painting, floor layers, metal workers, painters and businesspeople in the business and legal field.

He designs and is responsible for basic and advanced training courses and also implements some of them himself as a lecturer. He also trains trainers.

Together with an interdisciplinary team, after several rounds of negotiations with the decision-makers, he finally had the opportunity to design an "Education Innovation Lab", set it up and select and implement learning materials. He was also able to design new teaching formats, conduct seminars himself as a lecturer and test them in an "Education Design Thinking Process".

There is already some experience as to why innovation labs are not successful. Ahuja has found that there could be three main reasons (Ahuja 2019, 123 ff.):

- 1) Lack of alignment with the business
- 2) Lack of metrics to track success
- 3) Lack of balance on the team

It proposes that the innovation lab pursue a clear strategy as a business unit. This strategy must be adapted to the corporate strategy. To this end, a clear vision and a clear mission should be developed and communicated. It should also be clarified what should happen with potential growth innovations. Will these new developments be brought into the core company and further developed from a marketing perspective, or will they go to a potential incubator or accelerator? And how is the customer benefit checked or tested? When is the point of market maturity reached in order to launch the new development? What criteria should be used to measure success?

Applying the principles of a Blue Ocean Strategy also seems appropriate (Kim et al. 2005, 118 ff.). Ahuja suggests adopting specific key figures and committing to them. What should the financial return on investment look like? Other questions that those responsible should ask themselves: "How many users are finding value in the idea? How often do they tell their friends about it? How often do they return to use it? Financial metrics can be introduced as early as the prototype stage: Are users willing to pay for this? And later: How much revenue is being generated from these new offerings?" (Ahuja 2019, 125). In her study, however, Ahuja does not report on the correct organization or design of the Innolabs; she also does not talk about the selection and application of methods and techniques to create innovation.

This represents a research gap.

According to a study from 2019, there were 760 concrete innovation activities of the top 1000 German firms. 22% pursued innovation programs or innovative business units like innolabs. 19% operated innovation units or digital labs. 17% acted as accelerators and incubators, 15% as venture capital formats. 14% started or operated internal start-ups (or start-up shares) and 13% carried out events like hackathons (Kawohl et al. 2019, 9).

According to a study by Meyer in 2013, this is progress. Of the 194 questioned idea and innovation managers, those responsible for product development and board members of German companies, the topic of innovation is only part of everyday business for a third of those surveyed. In 75% of companies, innovation is only encouraged as long as it doesn't cost anything.

- ⇒ 21% of the companies surveyed are *active innovators*. The topic of innovation is strategically anchored, resources are budgeted, the corporate culture promotes creativity and includes mistakes as necessary, new ideas are refined company-wide and some groundbreaking innovations are the result.
- ⇒ 36% of the companies surveyed fall under the so-called *passive innovators*. They have no ambitious goals and follow established processes. Ideas are processed according to regulations, but without passion.
- ⇒ 27% of the companies surveyed can be described as *reactive innovators*. Trading only takes place under pressure from the market or management. The corporate culture that promotes creativity is not lived (Oldham et al. 1996).
- ⇒ 16% of the companies surveyed play on chance, so-called *random innovators*. There are no strategic goals for innovation. The creative potential is not used. Processes do not promote innovation (Meyer 2011, 30 f.). It is noteworthy that since the year 2000 these innovation activities have grown exponentially from almost non-existent to this scale, at least in Germany (Kawohl et al. 2019, 16).

Due to the large number and diversity of companies' innovation activities, this study focuses on innovation labs and their working methods. A qualitative research strategy is pursued in order to locate the problem in theory and thus

obtain explanatory approaches (propositions) for the conception, design and operation of innovation labs and for further research (Eisenhardt et al. 2007, 26).

As there are a variety of innovation lab types, this paper examines the success factors of "Education Innovation Labs" or "Learning Innovation Laboratories", using the example of the new Education Innovation Lab conceived, designed and commissioned by the author.

"In education, innovation can appear as a new pedagogic theory, methodological approach, teaching technique, instructional tool, learning process, or institutional structure that, when implemented, produces a significant change in teaching and learning, which leads to better student learning. Thus, innovations in education are intended to raise productivity and efficiency of learning and/or improve learning quality" (Serdyukov 2017, 8).

Leading research questions of the doctoral thesis

Leading research question 1:

The performance of Innolabs. How do they manage to improve their ability to innovate? Which success factors can be measured?

Leading research question 2:

What should a learning environment (spaces) look like in order to optimize learning success? What is the relationship between the design of the learning environment and the selection of learning materials and the ability to create innovations?

Leading research question 3:

What is the relationship between innovation techniques (activities), e.g. agile techniques such as creativity methods or design thinking and game-based learning via Lego Serious Play, and the ability to create innovations? Which success factors can be measured?

Research question 1 examines the success factors of Innolabs and analyses the current state of research. It aims to make methods, patterns, organisation, design and operational implementation visible. It looks at how, where, when and with what success Innolabs are operated.

Research question 2 asks about the connection between the learning environment and the ability to create innovations. The learning environment includes parameters such as the design of the lab, the aesthetics of the space, its flexibility, the atmosphere, the flexible and spontaneous organization of group workstations and flexible furniture for interactive learning and breaks. In addition, how creativity can be encouraged and why the learning environment is crucial for this.

"When you walk into a space it tells you what activities are acceptable, allowable, what can and can't happen there. Everything from the design to architecture to furniture helps us and allows us to answer the question of what it is we can do in a space. That question is incredibly important to creativity. You need to know immediately when you walk in" (Cooper et al. 2017, 167). The learning resources include parameters such as furniture flexibility, analogue and digital collaborative tools, magnetic plaster walls, writable whiteboard walls or perhaps just the quality of the projector.

Research question 3 deals with teaching and learning methods and their relationship to the ability to create innovations. It asks about specific success factors during the operation of an Innolab.

1.4. RESEARCH DESIGN AND STRUCTURE OF THE DISSERTATION

The research questions are indicators for the identification of the research design (Eisenhardt et al. 2007, 26; Yin 2014, 9 ff.). In addition, two further conditions: the researcher's control over an event and the focus on current or historical events (Yin 2014, 12 ff.). To answer these research questions, a research model is designed based on scientific studies and theories as well as own conceptual considerations. Primary data collection is carried out. "The suitability and therefore also the meaningfulness of data from primary data collection are higher than the data from secondary data research. The advantages are apparent: precise selection or self-defined sample in the target group, concrete questions, knowledge, and design of framework conditions, e.g., survey time point, up-to-dateness of the data" (Ortmanns et al. 2023, 13). The correlations formulated in this model are examined by means of three empirical, implicit qualitative studies.

In the first qualitative study using expert interviews, questions are asked about the current success factors of Innolabs in general. The research status of the literature analysis flows into the expert interviews and is to be confirmed or not confirmed. The added value of qualitative research lies in understanding the world from the perspective of the analysed objects (informants) (Pratt 2009, 856).

"In contrast to quantitative research, qualitative research is not based on a hypothesis-testing approach that reveals the connections and relationships between constructs and the variables derived from them and thus tests general theoretical assumptions. Rather, qualitative research serves to develop constructs, to work out the connections between them and then to conceptualize the constructs and convert them into theories. However, qualitative work also serves to supplement or expand existing theories when certain aspects of a theory are under-examined or postulated connections are unclear" (Goldenstein et al. 2018, 92).

The results of the literature analysis and the qualitative expert interviews are incorporated into the design of the real "Education Innolab" and form the basis for two further studies.

The parameters for the design, layout and equipment of the "test classroom" were therefore determined on the one hand according to the current state of

research and after analysing the expert interviews. On the other hand, a second qualitative study was conducted by means of a group opinion poll on the current situation in the existing (original) teaching rooms. The participants were able to evaluate the existing learning environment and learning materials. They also had the opportunity to suggest changes to improve learning success.

The author was able to convince the management to set up a test classroom. He is responsible for the project and, together with an interdisciplinary team, designed this "Education Innovation Lab" from autumn 2022 according to various parameters and converted and set it up over a period of three months. The "teaching test room" was set up at the beginning of 2023 in the Chamber of Crafts of Middle Franconia in Nuremberg, Germany. The author designed a new one-week course for "Innovation Marketing, Sales and Project Management" in his role as a lecturer following the conceptualisation and parallel to the redesign. Target group: management trainees. In this seminar week, agile methods such as design thinking are used to develop new products together and finalize them up to the prototypes. It is therefore about product innovation, marketing innovation and teaching innovation, as well as the connection to the sales management of the new products. "Lego Serious Play" is used and tested to increase the success of the innovation. The one-week workshops began in March and ended in October 2023. The dramaturgy of the seminar week resembles a design thinking process.

Most of the participants in this new seminar week took part in the qualitative study (Study No. 3). In this study, a written survey of participants in this new "Innovation Education Laboratory" was conducted and analyzed.

According to Mayring, this is a qualitative experiment. This is because the author attempts to use the "teaching test room" to bring about a "controlled, object-adequate intervention in the area under investigation under conditions that are as natural as possible and that allow conclusions to be drawn about its structure" (Mayring 2016, 58-61). "Research designs should capture data directly from the process through which development and change occurs" (Poole et al. 2000, 5). This is exactly what the author is concerned with in this dissertation: carrying out innovation management directly with those affected, making them participants and scientifically accompanying the innovation process in order to be able to make recommendations for action.

Summary

- ⇒ Theoretical foundations and Objectives of the thesis
- ⇒ Qualitative Study #1 using Expert Interviews on Innolabs
- ⇒ Qualitative Study # 2 by means of a Survey on existing seminar rooms
- ⇒ Qualitative Real-Life Experiment over 12 weeks
- ⇒ Qualitative study # 3 by means of a Survey about the new Education Innovation Laboratory, the new workshop design and its implementation after the qualitative Real-Life Experiment via Qualitative Evaluation
- ⇒ Theoretical and practical recommendations
- ⇒ Future Work: Design Based Research

To answer the research questions with the help of the strategy, the course of the investigation shown in Figure 1 was developed. The author pursued a mixed methods approach:

Structure of the doctoral thesis			
Chapter 1	Introduction	○ Practical and scientific relevance ○ Objectives & motivation ○ Research design & structure of the thesis ○ Research questions	Theory
Chapter 2	Theoretical Framework Current Research	○ Conceptual clarifications ○ Innovation Management ○ Innovation Laboratories ○ Education Innovation Laboratories ○ Education 4.0	
Chapter 3	Qualitative Studies Real-Life Experiment	(1) Qualitative study # 1: Expert Interviews (2) Qualitative study # 2: Group Opinion Poll (3) Qualitative Real-Life Experiment - Transformation into an Education Innolab - Transformation into new workshops GBL - Experimental operation over 12 weeks (4) Qualitative study # 3: Evaluation (5) Iterative development of propositions	Empiric Mixed Methods
Chapter 4	Overall Discussion	○ Discussion of overall results	
Chapter 5	Conclusion	○ Presentation of results ○ Final answers to the leading research questions ○ Discussion of theoretical and practical recommendations	Conclusion
Chapter 6	Limitations Future Work	○ Discussion of limitations ○ Recommendations of practical implications and future work	

Figure 1: Structure of the doctoral thesis (own representation)

The course of the study leads from the literature study on innovation management and the success factors of Innolabs to explorative study no. 1 with four expert interviews from different industries. The author conducted expert interviews with shareholders and stakeholders from companies that operate or work in innovation labs or similar facilities. These are analysed in the qualitative study.

Based on these first two steps, the conceptual frame of reference was developed for the subsequent necessary study no. 2 (qualitative group opinion poll of the current situation in the existing seminar rooms) and for the qualitative real-life experiment.

In study no. 3, primary data was collected by the author sending questionnaires to participants of the training courses in the "test classroom" via QR code and analysing them. The evaluation of the collected data enables the research questions to be answered using multivariate analysis methods.

This data is qualitative in nature in order to gain an overview of how innovation labs should be designed and equipped, what strategy and tactics they use and what resources they believe are necessary to be successful. The aim of this work is also to find out which techniques and methods used within innovation labs are promising and which success factors are decisive.

These scientific methods are understood as those that exist as rules. They are communicable and teachable, normative, and prescriptively intersubjectively controllable (Stier 1999, 2). This ultimately leads to the development of a model for the design, establishment, and operation of an "Education Innovation Lab". The practice-oriented aim of this study is to derive practice-relevant recommendations for action from these newly acquired scientific findings in order to organize the work in innovation labs more effectively and efficiently. Firstly, for the organizers and lecturers or trainers, secondly for the participants and thirdly for the organizing organization itself.

As a further practical result of this work, other seminar rooms could be redesigned according to the model of the aforementioned "Innovation Education Lab" and teaching could be changed. In addition, findings from Education 4.0 research could be incorporated into a "digitalized" seminar room.

II – THEORETICAL FRAMEWORK & CURRENT RESEARCH

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2.1. INNOVATION

The definition of innovation also reveals a complex picture in the literature. What they have in common is that they are based on the Latin root word "innovare", meaning to innovate (<https://www.latein.me/latein/innovare> retrieved on 28/08/2023). This is how Schumpeter described it in 1912: "Innovation as an important part of entrepreneurial activities. Recognizing and implementing new opportunities as a main objective of entrepreneurship" (Schumpeter 1997, 180). Rogers proposed this definition: "An innovation is an idea, practice or object that is perceived as new by an individual or other unit of adoption. It matters little, so far as human behaviour is concerned, whether or not an idea is "objectively" new. The perceived units of the idea for the individual determines his or her reaction to it. If the idea seems new to the individual, it is an innovation" (Rogers 2003, 12).

Innovation is about something "new". Novelty is more than new, it means a change of kind: "It is about new products, forms of contract, distribution channels, advertising messages, corporate identity. Innovations are qualitatively new products or processes that differ noticeably - however this is to be determined - from a comparable state (Hauschildt et al. 2011, 4). Hauschildt et al. describe the implementation of an innovation as a sequence of decisions not to discontinue (Hauschildt et al. 2011, 366).

"Innovation is by no means limited to technology, but must include sales, processes, costs and prices" (Simon 2011, 195). Innovation is not an end in itself or a nice to have. Innovation is vital to a company's survival. „Traditional markets have plateaued, and growth, which accounts for 60% to 70% of shareholder returns in the medium term, is found primarily in new markets, including those created by technology disruption, such as e-commerce, streaming media, cloud-based interactions, mobility solutions, and smart energy solutions" (Manly et al. 2023, 4).

And Innovation is vital to a country's survival. "The Global Innovation Index (GII) ranks world economies according to their innovation capabilities. Consisting

of roughly 80 indicators, grouped into innovation inputs and outputs, the GII aims to capture the multi-dimensional facets of innovation". Germany ranks 8th among the 132 economies featured in the GII 2023. It ranks 6th among the 39 economies in Europe. It ranks highest in Human capital and Research (4th) and Creative Outputs (7th). Germany ranks lowest in Infrastructure (23rd), Institutions (22nd) and Business Sophistication (16th). Spain ranks 29th among the 132 economies featured in the GII 2023. It ranks 18th among the 39 economies in Europe. Spain ranks highest in Infrastructure (16th), Knowledge and Technology Outputs (24th) and Creative Outputs (29th). It ranks lowest in Institutions (46th), Market Sophistication (33rd) and Business Sophistication (32nd) (Wipo 2023). (...) infrastructure, business sophistication and human capital & research, in this order, are innovation drivers" (Cavalcante 2024, 74).



Figure 2: Top 10 most innovative economies GII 2023 (Wipo 2023)

Müller-Prothman et al. define innovation as the result of idea, invention, and diffusion. Invention means the realization of ideas into new products, services, or processes. Diffusion means the successful application and market penetration of innovations (Müller-Prothmann et al. 2011, 31). "Innovation is the targeted

implementation of a novelty in terms of business model, products, processes, structures or work organization" (Franken et al. 2020, 248).

The following innovation dimensions can be distinguished (Hauschildt et al. 2011, 4):

<i>1) In terms of content:</i>	<i>What is new?</i>
<i>2) Processual:</i>	<i>Where does the innovation begin, where does it end?</i>
<i>3) Subjective:</i>	<i>New for whom?</i>
<i>4) Intensity:</i>	<i>How new?</i>
<i>5) Normative:</i>	<i>Is new also successful?</i>

(1) Content Dimension

The content dimension comprises product or process innovation. The system-orientated view has become established in the literature. It allows the place and object of innovation to be determined in a more differentiated way than the strict distinction between product and process innovation. The system-orientated view distinguishes between these parameters (Hauschildt et al. 2011, 8):

Innovative system components: innovative sub-units that supplement or improve an existing product (e.g., e-motors or connectivity in cars).

Innovative systems: new products or processes that are developed from scratch (e.g., Tesla cars).

Innovative system networks: Networking of several independent, new systems into a single unit (e.g., autonomous driving). Osterwalder et al. refer to the result of these innovations as "sustainability innovation". These innovation activities

improve and expand a tried and tested business model. They could involve new market segments, new offerings, new sales channels, new customer groups or new customer perspectives (Bettencourt et al. 2008, 111 ff.). Or entry into new market areas (Osterwalder et al. 2020, 327). The system-oriented view therefore also encompasses Ansoff's product-market matrix, as Ansoff differentiated four options with which a company can achieve growth: Market penetration, product development, diversification, market development (Ansoff 1965, 109).

Innovation research no longer concentrates solely on technical developments, but also examines the question of economic and organizational innovations. Similar to integrated marketing, it is called integrated innovation management. This distinguishes between several dimensions (Hauschildt et al. 2011, 9 ff.):

Technical innovation:

Products, processes, technical and technological knowledge. „First, technology is evolving rapidly, and proficiency in a technology today, such as AI (Artificial Intelligence) means that as the technology grows more powerful, a company can be faster at deploying it. Second, companies that have these capabilities benefit from a flywheel effect: they can invent, deploy, adapt, and reinvent more quickly and with greater impact than their competitors can“ (Manly et al. 2023, 4).

Organizational innovation:

Structures, cultures, systems, management. This includes new agile work structures in companies, self-organization, or digital collaboration structures among employees; these changes require digital transformation management (Keuper et al. 2018, 4).

Corporate culture is also changing, or must change, as an important element of entrepreneurial success. These are norms and attitudes that shape an organization. Corporate culture is the totality of all norms, values, and basic attitudes of an organization (Porter 2010, 53). It is typically located on several levels:

Artefacts and creations

They are perceptible elements of the organization such as technologies, building architecture, visible and audible communication behaviour, brand, or company logo.

Basic assumptions

Internal attitudes of an organization's employees. They influence behaviour almost unconsciously; they are self-evident but invisible.

Values of the company

Values are attitudes to strive for and corresponding behaviours, for example honesty, friendliness, service orientation or initiative as values of entrepreneurial action (Grichnik et al. 2010, 372 ff.).

The following types can be subsumed under values: The way employees cooperate, the expression of their creativity, their collaborative behaviour, which is based on various values: Place maturity values, incidental values, core values and target values (Kotler et al. 2010, 93). "Place values include the basic behaviours that employees (...) should bring to the table (e.g., professionalism and integrity). Aspirational (target) values are those that the organization lacks but that management hopes to achieve. Incidental values result from similarities in character between employees. Central values are the actual corporate culture that characterizes the actions of employees (...). The values and the behaviour of employees should work together as value ambassadors to market the brand mission to the consumer" (Kotler et al. 2010, 90).

This lived structure of beliefs can be recognized by a wide variety of rituals, symbols, and actions, among other things. Regarding transformation processes in companies and possible disruptions, culture is seen as a key success factor (Granig et al. 2018, 149). An innovation-promoting corporate culture needs some more elements: "Dealing productively with differences, Permissiveness and tolerance (allowing),

Continuity, Openness, Willingness to take risks" (Kaudela-Baum et al. 2014, 234).

These values are also referred to as cognitive culture. Another success factor for a successful corporate culture is the so-called emotional culture. This encompasses the affective values, norms, artefacts, and assumptions of employees. Affective values control what feelings employees have and, above all, what they communicate verbally or non-verbally within the company. Studies show that the emotional culture has an impact on employee satisfaction.

Having positive feelings and (being able to) show them in the company results in better performance, higher quality, and more beneficial customer service. In contrast, having negative feelings such as fear, anger, nervousness, or insecurity and also being able (or having to) show them in the company leads to a drop in performance or higher staff turnover (Barsade et al. 2016, 22 f.).

"Organisations should understand that creating a conducive work environment that satisfies the needs of employees is essential for developing their readiness to innovate. Creating a positive innovation climate is not enough; ensuring a better balance between performance and organisational rewards is also essential" (Suliman 2001, 57). This is because the disruption of the cultural, social, and technical-instrumental subsystems of the organization can lead to conflicts (Glasl 2013, 36).

According to studies, corporate cultural values and their balanced and fair realization have advantages for business success:

- ⇒ The security of the employees leads to clarity.
- ⇒ The foresight of the organization and its employees creates sustainability.
- ⇒ Identification with the employer increases employee motivation.
- ⇒ The common good is good for the organization's reputation (brand image).

- ⇒ Inspiration leads to innovation.
- ⇒ Personal responsibility increases efficiency (Kanter 2012, 31).
- ⇒ The co-responsibility of employees is encouraged.
- ⇒ There are advantages in recruiting and preventing the poaching of employees.
- ⇒ Productivity, effectiveness, and efficiency are increased.
- ⇒ Customer services improve.
- ⇒ Sensitization to the cultures and people of other countries.
- ⇒ The integration of diversity and its effective utilization is promoted.
- ⇒ Finally, the development of creative values increases the likelihood of innovation (Kotler et al. 2010, 94 ff.).

Hauschildt et al. have summarised empirical findings of successful innovation cultures in organisations and companies (Hauschildt et al. 2023, 102 ff.).

Business-related innovation:

Renewal of the business model, the industry structure, the market structures and boundaries, the rules of the game. Osterwalder et al. also refer to this as "transformation".

It is a radical form of innovation and involves new business models with which a company has little or no experience. There is a possibility that the transformation may even cannibalize the company's own business model (Osterwalder et al. 2020, 327).

Social innovations:

New social technologies and new lifestyles (Hauschildt et al. 2011, 5). It can also involve changes in the human aspects of organizations, such as new working time

models or personnel development systems. The aim is to improve the organization's employer branding on the external and internal labour market (Krause 2013, 134).

Social innovations are also about new working styles such as new work, digital and virtual leadership, leadership 4.0 and agile working. These new approaches aim to give employees more freedom of action, independence, flexibility (working from home) and co-determination (Keuper et al. 2018, 45). The consequence of these social innovations could be that further innovations can emerge. Researchers have found that the type of leadership can have a significant impact on employees' ability to innovate.

„The relation-oriented behaviour like providing coaching and advice, opportunities for skill development, allowing substantial responsibility and discretion in work activities and showing empathy are found to be most important to stimulate the innovative behaviour of employees. These types of behaviour match with the transformational and participative leadership style. Next to that, our findings shows that a good relationship between the leader and the employee is crucial and essential to foster this kind of behaviour and is next to granting freedom to the employee, the main factor in stimulating employee innovativeness“ (Raja 2018).

Pedagogical innovations:

These can be further or new developments in theory and practice, ways of teaching and learning, use of technology in the classroom or in the self-learning phase. The aim is to improve teaching and learning (Serdyukov 2017, 8). The application of an instructional design plan is helpful here (Morrison et al. 2019, 3 ff.).

(2) Processual Dimension

Innovation is more than just invention. An innovation is subdivided into process stages. It starts with discovery through observation, initiative, or an idea. Research can also be a source of innovation. Typically, prototypes are produced and tested. If successful, commercialization begins and then ongoing exploitation in daily

routine (Hauschildt et al. 2011, 20; Smith 2006, 107 ff.). “Bringing truly valuable ideas into your company or organization is probably one of the most effective methods of changing the attitudes about user experience innovation in your company” (Kraft 2012, 191).

Purpose-driven process management and the application of innovation concepts and methods play a major role in minimizing risks and uncertainties so that the idea can be developed into a viable business.

There are four types of innovation risks that can cause an idea to fail:

a. The risk of desirability:

Customers are not interested. The target market is too small, the value proposition or the benefits are too small. Or the customers cannot be reached via marketing and sales.

b. The risk of profitability:

Sales and profit or return on investment (extended ROI analysis) are not in a profitable relationship (Schierenbeck et al. 2008, 101).

c. The risk of feasibility:

The product or service seems to work, but it cannot be produced or implemented because key resources such as suppliers, logistics, marketing, sales, technology, or brand are missing, key partners cannot be convinced or there are delivery difficulties.

d. The risk of customisability:

The new product or service cannot be adapted to the competitive environment, changing technologies or legislation, social or market trends. The macro environment such as post-Covid, inflation and the Ukraine war can be unfavourable (Osterwalder et al. 2020, 19). "The drivers that influence and change our entire environment can be described with the acronym VUCA. VUCA stands for volatility, uncertainty, complexity, and ambiguity" (Sauter et al. 2018, 4). In this world, other skills and behaviours are required:

- ⇒ „ Sound business fundamentals
- ⇒ Innovation
- ⇒ Fast-paced response
- ⇒ Flexibility
- ⇒ Change management
- ⇒ Managing diversity at local and global level
- ⇒ Market intelligence
- ⇒ Strong collaboration with all relevant stakeholders including employees, customers, suppliers, shareholders, and society" (Kornelsen 2019, 33; Burkhardt 2017, 14 ff.).

Other economic conditions can have a strong influence: Trends in economic developments, economic cycles, seasonal factors. Interest rate trends, the value of money, the development of gross domestic product, the employment situation or the shortage of skilled labour are also influencing factors that need to be responded to (Schierenbeck et al. 2008, 309). Categorization models for trends are helpful in the assessment. Wenzel et al. recommend a categorization into trend types:

- ⇒ Megatrends last between 30 and 50 years and include ageing, health, globalization, neo-ecology, and mobility.
- ⇒ Technology trends last between 10 and 20 years and include digitalisation, e-mobility, and the development of environmentally friendly technologies.
- ⇒ Social trends have a duration of between 5 and 10 years and include trends such as regionalization, new work, sustainability, social media, individualization, and the creation of meaning in work.
- ⇒ Consumer trends and product trends have a shorter duration of 2 to 5 years (Wenzel et al. 2012, 17). Innovative marketing approaches in the areas of CRM, mobile marketing, multichannel marketing and customer value should also be considered (Meffert et al. 2008, 856 ff.).

Studies recommend several parameters for mastering the procedural dimension: Develop and communicate clear strategic guidelines. These guidelines define in which area innovation should take place, in which direction innovation should take place and in which direction it should not. The allocation of resources in terms of time, budget, logistics and manpower must be clarified and how the innovation team can access the resources and expertise of the core business. Agile values should be internalized and lived by people. "This emotional-motivational process of acquiring or interiorizing values therefore requires development arrangements that systematically enable this experiential learning" (Sauter et al. 2018, 23).

Employees need additional skills to be able to act successfully and master the challenges of the VUCA world and metatrends:

- ⇒ "Always developing yourself further
- ⇒ Self-organised action
- ⇒ Taking responsibility for your own actions
- ⇒ Consistent customer orientation
- ⇒ Determination
- ⇒ A willingness to experiment
- ⇒ A pronounced curiosity" (Sauter et al. 2018, 24)

Organizational design encompasses the status and power that the people working innovatively have within the organization. This should be defined and communicated. Just as special incentive and reward systems should be set up and skills development should be established (Osterwalder et al. 2020, 314). Finally, a separate trend management system should be established: "Trend management is the application of suitable methods to recognize at an early stage the developments in a company's environment that will shape the future and to find adequate answers to these strategic challenges" (Liebl 2008, 83).

(3) Subjective Dimension

The question is new for whom. It is about for whom the innovation is new, who perceives it and how. Whose awareness of the innovation is changed by familiarizing themselves with it and testing it. From an operational perspective, innovations are all products or processes that are introduced within a company. From an industrial-economic perspective, an innovation exists when it is introduced within an industry for the first time. All market participants, industry participants, researchers or experts can therefore represent the target group (Hauschildt et al. 2011, 18 ff.).

(4) Intensity Dimension

The question is how new the innovation is. Another distinguishing feature is the degree of innovation. Research distinguishes between evolutionary, radical, and disruptive innovations. In the case of evolutionary types, the performance or customer acceptance of existing products or services is improved in small steps. (Christensen et al. 2011, 6) "Larger steps" indicate a radical nature. Disruptive innovation means that a company plans and implements completely new strategies. For example, entering new markets, customer segments or foreign industries (Anthony et al. 2011, 26). Maturity models are helpful here.

Maturity models are "measuring instruments" for the systematic development and improvement of skills, processes, structures, products, services, or framework conditions of organizations. The level describes a development path in successive stages, starting from the initial stage through to maturity. The prerequisite is that the characteristics and characteristics of the individual development stages are clearly defined so that it is clear what is necessary to reach the next maturity level (Hölzle et al. 2019, 11).

In this context, we talk about the degree of innovation. The most important distinguishing feature is the differentiation between evolutionary and disruptive innovation. The correct classification is important in order to be able to react

appropriately to innovations outside one's own organization that could have an impact on the organization.

Evolutionary innovations are developed from existing products or processes. They aim to improve on what has gone before. These innovations are designed to increase the performance of existing products or services along the respective value chains. Evolutionary technologies can be incremental (low degree of innovation) or radical (high degree of innovation) in nature (Christensen et al. 2011, 6).

These include performance-enhancing innovations that replace old products with new and better ones. Minimal further developments become new models. Examples include smartphones or cars, which are regularly given a facelift and offered as new models at regular intervals.

Efficiency-enhancing innovations ensure that companies can offer their products or services, which have a high degree of maturity and are established, to the same customers at a lower price. Efficiency-enhancing innovations increase productivity and release capital, which in turn can be invested or distributed.

Market-creating innovations radically remodel complex and very expensive products. These become suitable for the mass market. This creates a new market or reaches new customer target groups. Examples: The first mainframe computers cost several hundred thousand US dollars, the first personal computers only around 2,000 US dollars. Smartphones were developed from personal computers in combination with telephones and the Internet and became suitable for mass use.

"An efficiency-enhancing innovation that points in the right direction, i.e., turns a non-consumer sector into a consumer sector, becomes a market-creating innovation." The application of technologies reduces costs as volumes increase and new business models emerge. The provider reaches new customers who were not previously customers because they could not afford the previous very expensive product or did not see the benefits" (Christensen et al. 2014, 34 ff.).

Disruptive or radical innovations primarily involve the use of new technologies in existing products or processes. This creates new products or services that can change the company, as different competences are required to develop and implement these innovations. Disruptive innovations initiate new development paths. The previous industry leaders are often successfully attacked (Christensen et al. 2011, 26; O'Connor et al. 2004)). Other processes and organisational forms are required to develop radical innovations. Veryzer has researched these so-called Discontinuous Innovation Processes and recommends a more radical approach to new product development (Veryzer 1998, 316 ff.).

It should be noted that the different degrees of innovation can have varying degrees of influence on employees and the organization. "The way innovation is introduced is a decisive factor and a message heralding its success rate: innovations of gradual change have lower impact on hierarchy relations and as a result, are treated with a more moderate reaction and inertia compared to the more radical ones. The 'hazardous innovations' resisting the most are the ones with a dividing nature and have the tendency to change structure, in order to affect only positively the system's functionality" (Carayannis et al. 2015, 66). Completely new business models can also emerge that did not previously exist: BMI.

"A business model depicts the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities" (Amit et al. 2001, 511). According to Osterwalder and Pigneur, a business model describes the basic principle according to which an organization creates, conveys, and captures value. It includes nine fundamental building blocks for running a business profitably: customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure (Osterwalder et al. 2011, 18 ff.).

"BMI is a conscious change to an existing business model or the creation of a new one that satisfies customer needs in a new and better way. A business model innovation embodies the economic implementation of a new business idea, so that the basic structure of a business is rethought, and a competitive advantage is created through differentiation from competitors (Franken et al. 2020, 257).

„Business model innovation is the process for the integration of a value enhancing, new-to-the-firm business model comprising a new value proposition and value constellation – here: without involving M&A” (Trapp 2014, 38). "Innovation-centered business models bring new transaction partners together or connect existing transaction partners in new ways, thus creating new transaction opportunities" (Grichnik et al. 2010, 116).

„**Disruptive innovations** typically pose difficulties for an industry's incumbent leaders, who are faced with the choice of investing to improve their products along the sustaining trajectory or investing in disruptive innovations. The choice is difficult because sustaining innovations appear to be much more attractive than disruptive ones, even though disruptive innovations often ultimately drive more long-term growth” (Christensen et al. 2004, 279).

(5) Normative Dimension

The question is whether new equals successful. And what does successful mean? The management of innovations is always future-oriented. Innovations should be used to pursue a variety of short-term and long-term goals: e.g., increasing customer benefit, retaining, and gaining customers, creating competitive advantages, opening up new markets or increasing the value of the company. Securing the business model and jobs by further developing and maximizing market opportunities for stakeholders and shareholders (Osterwalder et al. 2020, 10 ff.). Innovation can therefore only be evaluated ex post on the basis of the normative dimension. Innovation management works with expected innovation success, not realized success (Hauschildt et al. 2011, 22).

Success does not always have to be a financial success such as return on investment. Other dimensions can also be used to assess success, e.g., the opening up of takeover opportunities on the markets, the increase in brand awareness or simply the desire for renewal and further development.

The Why of the innovation project should be strategically clarified. Analysis, diagnosis and forecasting of the company's past, present and future are required in order to define guidelines for the further development of the organization. This is the strategic task of the sense-making and sense-conveying process in order to offer those affected and involved an orientation framework (Granig et al. 2018, 147).

Hauschildt et al. recommend a process-accompanying evaluation of success, i.e., using the milestones in the process as intermediate stages in order to critically assess the results achieved. These intermediate stages should be determined individually depending on the innovation process and type. The aim is to use a measurable or assessable system to gain increasing certainty that the expected income justifies the expenditure.

The success of innovation cannot be assessed with a single measurement. Numerous and different measurements are required from different shareholders, who are involved depending on the progress of the innovation process, e.g., expert surveys, scientific studies, market researchers and marketing managers, controllers, industry experts or even bank employees to assess the opportunities of the innovation. In the case of a successful innovation, the continuation decisions have prevailed (Hauschildt et al. 2011, 366 ff.).

2.2. INNOVATION MANAGEMENT

The task of innovation management is to successfully organise innovation processes. When defining management, a multi-layered picture is evident in the literature. "Management is characterised by the fact that it defines and pursues strategies and goals, makes decisions, determines and influences information flows, establishes and shapes social relationships and influences the partners in these social relationships in order to realise the decisions made" (Hauschildt et al. 2011, 29).

"The ability to shape and continuously adapt value propositions and business models in order to further develop the most promising ones" (Osterwalder et al. 2020, 336). According to Backhaus and Schneider, corporate strategies should be understood as an orientation framework for operational measures geared towards the goals of a company. It provides "not a rigid framework, but a framework that may need to be adapted under changing environmental conditions" (Backhaus et al. 2009, 15).

"Strategy is correct action when we do not know what the future will be like, but still have to act, whereby doing nothing is also action" (Malik 2011, 19). "Vision is simply an idea of what the company should look like in the future. Vision must set the goal and direction and go beyond day-to-day business in terms of quality and time. Above all, a vision must be communicated, exemplified and implemented" (Von der Gathen 2014, 16).

"Management is about people in organisations and, conversely, organisations with people". (...) "A society's productivity and innovative strength depend on management" (Malik 2005, 62). Malik compares innovation management to mountaineering. For new routes, no other mountaineering skills are required than for the ascent of known routes. However, the first ascent requires professional mastery of technique and equipment as well as the best preparation in terms of route, weather and human condition (Malik 2006, 380).

Hauschildt et al. describe innovation management as a leadership process to promote the cognitive performance of innovators and to regulate the conflicts triggered by innovation. Special resources and potentials are necessary: this refers

to the company's immediately available production factors, the "resource-based view". Potential means that the innovators procure missing resources and competences and combine them with existing resources in a new way. Above all, the knowledge of employees is a decisive factor. Expertise, management knowledge, market and network knowledge, strategic knowledge, knowledge of human nature, technological knowledge and knowledge of the application of new methods such as creativity techniques or agile methods (Hauschildt et al. 2011, 38 ff.).

"In order to have an impact, innovation must be at the top of the organisational chart. Either the CEO, a Co-CEO or someone who reports directly to the board must be responsible for growth and innovation and invest a serious amount of time and energy in it. Talking about it at the executive level is not enough" (Ostermayer et al. 2020, 320). In other words: establish leadership (Gilbert et al. 2012, 72).

What is needed is a strategic direction for innovation projects, with clear objectives and tactical or operational continuous implementation (Teece 2006). Managers must be behind innovation management and all employees must be informed about the success or failure of innovation. The more extensively the innovation could change the existing organisational structures, for example when significantly changing a traditional business model, the more attention must be paid to the error culture to avoid conflicts (Brenk et al. 2019, 1114 ff.).

"Any evaluations are advised to place greater emphasis and weight on collegiality, pro-social emotions, disagreeableness and effectuation. Additionally, from an organisational innovation management perspective, these emotional dimensions could be monitored and encouraged to support positive innovation outcomes" (Swart-Oppermann et al. 2022, 119).

Employees should be involved wherever possible, and a culture of error should be introduced and practised, i.e. a culture of failure (Mezger et al. 2014, 245 ff.; Shepherd et al. 2018, 236 ff.). "Our results strongly supported the idea that toleration of early failure combined with long-term incentives encourage innovation" (Manso 2017, 27).

The tasks of management are therefore to formulate an understanding of innovation and to develop goals. An innovation strategy must be developed, and

innovation instruments selected. “The increasing importance of knowledge as an economic driver has major implications for innovation management, which is, in turn, a key determinant of national and regional competitiveness in the global, knowledge-driven economy” (Hidalgo et al. 2008, 115). Appropriate measures must then be implemented, evaluated and improved. Continuous communication improves the cultural development towards an innovative company (Freudenthaler-Mayrhofer et al. 2017, 279 f.).

The motivation to innovate can be positively influenced through work climate factors. On the occasion of the “Year of Innovation” in the UAE, researchers in the UAE have analysed how company employees can successfully innovate and how they should be supported in doing so.

The success factors are: “nature of work, employee skills and personality traits, employee involvement, supervisor and peer relations as well as reward and development opportunities with employees’ readiness to innovate. (...) Highly significant links were found between employees’ readiness to innovate and work climate along with two of its components, namely employee skills and personality traits and nature of work. Other factors of work climate like employee involvement, supervisor, peer relations and reward and development factors also showed positive relationship with the employees’ readiness to innovate” (Elshafea et al. 2015, 273).

Innovation management is a comprehensive and ongoing management task. Starting with an innovation strategy and the operational action plans derived from it. After all, the megatrends of digitalisation, the Internet of Things (IoT), e-mobility, sustainability and New Work alone mean that most companies will have to innovate in order to survive (Granig et al, 2018, 25).

According to Burkhardt, innovation strategies require three main characteristics: Diverse - the strategy supports the diversity of associations. Global - the strategy supports foresight and allows excursions into unknown territory. Systemic - the strategy moves employees' thinking away from products and towards systems (Burkhardt 2017, 137 ff.).

Innovation management must be distinguished from research and development (R&D). R&D usually refers to scientific or technical developments. Innovation can also be of an administrative, social, legal or organisational nature.

R&D usually follows a lived, coordinated and systematic process that has been practised over many years and can be repeated. Innovation management must also master non-systematic processes that bring about a one-off change or for which institutionalisation does not make economic sense (Hauschildt et al. 2011, 30). In this respect, a distinction should also be made in the assessment or measurement of success, which should be handled differently depending on whether it is innovation management or R&D (Chiesa et al. 2009).

Ambidexterity

In recent literature, ambidexterity is often referred to in the context of digital transformation and describes the entrepreneurial challenges of change. Duncan was the first person to mention the concept of ambidexterity in a theoretical realisation. According to him, management requirements with different time horizons should be separated from each other. (Duncan 1976, 180). "Ambidexterity describes the ability of a company, on the one hand, to continuously develop its core business, but at the same time to establish new ways and ways of thinking and thus ensure that changes in the surrounding system are recognised in good time and the resulting opportunities for the future are used" (Schneeberger et al. 2020, 105). To ensure the competitiveness of companies, they must innovate, develop new products or services, or at least further develop existing ones, as the competition could pass them by. This is known as exploration.

After the successful market launch, the aim is to produce and market the new products or services as efficiently as possible. This is called exploitation. Without further or new development, this applies above all to the existing business. The ambidexterity therefore means using "one hand" to position the existing business model on the market as effectively and efficiently as possible. The "other hand" is used for innovation management in order to maintain a competitive advantage in the long term (Freudenthaler-Mayrhofer et al 2017, 14; Backhaus et al. 2009, 266 ff.).

Ambidexterity refers to an organizational ability to manage the business model efficiently and future-oriented at the same time. This requires the organization to have both exploration skills in terms of discovering new paths and innovations and exploitation skills in terms of preserving the status quo and the

core business (Reinhardt 2020, 327). In other words: “guided evolution and managed change” (Schein 1990, 117 ff.).

Companies can carry out exploration and exploitation simultaneously if these activities are structurally separated from each other within the organization. This has an empirically proven positive impact on the company and its economic performance. However, the reaction can also be carried out sequentially, ie one after the other, in order to achieve efficiency. So far, there is no empirical evidence for the sequential approach. The company also may focus on either exploration or exploitation, a separate approach. New competencies could arise through strategic alliances or the acquisition of exploratory companies such as start-ups. Empirical research confirms the positive impact of this strategy (Schneeberger et al. 2020, 125 f.).

In an ambidextrous company, differences should be cultivated. Using the same key performance indicators for the innovation areas as for the established business would put innovators at a disadvantage and lead to conflicts. The goals of the established business areas differ significantly from those of the innovation department. Resources should be shifted to current needs, as there are not always sufficient resources available. If the core business and innovations are to be promoted in parallel, managers must constantly pursue and manage two objectives (Tushman et al. 2011, 38 ff.).

Researchers identified six management principles of successful innovation management: Dynamic capabilities, a continuously changing organization, a people-centric approach, an ambidextrous organization, an open organization that networks with its surroundings and a systems approach to work (Steiber 2014, 16 f.). Meffert et al. recommend further success factors: design of management and incentive systems, unhindered flow of information, appreciation of employees and their ideas, visible and sustained commitment of top management to innovation, decentralised and flexible structure and holistic innovation orientation of the company (Meffert et al. 2008, 455 f.; Steiber 2014, 110 ff.; Nguyen 2021).

Psychological research has shown that the so-called "flow" of employees should be supported. “We propose that workers may use four self-determination strategies to satisfy their basic needs, facilitate flow experiences, and, in turn,

increase their job performance: self-leadership, job crafting, designing work to be playful, and strengths use" (Bakker et al. 2017, 52 ff.).

In the meantime, the relatively young research field of innovation management has developed further. There is a recognised ISO standard for certification as an innovation manager: International Organization for Standardization: ISO 56002:2019 Innovation Management System (ISO 2019). Studies in Sweden have shown several advantages for theory and, above all, practice: „For innovation management professionals it is interesting how personal certification may affect the legitimacy of the role and how the professionalisation may influence the possibilities to conduct fruitful innovation management work. This may also contribute to eliminate a number of innovation management ideas that are not based on research or well-proven practice. Organisations may reflect on how to utilise personal certification in innovation management; and for certification bodies it is interesting to inform their further development work of this kind of personal certification" (Kihlander et al. 2022, 71). There is also a global certification in innovation management (GIMI 2022).

Like the research field of innovation management itself, education and training and the corresponding certification are still at the development stage but growing. Building on learning and knowledge is one of the key success factors to create innovations (Sattler 2011, 154 ff.). A study in Spain shows that there is a positive relationship between human resources practices and innovation due to process- and product innovation. Autonomy, participation, training, career plans, and organised recruitment processes, are strongly linked to creativity and innovation (Escribá-Carda et al. 2014, 119 ff.).

2.3. INNOVATION LABORATORIES

A laboratory (short: lab) is a place dedicated to work (*laborare* in Latin) and to manufacture something. It is supposed to be a space dedicated to scientific experimentation (Sanchez et al. 2021, 4504). An innovation space should be visually memorable, inspiring, and atmospherically appealing and inspire creative thinking. It should offer an efficient and flexible room concept. The room should be easily adaptable to the conditions of the event or to the needs of the users. The room should combine four room types (Gerstbach 2022, 41 ff.):

1) Stimulation:	Space for inspiration
2) Reflection:	Space for reflection
3) Collaboration:	Space for sharing
4) Play:	Space to connect and explore

According to a BCG Global Innovation Survey (listing from top 1 to top 10), the top 10 most innovative companies in 2023 include Apple, Tesla, Amazon, Alphabet, Microsoft, Moderna, Samsung, Huawei, BYD Company and Siemens. What are the "winners" doing to succeed? Nearly 90% of ready companies plan to increase innovation spending (Manly et al. 2023, 3-5). „More companies are building adjacent and new frontier business models to serve as growth engines. Many firms are also planning to increase their spending on such tools as M&A, innovation labs, and open innovation ecosystems, despite the possible downturn“ (Manly et al. 2023, 7).

In this work, the author focuses on the setup, operation, and success factors of Innolabs. Different types have evolved. In recent decades, numerous so-called innovation laboratories (hereinafter: "Innolabs") have also been established in Germany. They have numerous names: "Fablabs", "Living Labs", "Design Factories", "Think Tanks" and "Corporate Start Ups", "Social Innovation Labs", "Living Labs", "Urban Transition Labs in Public Sector", "Innovation Labs". "Education Innovation Labs" or "Learning Innovation Laboratories". The media industry has also recognised the potential of Innolabs and founded Journalism

Innovation Labs 2.0 „to act as an innovation motor for the transformation of their media organisation by knowledge transfer, sharing of new ideas and approaches through advanced training, comprehensive and transparent innovation communication, agile project accompaniment, and personnel rotation“ (Hogh-Janovsky et al. 2021, 361).

And there a Labs to support public economic development (Stember et al. 2020, 334 ff.). “These policy labs use a range of innovation methods and approaches, including co-production, co-creation, co-design, behavioural insights, systems thinking, ethnography, data science, nudge theory and lean processes. Although the methods may vary, one element is consistent: policy labs actively, creatively and collaboratively engage the public and a wide range of stakeholders in jointly developing solutions” (Whicher et al. 2019, 291). Research shows that this type of public Innolab can help cities and municipalities (Vibeke et al. 2012). Osorio et al. have compiled affinities and differences between the various laboratory concepts in a bibliometric study and analysed their development (Osorio et al. 2019a).

The Danish LEGO Group has been using Innolabs since 2007 as part of its strategy development to develop new products for various markets. LEGO calls its Innolabs the "LEGO Concept Lab". At the same time, a so-called innovation matrix was developed, which serves the continuous further development of the entire company.

“One of the changes in structure was the separation of the Concept Lab, which had been integrated into the main product development organization. As part of the restructuring, the company separated the development of revolutionary play experiences and assigned them to the Concept Lab. They challenged the Lab to develop new experiences that were “obviously LEGO, but never seen before.” The Concept Lab was also restructured geographically – innovation hubs were located in some of the company’s most important markets, including Japan, Germany, the US and Spain. LEGO employees in the markets developed a network of local inventors who were charged with developing new play concepts for the LEGO Group” (Robertson 2008, 2 f.).

In order to successfully implement change management processes, some companies even set up "change labs". These are intended to train the learning of behaviour, attitudes, and procedures in change management (Stolzenberg et al. 2013, 270 ff.).

1023 companies worldwide were asked, how they will anticipate the use of innovation vehicles to change in response to macroeconomic factors such as a potential downturn, inflation, or uncertainty. 33 % percent of them are willing to increase their spending in digital or innovation labs. 53 % will maintain their current spending. 14 % will decrease their spending (Manly et al. 2023, 9).

The establishment and operation of an Innolab thus represents an entrepreneurial measure to achieve a strategic goal. „An innovation laboratory comprises specific structural and infrastructural content. A laboratory is a physical research setting dedicated to conducting specific types of experiment. For organizational applications, this normally means a separate room or set of rooms designed for spatial re-configuration (e.g., moveable barriers, cubicles and open spaces etc.) and participant observation“ (Lewis et al. 2005, 3; Griffin et al. 1991).

Prototypes are normally created in Innolabs to test innovations and bring them to market maturity. Prototypes can make abstract ideas and concepts tangible and easier to understand. "The prototyping process converts uncertainties into known risks but does not completely eliminate them (Granig et al. 2018, 109). Prototypes originally come from the fields of (product) design, architecture, or engineering. Prototypes are now also used for processes or services and strategy or organisational development. They are used to visualise concepts and ideas and make them tangible. They initiate discussions or can demonstrate feasibility or benefits (Osterwalder et al. 2011, 166).

New technologies such as 3D printing or 3D scanning are often used here (Granig et al. 2018, 17). Prototypes can be used to carry out fast, sustainable, and creative feedback loops with target groups or users interested in the product (Dopfer 2019, 5). The development of prototypes is an elementary component of an agile design thinking process.

"Design thinking is a method for promoting outstanding ideas for complex problems of various kinds. The aim of design thinking is to use a creative process to create innovations that precisely fulfil the needs and wishes of the customer. (...)

Important parameters of design thinking are multidisciplinary teams, a focus on customer benefit, an iterative process, empathy, optimism, experimentation, and a playful approach" (Franken et al. 2020, 335 f).

There are different objectives for an Innolab, depending on the strategic vision (Montes et al. 2024). Some lab operators try to develop product innovations and thereby make their own business model competitive or develop new business models. Others aim to involve as many stakeholders and shareholders as possible in the development of new products or services, e.g., through open innovation. Education Innovation Laboratories aim to develop modern learning formats - as an interface between research, education and business, as an incubator for educational innovations. The core task of innovation management is the organisation of innovation processes. It is applied to areas that are new and for which there is little or no experience or routine.

Malik compares innovation management with mountaineering. No different skills are required for new routes than for climbing known routes. However, a first ascent requires mastery of technique and equipment as well as the best preparation (Malik 2006, 380). Working in an Innolab could, to stay with this image, prepare this first ascent.

Motivated by technological (digital), global, social, economic, ecological and political (mega) trends and the development of research in the field of innovation management, innovation labs have been partly outsourced as "business units". This seems to be in line with the current state of research:

Christensen, Matzler and Eichen, for example, recommend spinning off and establishing separate organisational units for the development of innovations and the company's own defence, for example against disruptive innovations. Due to different corporate cultures and strategic orientations, these should not be located in the parent company, but outside the company's own headquarters or branches in independent organisational units (Christensen et al. 2011, 130).

The term "disruptive" refers to a development that destroys something existing with something new. This is because "these ground-breaking innovations harbour entirely new business opportunities. A company enters unoccupied market segments with completely new offerings" (Anthony et al. 2011, 26).

In one of the first studies of the organization of innovation laboratories, Lewis and Moultrie conclude, “that the ‘innovation laboratory’ can offer real benefits for organizations: reinforcing corporate commitment to innovation and creativity by providing a physical manifestation of dynamic capability and double loop learning concepts” (Lewis et al. 2005, 2).

Another study shows, that „Innovation labs are a safe place for organizations to run experiments and iterate on projects, and they’re an important investment for firms that have rigid approaches or that work in highly regulated industries” (Ahuja 2019, 123). Running an innovation laboratory seems to make sense. The question is how to work in such a laboratory. Which knowledge, which methods and techniques are used in which order? Why are these techniques used in this order and depth or breadth? With what success?

“Although several studies have tackled the problem of design, development and sustainability of innovation laboratories, there is still a gap in understanding how the capabilities and performance of these environments are affected by the strategic intentions at the early stages of design and functioning” (Osorio et al. 2019, 1).

2.3.1. Conception, Design and Operation of an Innovation Laboratory

How should the Innolab be planned, designed, equipped, and operated? In this chapter it should be discussed, how the physical space of an Innolab encourages creative behaviour for the people working or learning in it, as users. The aim of this chapter is to summarize the current state of research to gain relevant parameters for the design, establishment, and operation of a new, in this case as an experiment, Educational Innovation Lab.

These physical parameters form the basis for the experiment that the author carries out in real life, and which is explored in this dissertation. Based on these parameters, iteratively combined with the outcomes of the first quality surveys in this dissertation, the real Education Innovation Lab at the chamber of crafts in Nuremberg, Germany, was designed, built, operated and is still being operated. In

the next chapter, the author will gather research to operate an Educational Innovation Lab and combine it with the outcomes in this chapter.

Learning is a continuous process of action and reflection. This process consists of asking questions, seeking feedback, conducting experience, reflecting on results, and discussing mistakes or unexpected outcomes of actions (Edmondson 1999, 353). Lewis and Moultrie recommend, that the users need to be in a space that reduces the hierarchy and that supports participation. The design of the lab should promote dynamism, playfulness, and communication. The reason: it should encourage creative behaviours and support innovative projects with all needed resources, visualization-tools and, if necessary, the ability to prototype (Lewis et al. 2005, 4). The equipment and furnishings in the rooms can set the tone for the desired emotional behaviour that should or may be displayed in the rooms. This includes, for example, comfortable, ergonomic chairs, friendly pictures on the wall or small items such as handkerchiefs. A culture of joy should be conveyed. A culture of fear, on the other hand, is created when signs with prohibitions, rules of behaviour or the consequences of violations are displayed (Barsade et al. 2013, 24).

In order to ensure and increase the quality of teaching, the learning environment, educational infrastructure and the manner of teaching are crucial, in addition to organisation, financial resources and the continuous integration of scientific research (Jemmy et al. 2023, 358 f.). Researchers and consultants around Innolabs recommend putting people at the centre and planning for them, planning for flexibility and thinking about the future (Gerstbach 2022, 46f.).

Scientists from Rotterdam, Netherlands, recommend eleven design principles on which innovation is conditional:

- 1) "Formulate an urgent and intriguing question
- 2) Create a new approach
- 3) Work from individual motivation
- 4) Make unusual combinations of subject matter expertise
- 5) Work from mutual attractiveness
- 6) Build on strength

- 7) Create something together
- 8) Entice [students] to see new signals and to give them new meaning
- 9) Connect the world inside the innovation practice to the world outside
- 10) Pay attention to the social and communicative process
- 11) Actively support the development of competences” (Miltenburg et al. 2019, 17)

It should be noted that any conflicts must be resolved to achieve success. It is known from conflict research that while conflicts remain unresolved, only quasi-solutions are obtained. This quasi-problem solution may be effective immediately and in the short term but obscures its short-term solution. The implementation of the innovation is questionable (Glasl 2013, 267).

2.3.2. Space for Creative Thinking and Learning

(1) The designed or natural environment of the Innolab should support creativity

Creativity is defined as having insights or coming up with solutions to problems. According to Kupp, creativity consists of three essential components, which in turn can be subdivided. The components are inspiration, intuition and imagination.

- ⇒ Inspiration can be an idea, a flash of inspiration or an intuition to do something new.
- ⇒ Intuition means mentally analysing the inspiration. Would the inspiration be possible and feasible, at what opportunity cost, in what time or by what means?
- ⇒ Imagination is the ability to give shape to the new in thought and then in reality, to realise it.

These characteristics must be lived in the corporate culture of an organisation that wants to create innovations. In addition, employees need spaces in which they can meet openly, curiously and without prejudice in order to be creative and inventive (Kupp 2011, 61 f.).

Goleman summarises the studies by Gardner et al. and supplements the definitions of creativity with interpersonal intelligence. It is the ability to understand other people. What they feel, how feelings, temperaments, motivations, or desires influence their behaviour, how they work and how best to work with them. It is about how to respond appropriately. There are seven main types of intelligence that are decisive for cooperation between people:

1. Verbal and non-verbal competence
2. Mathematical and logical skills
3. Spatial imagination to create images, shapes, or objects
4. Kinesthetic competence for efficient and graceful movements
5. Musical competence
6. Interpersonal skills: Leadership skills, ability to maintain relationships and friendships and to network or resolve conflicts.
7. Intrapyschic skills. The ability to organise one's life in a way that is consistent with one's emotions and leads to inner satisfaction.

These intelligence subtypes can serve to put people in a pleasant state (Goleman 2013 I, 59-61). Goleman states, that, in using these types of intelligence, open awareness could be created. Open awareness then could create a mental platform for creative breakthroughs and unexpected insights. It creates a mental situation of floating (Goleman 2013 II, 42). To be creative, research shows, that the human brain should relax, and human beings should feel some kind of happy, to release dopamine, one hormone of happiness and this helps the brain to relax from stress (Cooper et al. 2017, 37).

"Stress is understood as a state of the organism in which the well-being is perceived as endangered as a result of an internal or external threat. Stress can have a performance-stimulating effect and thus mobilize (eustress), but it can also have health-damaging consequences (distress)" (Spieß 2013, 16).

This type of creativity refers to the development of new and useful ideas for a product, service, process, or workflow. For something to be considered as creative at work, the result must be new and useful (compare Krause 2013, 2). "Accordingly, one speaks of creativity in an organizational context when, on the one hand, ideas contain something that has not existed before in this way and is therefore unique, and on the other hand these ideas must be useful, i.e., implementable" (Krause 2013, 61).

Neuroscientific studies show that, when human beings are under stress and pressure, their brain is in a highly activated gamma state and they are highly efficient, but only a small part of their brain pathways is active. New and creative thoughts only arise at the significantly calmer and more relaxed brain wave frequency of alpha or theta waves. Mindfulness also promotes agility and flexibility. And these are some more requirements to be creative (Dopfer 2019, 107).

Goleman found that just before a new idea or a problem is solved, our brain is in a calm, open minded alpha waves rhythm, like a daydream. This "freely roaming awareness ups the odds of serendipitous associations and novel combinations" (Goleman 2013 II, 42 f.).

"Creativity is the ability to create something new from something already known, which has not yet been conceived in such a way. The creative process involves the identification of a task and a solution process. Accepting a task triggers the solution process with the proviso to find a solution achieving a certain objective. Thus, from referring between the familiar and known, new insights and a deeper understanding can result such that by establishing a theory new relationships are discovered, or such that by combination new qualities are produced. Supportive skills are the ability of association and, of course of imagination" (Weis 2015, 223).

Creative intention, i.e., the intention to be creative, can, to a certain extent, be positively related to the creativity achieved. However, conscious thought through full and focused concentration on a problem or challenge causes a limited set of useful thought processes or analytical problem-solving skills to be employed.

On the other hand, thought processes that at first glance seem less relevant to creativity could lead to new results. Because unconscious thoughts lead to less focused but more associative processes. These could make it possible to access less obvious and more inaccessible trains of thought (compare Krause 2013, 23).

“However, one has to realize that the possibilities of rationally influencing creativity, without which ideas cannot be generated, are very limited. One can only speak of creating favorable framework conditions and not of controlling the idea work. In particular, the early phases of idea development are hardly controllable. In the later phases of the innovation process, on the other hand, standardized methods and instruments are appropriate” (Franken et al. 2020, 249). “The variety of perspectives leads to more creativity” (Brandes et al. 2014, 108) and this also requires spatial changes in perspective (Blumenschein et al. 2015, 15 ff.).

Creativity makes people happy.

Creativity is worthwhile because it triggers a mix of different positive emotions and motivations. Studies by neuroscientists support this: “Problems solved with high insight showed significantly greater neural activity in several key subcortical midbrain reward processing regions. (...) The conclusion of the study was: A good mood promotes creativity - and vice versa: being creative also promotes good feelings.” (Gernstbach 2022, 54 f.).

(2) The environment of the Innolab should support collaboration and dialogue

"Creative processes require flexible room concepts, e.g., movable furniture, high tables, cushion landscapes, places of retreat, flexible partition walls, whiteboards, presentation areas and a variety of moderation media" (Sauter et al. 2018, 47). „Dialogue is in essence reconnoitering learning—to be considered not just a result of acquiring information or doctrines and also not a means, to verify or criticize a particular theory or program, but part of an ongoing process of creative interaction among peers.

It creates a space in which attentiveness is given, and allows spreading ideas and interpretations, which enables a kind of collective proprioception (self-perception) or immediate mirroring of two aspects: the content of thought and the less apparent, the dynamic structures that dominate thinking” (Weis, 2015, 226).

“Since the knowledge of each individual in the team is a supplement to the knowledge of the others, such problem-oriented collaboration increases self-confidence. It stimulates creative thinking and strengthens well-being” (Dopfer 2019, 121; Steiger et al. 2013, 403 about “living learning”).

In his studies, Poguntke found that architecturally aesthetic buildings, unusual design, daylight and wide-open spaces can have a positive influence on people's motivation and mood. These extraordinary places can create a "wow effect", which in turn increases the intrinsic motivation to create something extraordinary (Poguntke 2019, 84.). Visualisation is a means to an end. It serves to visualise, illustrate and clarify knowledge, information or methods. A distinction is made between static (images, photos, graphics, schematics, matrices, tables or diagrams), dynamic (videos, animations, films, 2D and 3D simulations) and interactive (annotated and interactive videos, simulations, games or software) visualisations (Kauffeld et al. 2019, 404).

(3) The environment of the Innolab should support wellbeing.

“Wellbeing is linked to performance, and high level of performance logically are a prerequisite for achieving creativity and innovation” (Cooper et al. 2017, 103). Science distinguishes between physical, social, and emotional well-being.

Physical well-being encompasses people's physical needs: adequate warmth, fresh air, protection from harm, healthy nutrition, healthy workplaces and recreation rooms, little noise or disturbance, physical integrity (Dopfer 2019, 94).

Poguntke recommends the following parameters to achieve a sense of well-being:

- (1) High ceilings support conceptual thinking and allow "thoughts to flow freely".
- (2) The naturalness of the surroundings with plants and walkable outdoor areas support performance as it calms people down.
- (3) Pictures provide relaxation and inspiration.
- (4) Rows of tables or chairs that cannot be moved inhibit dialogue and creativity.
- (5) Physical objects for building prototypes such as Lego, building materials or games for breaks support inspiration.
- (6) Individual colour schemes (e.g., blue in the morning and orange in the late afternoon) in the rooms simulate different times of day and have a natural effect. The colour change of the lights supports the natural biorhythm of the participants, similar to new commercial aircraft. This effect ranges from relaxing to inspiring:

- ⇒ Blue symbolises the sky, the horizon, or the sea. Colour psychologists have discovered that blue can have a calming and creativity-enhancing effect.
- ⇒ Red is associated with power, energy, alertness, and vitality. It acts as a signal colour.
- ⇒ Yellow is reminiscent of light and sunshine. It promotes focused and concentrated thinking.
- ⇒ Orange has a calming effect on people and creates self-confidence.
- ⇒ Green also has a calming effect as it is reminiscent of plants, nature, life, and vitality (Poguntke 2019, 85).

Social well-being relates to interpersonal relationships and social interactions at work and in personal life. The work is about a meaningful activity in a secure employment relationship, about ergonomic workplace design or cooperation with colleagues (Dopfer 2019, 94).

One of the most important factors in group work for achieving outstanding (creative) performance is the state of inner and social harmony. Goleman calls this the group EQ (EQ or EI = emotional intelligence). This allows group participants to utilise the talent and skills of all members of the group. Negative feelings such as fear, envy, conflict potential, anger or rage curtail harmony (Goleman 2013 I, 204 ff.). In a study conducted by Capgemini, 53% of senior managers and 44% of non-managerial employees in Germany stated that emotional intelligence will be the decisive competence for the advancement of automation and the use of artificial intelligence (Crummenerl et al. 2019, 3).

In order not to lose the attention and concentration of the participants, it is important to alternate between emotional and analytical content or learning units. Shared emotional reactions are a unifying social force among people (Duarte 2012, 136 ff.). Group work can be seen as a precursor to so-called flipped classrooms, the benefits of which have now been researched.

The results of a meta-analysis about flipped classrooms show that learning mathematics is promoted. In various aspects: academic performance, active participation, motivation, interest, and interaction between students and between students and teachers (Fornons et al. 2021, 9 f.).

“Nevertheless, this created knowledge has been structured to facilitate its use because it enables identification of the learning activities in which it can be helpful. However, it has also been classified with a set of labels based on different views: types of learning activities, types of content, user profile and theme. This evidence constitutes support for organisational learning, specifically for the creation, organisation and distribution of knowledge. Students have created a similar amount of knowledge for theoretical and practical activities (...), and, for the most part, these resources are directed to other students who have had difficulty performing a learning activity (...). Explanations, notes, examples, exercises and summaries (...) are the five most utilised resources” (Sein-Echaluze et al. 2022, 10).

Open and activity-orientated learning situations appear to be suitable for developing the prerequisites for cooperative learning. Co-operative learning has several advantages over learning as an individual (individual learning):

Co-operative learning is active and social learning with one another. It consists of positive interdependence (mutual dependence) with simultaneous individual responsibility. According to the latest research, it is preferable to individual learning. The prerequisites are skills and a willingness to work together. In addition, appropriate competences in the respective subject area. Instructions for co-operation are also required. The learning task must be appropriately challenging so that the collaboration appears worthwhile. True to the motto: What one person cannot do, many can do together. The incentive structure must appear individually attractive and rewarding for the entire group in order to strengthen the intrinsic motivation to cooperate (Wilbers 2017, 160 ff.).

Collaboration should take place in small groups so that participants can create learning content and solve learning tasks together. This results in highly interactive and very individualised learning, with teachers acting as facilitators or mentors. The previous learning formulas of passive learning with frontal reproduction of content, little interaction, "one size fits all" and the teacher as authority are no longer up to date (Kohlert et al. 2017, 168 ff.).

Emotional well-being includes control over one's life, self-actualization, belonging, and emotional attachment to other people. Emotional well-being has a powerful impact on social and physical well-being (Dopfer 2019, 94). Gardner developed the theory of multiple intelligences and studied the lives of creative people. He discovered that people who are in mental "flow" can be very creative, but that their brain power does not skyrocket or overwork them. These creative people in flow do not experience any mental effort. This can also be applied to learning.

Gardner has researched that children learn more easily and much better when they are intrinsically motivated because they enjoy learning either that subject or a subject in certain ways. Threats or the promise of a reward are counterproductive. If someone has a natural talent and therefore competence in music, it will be easier for them to enter a state of flow in this area. In areas where

their skills are weaker, they need to be encouraged. The following applies: a task that is too easy is boring, a task that is too difficult leads to nervousness or even anxiety (Goleman, 2013 I, 123 ff.).

Emotions can therefore have a positive or negative effect on learning, remembering, and recalling what we have learnt. Under pressure or excessive demands, stress hormones such as cortisol impair the performance of our brain. Although we can then cope with routine tasks, solving creative or complex tasks becomes more difficult or even impossible (Franken et al. 2020, 178). "Emotions cause the release of messenger substances that open learning channels in our nerve cells and thus permanently inscribe change processes in the brains of those involved" (Klinkhammer et al. 2015, 68).

2.3.3. State of Research: Selection of Methods for Innovation Laboratories

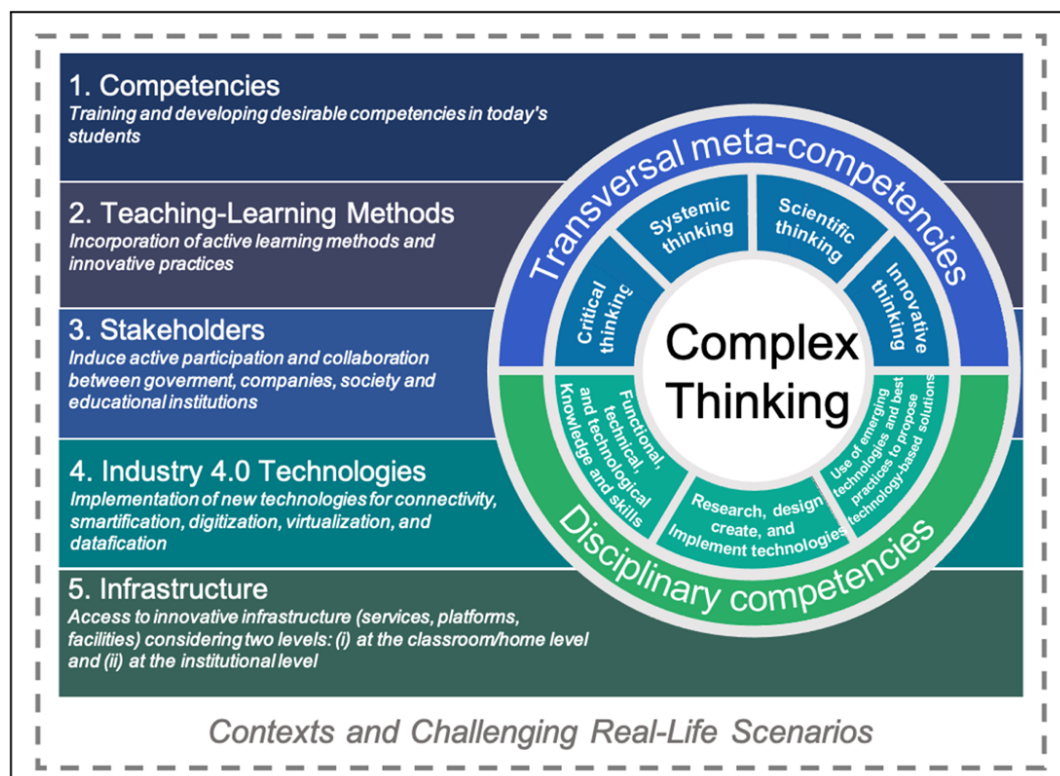


Figure 3: Education 4.0 (Ramírez-Montoya et al. 2022, 4).

Ramírez-Montoya et al. explored, that complex thinking competency, teaching methods and techniques are the predominant components of Education 4.0 (Ramírez-Montoya et al. 2022, 1). There are several key success factors to improve the way of teaching and learning (see figure 3). "Hence in Higher Education 1.0 students were largely consumers of information resources that were delivered to them for absorption" (Salmon 2019, 97). That changed.

The development from Education 1.0 to 4.0 is fluid but can be measured in levels of maturity (Berghaus et al. 2016). Education 2.0: communication, collaboration, connecting, invasion of technology and social networking. Education 3.0: from hybrid teaching settings to blended learning (Sanchez et al. 2021, 4510). Methods: Small learning units, online forums, shared learning, webinars, digital scripts, quizzes, free access to online libraries, OER and face-to-face events (Salmon 2019, 108 ff.; Kauffeld et al. 2019, 100). E-Education can be differentiated based on two characteristics. Education does more than just transport information. The information, knowledge and practicable methods should be understood and applied by the learners. In addition, structured, problem-solving orientated, creative thinking should be trained (Wirtz 2011, 688).

Education 4.0 is defined as teaching professionals capable of applying physical and digital resources by using active learning. There is a shift from teacher-centered to student-centered instruction, from theory to transfer into practice. Students and pupils are then supposed to find innovative solutions to current and future challenges regarding transformations in society, economy, and nature (Ramírez-Montoya et al. 2022, 3).

Literature shows five core components of Education 4.0. These competences innovate pedagogical processes by using new technologies, new (digital) infrastructure and new methods of teaching and learning. To learn and teach these competences a special kind of management tactics are necessary. "Management is characterised by the fact that it defines and pursues strategies and goals, makes decisions, determines and influences information flows, establishes and shapes social relationships and influences the partners in these social relationships in order to realise the decisions made" (Hauschildt et al. 2011, 29).

Innovation stands, among other things, for the change of a technology, which in this context includes marketing, investment and management processes (Fields 2011, 18). Simon points out that innovations are not limited to technology, but can have an impact on processes, costs, prices and sales (Simon 2011, 195).

"Disruptive innovations typically pose difficulties for an industry's incumbent leaders, who are faced with the choice of investing to improve their products along the sustaining trajectory or investing in disruptive innovations. The choice is difficult because sustaining innovations appear to be much more attractive than disruptive ones, even though disruptive innovations often ultimately drive more long-term growth" (Christensen et al. 2011, 138).

Research offers processes for developing innovations. A typical innovation process is broken down into stages. From the idea to discovery or through observation, then from research and invention to development and commercialisation. Ideally, this is followed by ongoing commercialisation (Hauschildt et al. 2011, 20 ff.). Innovation labs should provide the resources, techniques and methods to carry out these processes effectively and efficiently.

Literature offers hundreds of techniques, tools, and methods to develop innovations. There are methods based on types, creativity, teambuilding, exploration, design thinking phases, tool clusters or methods based on their results. Or methods based on innovation effectiveness (van Aerssen et al. 2018, 8-10). There are numerous ways to combine these methods and techniques and apply them in innovation labs. However, research only offers isolated hints and recommendations.

According to Moreno-Guerrero and his fellow researchers from the Department of Didactics and School Organization at the University of Granada in Spain, "it is considered necessary to apply active and innovative teaching methods in the field of Higher Education, seeking to promote a change in the roles of the agents participating in the training process, making the student the center of his or her own learning and the teacher the guide of the entire process" (Moreno-Guerrero et al. 2020, 10). In a study, Graner and Mißler-Behr found that two factors in particular are decisive for success in new product development:

1. The more different methods are used, the greater the success of the innovation. This appears to be because in heterogeneous cross-functional innovation teams, different methods appear to be most suitable for each member personally.

2. The more members of an innovation team from different areas of the company such as research and development, marketing, production, purchasing and logistics work together and the more intensively they communicate and exchange ideas, the more successful the development project will be (Graner et al. 2014, 15).

Ahuja confirms this approach: "It takes a diverse team to succeed. You do need a few people from outside the four walls of the organization, but they should be surrounded by others who bring a mix of skills — including longstanding employees who have a passion for innovation and know how the company works" (Ahuja 2019, 126).

Zivkovic proposes a new type of lab for solving wicked problems: the Systemic Innovation Lab. The main aim here is to apply techniques from design thinking. Systemic design, solution ecosystems and systemic innovation approaches should be supported in this lab. Zivkovic also proposes participant groups that are as heterogeneous as possible, the involvement of users as co-creators and the establishment of networks with the authorities (Zivkovic 2018, 348). Miltenburg et al. from the Rotterdam University of Applied Sciences have been experimenting with Innolabs since 2010 and recommend five characteristic features for the design of this "**powerful learning environment**":

1. "A multidisciplinary issue drawn from actual practice.
2. An authentic learning environment.
3. Professional excellence as both the aim and basis for assessment.
4. Qualified teachers setting high standards for their students.
5. Working and learning in a Community of Learners made up of all those involved.

These five characteristics will only lead to a powerful learning environment if they are all present and if they are interrelated. No one feature can exist without the other” (Miltenburg et. al 2019, 7).

2.4. EDUCATION INNOVATION LABORATORIES (LEARNING LABS)

The aim of this chapter is to summarize the current state of research to gain all relevant parameters for the design, establishment, and operation of a new, in this case as a long-term experiment, Education Innovation Lab. These physical parameters form the basis for the experiment that the author carries out in real life, and which is explored in this dissertation. Based on the parameters to operate an Innolab in general plus the outcomes of this chapter to operate an **Education Innovation Lab**, iteratively combined with the outcomes of the first two quality studies in this dissertation, the real Education Innovation Lab at the Chamber of Crafts in Nuremberg, Germany, was designed, built, operated and is still being operated. In the next chapter, the author then will analyze and combine the outcomes of the expert interviews to operate an Educational Innovation Lab and combine it with the outcomes in this chapter (Innovation Education Labs) and the chapter before (Innovation Labs).

Innovation research no longer deals only with technological innovations, but also with economic, social, educational, and organizational innovations. Pedagogical or learning and teaching innovations can be defined as follows. "Innovation can be directed toward progress in one, several, or all aspects of the educational system: theory and practice, curriculum, teaching and learning, policy, technology, institutions and administration, institutional culture, and teacher education. It can be applied in any aspect of education that can make a positive impact on learning and learners" (Serdyukov 2017, 8).

Other definitions: "(...) a physical, digital and human space for observation, experimentation and evaluation, to rethink and enrich learning and teaching attitudes and practices" (Sanchez et al. 2021, 4511). „A space that aims to support the transformation of education through experimentation with emerging technologies, the promotion of creativity and the implementation of new teaching methodologies" (Almaraz-Menéndez et al. 2021, 5). Innovative universities and other education providers should innovate. This implies an entrepreneurial mentality, novelty should be involved, and profitability, or returns for society (Fernández et al. 2018, 44).

There remains a scientific gap in understanding how the design and functioning of an Innolab affect its performance. (Osorio et al. 2019, 1). Positive design can be viewed as a framework that encompasses designing for pleasure, function, personal significance, and virtue. (Cooper et al. 2017, 25).

„This implies that any attempt to innovate should be based on a context-analysis. 5 components of pedagogical innovation are relevant: **`the novelty, the object, the change, the finalized action, and the process`**. In other words, pedagogical innovation is based on a contextualized and relative novelty and the change results from a finalized action, which is considered as part of a process” (Sanchez et al. 2022, 4503 f.).

To achieve and develop new competences to raise the skills for the future like that recommended by the World Economic Forum it is important to try new ways towards Education 4.0 (see figure 4: Top 10 skills on the rise). The goal is to learn collaboratively and interactively in a kind of flipped classroom, both online and face to face - using agile methods and collaboration software (Sauter et al. 2018, 76; Cheng et al. 2018).

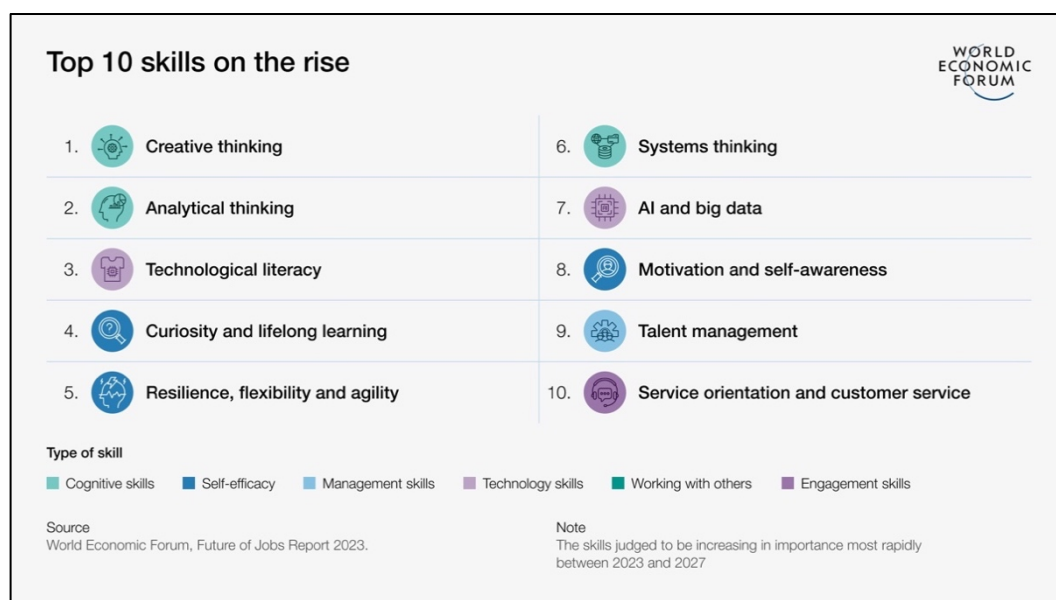


Figure 4: Top 10 skills on the rise. Source: <https://www.weforum.org/agenda/2023/05/future-of-jobs-2023-skills> (last download 22.10.2023)

The so-called media richness must be considered. The researchers suggest differentiating learning according to task types. The manner of teaching and the corresponding use of media or methods should be adapted according to the desired cognitive and executive or operational performance in order to improve learning success (Mangold et al. 2004, 749 ff.).

Places can be separate, flexible, virtual, or co-working spaces. New forms of learning such as meetups, BarCamps or hackathons can take place (Sauter et al. 2018, 77-82). This so called social blended learning is recommended for agile competence development because digital transformation is a megatrend that will accompany us (Sauter et al. 2018, 82).

With practice-oriented and interactive teaching, this can be promising (Franken et al. 2020, 184). Learning whenever, wherever, and however you want. The results of an experiment in Germany, which operated and analysed a mobile Education Innovation Lab for schools in rural areas over a period of 18 months, support these statements (Saegbrecht et al. 2019, 129 ff.).

According Csikszentmihalyi it is important to create a stimulating microenvironment, the immediate setting in which people work and learn. This environment should be flexible, enforce ideas and a respectful behavior towards these ideas. It's the task of the educators to create and use these spaces (Csikszentmihalyi 2013, 140). After establishing a Learning Living Lab in South Africa, the researchers identified several success factors: "commonly owned vision, strong leadership, self-sustainability, sense of challenges, face-to-face meetings, a strong host, and support for sustainability" (Herselmann et al. 2015, 32 f.). Empirical studies on the success factors of Learning Labs for students show that five competences should be addressed in the learners:

- ⇒ **Collaboration**
- ⇒ **Communication**
- ⇒ **Problem solving**
- ⇒ **Critical thinking**
- ⇒ **Creativity**

To strengthen these competences, student labs should be designed as authentic learning environments based on three principles: realistic, complex task situations adapted to target groups and personal maturity levels, multidisciplinary and social interaction (Admiraal et al. 2019, 85 ff.; Stolzenberg et al. 2023, 165 ff.).

Sanchez et al. consider that “a learning lab should enable a process aiming at both improving teaching and learning practices based on the use of digital technology in higher education (pedagogical innovation) and promoting a culture of innovation” (Sanchez et al. 2021, 4504). Sanchez et al developed and tested different types of learning labs in a collaborative design thinking process together with three other universities.

Three main components for the successful creation of innovations emerged from their scientific studies. A learning lab in a three-dimensional model (Sanchez et al. 2021, 4510): **Community, Activities and Spaces**.

1. Community of teachers and learners, flexible and open to new common goals

With shared values, practices, rules, and behaviour. However, this community is not isolated from the rest of the organisation but should be open to other stakeholders and shareholders in order to spread and promote innovation successes. Poguntke confirms this. Sanchez et al. have identified several success factors for corporate think tanks, which are similar to an Innolab in most parameters. The researchers recommend a heterogeneous team with creative participants and collaboration with stakeholders and external partners. This promotes openness to new and diverse ideas.

Not forgetting close collaboration and support from management to make decisions on possible implementations, provide resources and drive innovation work. Essential: consideration of the mindset of the organisation and its decision-makers, who must bring the innovation work into the context of the corporate strategy. From the outset, the participants should consider the possible implementation. This usually requires the support of other specialist departments. Its employees should be involved at an early stage and informed about progress and possible assistance (Poguntke 2019, 65).

2. Design and activities in the labs

Conception of concrete learning scenarios, collaboration, and exchange. “These activities must allow the discovery, observation, experimentation, and evaluation of teaching and learning practices. Activities should also include innovative modalities, be learner-centered, encourage sharing of knowledge, be assessed and formalized, be made visible and valued at a university level” (Sanchez et al. 2021, 4510). The success factors of the activities are **acceptability, usability, and usefulness**.

It is therefore advisable to organise game-based learning workshops or learning with "Lego Serious Play" (short: LSP) or "Playmobil Pro". „But the target and the culmination of the game is reaching a consensus in a problem solution. Players learn to understand and to combine different points of view, such as: individual/corporate interests versus team/societies interests; their own standpoint versus understanding the standpoints and opinions of others; from single aspects versus integrating of multiple aspects, from confrontation to cooperation“ (Pivec et al. 2003). McCusker found, that “the LSP process can be effective in educational contexts, where individual goals are examined and synthesised to identify ways of meeting the learning needs of a group of individuals with separate but common aspirations (...)”.

To use LSP in educational research, McCusker recommends further research to establish the external validity and value as an educational tool (McCusker 2014, 35). Lugaresi et al. experimented with Lego to introduce engineering students to prototyping entire factories – the so called “Lego Factory” (Lugaresi et al. 2020).

This dissertation explores the pedagogical-innovative benefits of LSP by intervening in the way it is taught (Plass et al. 2019, 3 ff.). The author and his colleagues use LSP in a new workshop series for marketing, sales and project management in the new Educational Innovation Lab. Activities also means knowing the learning methods and using them appropriately.

Literature distinguishes between the following learning methods:

Learning by teaching:

A presentation or brief input from the teacher. The participants learn as the trainer passes on his knowledge on the topic to them. As soon as the learners themselves use this learning method, they learn as well.

Self-determined learning:

The learners acquire new knowledge and new methods independently.

Dialogic learning:

Active participation in learning. The learners discuss with each other or solve problems together. They agree on solutions or recommendations for action.

Cooperative learning:

Group work or group discussions.

Process orientation:

The teacher considers the knowledge and learning speed of the learners and adapts the process.

Learning by discovery:

The teacher or the learners ask each other questions. This encourages everyone to try out and find solutions. Design thinking processes use this to break new ground.

Action orientation:

The learning content is developed haptically, practically or simulated. Role-playing games simulate conversations that could take place in a similar way. Working with Lego Serious Play falls under this category. She also uses playful elements to learn (Lienhart 2017, 110 f.).

Interactive learning:

Interactions between learners and teachers are necessary for the learning process. Research has identified six components for successful interactions in teaching scenarios.

- ⇒ Structuring the lesson: Teachers must explain the structure or common thread and the objectives of the lesson.
- ⇒ Conclusion: Teachers summarise the significance of what has been learned and place it in an overall context.
- ⇒ Evaluation: Teachers assess the learning material and communicate their personal comments.
- ⇒ Concrete interactions: Exchange of contact, discussions, conversations and coaching between teachers and learners, in group work between learners themselves.
- ⇒ Theory, content, and methodological knowledge: these are communicated to the learners.
- ⇒ Examples and comparisons: application serves to clarify theories (Kauffeld et al. 2019, 213).

Agile learning:

In order to survive in the VUCA world and to master metatrends, global upheavals and other economic challenges, research has developed agile learning. Agile skills and values development is the ability to creatively and self-organisedly solve challenges in the increasingly digitalised world of work and life using agile working methods.

"Competence research clearly shows that competences can only be built up if the necessary interiorisation, the emotional anchoring of values and the resulting emotional impregnation of information and action knowledge takes place via dissonant, contradictory, emotionally touching, stabilising situations. However, this is only possible in practice through transfer tasks, research assignments, practical projects, or challenges in the workplace" (Sauter et al. 2018, 70 f.).

3. Various customised "spaces", in classrooms or digitally

The presence rooms should have four components:

(1) Modularity

To adapt activities to users' needs. It is based on movable partitions of the rooms and furniture that can be easily arranged. To enable flexibility: bar tables, separate table workstations, separate rooms for working in smaller groups (Poguntke 2019, 83)

(2) Collaboration

Promote collaboration and sharing of different people and their characteristics (Sanchez et al. 2021, 4510 f.). Poguntke speaks of the wisdom of the many, or swarm intelligence.

Group decisions are often better than individual decisions. The joint discussion and "democratic" decision increase the probability of success. Many generated ideas increase the probability that a particularly groundbreaking approach is hidden underneath. Poguntke recommends three options for increasing swarm intelligence. Large group events with 100 or more participants are possible and useful.

Linking up with colleagues from other departments via software collaboration tools makes sense for brainstorming sessions (Schierenbeck et al. 2008, 191 f.) or proposed innovation solutions. The third possibility is the connection to the outside world under the keyword Open Innovation. This would increase the quantity and quality of innovation opportunities. Acceptance and the likelihood of implementation would benefit from this (Poguntke 2019, 74).

In the group, your own strength develops, which supports many people in their learning. It's easier to learn together because the desire to belong to the group adds to your own motivation. Therefore, group work is useful for learning success (Lienhart 2017, 45). "In addition, the playful look of the premises also helps to approach project issues in a more playful, experimental and open-ended way and to leave the usual convergent business heuristics out of the equation for once.

Taking such recommendations into account helps teams to create a working culture and atmosphere in which iterative, customer-centred and solution-oriented work becomes a matter of course" (Brandes et al. 2014, 65).

(3) Evolution

It should be possible to evolve the space according to users' needs and technological preferences, innovations, and possibilities (Sanchez et al. 2021, 4510 f.).

(4) Visualization

Pedagogical innovations undertaken by participants and teachers (Sanchez et al. 2021, 4510 f.). Images have a positive effect on the human brain. Images can clarify relationships. Images can be stored together with information and help to speed up memory (Franken et al 2020, 180). The following design principles should be considered when creating and using multimedia learning content.

Coherence principle

People learn better when interesting but irrelevant information is omitted.

Signalling principle

People learn better when essential information is emphasised.

Redundancy principle

People learn better when redundant (author's note: "superfluous") information is omitted.

Spatial contiguity principle

People learn better when related images and texts are placed in close proximity to each other.

Temporal contiguity principle

People learn better when related images and texts are presented simultaneously. It should also be noted that the reception of the information to be absorbed and processed depends on the cultural and social background, prior knowledge, and world view of the learner (Kauffeld et al. 2019, 405).

After their research Sanchez et al. concluded their definition of a learning lab:

“This definition states that a learning lab is a physical, digital and human space for observation, experimentation and evaluation, to rethink and enrich learning and teaching attitudes and practices at the university.”

(Sanchez et al. 2021, 4511).

According to Gerstbach, spaces should support innovation projects in different ways. They disrupt structures to create networks of knowledge and change people's consciousness to develop and disseminate ideas more productively. They also support conscious and chance encounters for sharing and collaboration. New connections are intended to promote communication and an active exchange of information (Gernstbach 2022, 117). Cooper and Kohlert provide six dimensions, that aim to boost positive wellbeing in the work environment by offering people choice and control over where they work and how they work:

- ⇒ **“Optimism:** fostering creativity and innovation
- ⇒ **Mindfulness:** being fully engaged
- ⇒ **Authenticity:** being really yourself
- ⇒ **Belonging:** connecting to others
- ⇒ **Meaning:** a sense of purpose
- ⇒ **Vitality:** having get-up-and-go” (Cooper, Kohlert 2017, 62)

The learning style experiential learning and different learning styles of people should be considered.

Experimental Learning

- 1) Experience
- 2) Think
- 3) Infer or analyze
- 4) Plan
- 5) Doing

“A learning process is initially triggered by experiencing something. After the first direct experience you start to think about it. In a third step, conclusions are derived from this, which lead to the planning of something new in the fourth phase. The concrete implementation would be the fifth step” (Töpfer 2010, 40).

Learning types

- 1) **The visual learner type** learns mostly with the eyes.
- 2) **The auditory learner type** learns mostly with the ears. This type likes to memorize the learning material by saying and repeating what is to be learned himself.
- 3) **The haptic learner types** use to learn with their hands. They want to touch, feel, twist, and try things.
- 4) **The communicative learner type** likes to exchange ideas in study groups, asks questions, listens, reflects and finds solutions together with others (Franken et al. 2020, 179)

People learn more effectively and efficiently once they experience it themselves. They use all their senses, whether consciously or unconsciously. They saw it, heard it, touched it, smelled it, felt it, tried it out, networked it with what they had previously learned or experienced, shared it with others or even passed it on themselves as teachers (Lienhart 2017, 35). Sanchez et al. combined literature review with a collaborative design thinking process. “Design Thinking is a human-centered design process that seeks to identify problems for which ideas are generated and which are rapidly prototyped into tangible solutions” (Freudenthalter-Mayrhofer et al. 2017, 41).

Poguntke sees the benefit of design thinking as a “structuring process for the user-centric development of all kinds of problem solutions, with a set of helpful tools. (...) Design Thinking is a method with a set of principles, a process, and a variety of tools for user-oriented, iterative and open-ended development of all kinds of problem solutions” (Poguntke 2019, 113 f).

Sanchez et al. performed by a multidisciplinary team of researchers and stakeholders. They chose an empirical and iterative process dedicated to test their ideas. Or in other words: “Test iteratively in the Real World” (Trapp 2014, 141 ff.)

The successful deployment of their model in four universities around the world (Switzerland, Egypt, Tunisia, Lebanon) in different cultural and academic contexts seems convincing. Their iterative way of research shows the need for a bottom-up process based on the needs and the participation of stakeholders. It is important to form a community. Another lesson learned is that the institutionalization of the learning lab is a key to a successful implementation.

Further research proposals: the study of Sanchez et al. demonstrates the difficulty to assess the impacts of a learning lab due to its long-term effect on the improvement of teaching and learning practices. Another challenge is the development of digital teaching and learning skills, either hybrid or purely digital (Sanchez et al. 2021, 4517 f.).

Franken et al. derive recommendations for the optimal design of learning from several studies and their own analyses (Franken et al. 2020, 178):

- ⇒ Learning situations and methodological forms of organisation should be dramaturgically and operationally designed in such a way that they support individual learning procedures, independent and individual learning processes.
- ⇒ Alternate between learning input, practice, support, and reflection, including presentation of performance - depending on the learners' level of development and emotional situation.
- ⇒ Collaborative learning (for example in group work) supports individual understanding of learning. They promote communication and problem-solving skills. Consequences: Increased performance, self-confidence, a sense of belonging, the ability to work in a team, conflict resolution, enjoyment of the joint achievement and motivation (Töpfer 2010, 45).
- ⇒ Appreciation must become part of the learning process.
- ⇒ Motivation and enthusiasm on the part of the teacher have a strong impact on learning success.
- ⇒ Independent learning is another success factor so that each learner can reflect and abstract individually. In this way, connections can also be made to other areas of knowledge in order to be able to solve problems in an interdisciplinary, transfer-orientated manner.
- ⇒ The emotional intelligence of teachers plays an important role in understanding their own emotional world and that of learners and reacting appropriately (Franken et al. 2020, 178). Emotional intelligence is divided into five areas:
 1. Self-awareness: recognising your own feelings.
 2. Managing feelings appropriately.
 3. Putting feelings into action; this is essential for attention, self-motivation, and creativity.

4. Empathy: recognising other people's feelings and knowing what others are feeling.
5. Managing relationships: responding appropriately to other people's feelings (Goleman 2013 I, 65 f.).

Almaraz-Menéndez et al. confirm these recommendations for action after planning, setting up and experiencing the operation of the MEDIALAB USAL at the University of Salamanca in Spain since 2010. They define their InnoLab as „a space that aims to support the transformation of education through experimentation with emerging technologies, the promotion of creativity and the implementation of new teaching methodologies” (Almaraz-Menéndez et al. 2021, 5). “The MEDIALAB space has been designed to provide a place for meeting, reflection, collaboration, experimentation, production, creative, interdisciplinary, and innovative. But above all, it is a mobile space where no type of furniture or object is fixed; it is a constantly changing space that adapts to each activity and needs” (Almaraz-Menéndez et al. 2021, 7).

The researchers in Salamanca divide their InnoLab into three areas: one area for creativity, brainstorming processes or to try out new technologies. A second area for creative work and for exchanging ideas with other departments or teams. The third area is the production level, the so-called MEDIALAB Factory. As MEDIALAB's focus is on technology, it is primarily equipped with digital hardware and software. „This is the factory area where the results of the interdisciplinary works are materialized and where workshops and practical activities are developed to learn how to use digital tools such as 3D printers, along with other tools more related to traditional carving (vinyl cutter, laser engraving machine, etc)” (Almaraz-Menéndez et al. 2021, 7).

The researchers recommend including educational innovation as a compulsory subject, establishing permanent open, interdisciplinary, and collaborative learning spaces with modern and flexible equipment to encourage unstructured experiments with emerging digital technologies.

"Spaces where creativity can emerge from the freedom to connect ideas in new ways, beyond the strict schemes of university education" (Almaraz-Menéndez et al. 2021, 10). Barriers to learning should be avoided because learning processes take time.

Science distinguishes between several obstacles:

- 1) **"Learning inhibition due to temporal proximity:** New things cannot yet be absorbed because the previous learning process has not yet been completed.
- 2) **Forward inhibition - backward inhibition:** If breaks are not taken when learning, successive learning materials can hinder each other's absorption.
- 3) **Similarity inhibition:** Materials that are very similar in content should not be learned directly one after the other. As a result, the contents would otherwise get mixed up and confusion would arise.
- 4) **Affective inhibition:** Strong feelings such as stress, anger, fear, but also infatuation can lead to forgetting what has already been learned. Strong feelings after the learning activity also hinder the transfer of what has been learned from short-term to long-term memory" (Töpfler 2010, 55).

2.5. SUMMARY AND DERIVATIONS FOR THE QUALITATIVE STUDY NR. 1

To design, create, build, and operate a new Education Innovation Lab, several categories should be considered.

Design

Positive design can be viewed as a framework that encompasses designing for pleasure, function, personal significance, and virtue (Cooper et al. 2017, 25). The users need to be in a space that reduces hierarchy and supports participation, dynamism, playfulness, and communication. It should encourage creative behaviors and support innovative projects with all needed resources, visualization-tools, and the ability to prototype (Lewis et al. 2005, 4). The design should support independent and individual learning processes. Alternation between learning input, practice, support, and reflection including presentation of performance - depending on the level of development and the emotional situation of the learner (Franken et al. 2020, 178).

Infrastructure and Creativity

Infrastructure should stimulate the creativity (Moultrie et al. 2007; Cocu et al. 2015). The design, (technical) equipment and furnishings of the rooms can set the direction for the desired emotional behavior. A culture of joy should be conveyed. A culture of fear arises when signs show prohibitions, rules of conduct or the consequences of violations (Barsade et al. 2013, 24).

Collaboration and Flexibility

Learning together supports the individual understanding. Studies have identified the success factors of collaborative learning (Delgado et al. 2020, 131). It promotes communication and problem-solving skills, it increases performance, self-

confidence, belonging, ability to work in a team, conflict resolution, enjoyment of the work performed together and motivation (Töpfer 2010, 45).

Interactivity and Networking

In an interactive group learning develops. It's easier to learn together, because the desire to belong to the group motivates people (Lienhart 2017, 45). It is recommended of putting people at the center and planning for them (Gerstbach 2022, 46 f.). These spaces disrupt structures to create networks of knowledge and change people's consciousness to develop and disseminate ideas more productively. They support conscious and chance encounters for sharing and collaboration. New connections are intended to promote communication and an active exchange (Gerstbach 2022, 117).

Lateral thinking should be promoted (Ștefănescu 2022, 115). This is because information processing to create innovative alternatives requires an alternation between vertical and lateral thinking. Vertical thinking is described as logical, systematic, analytical, and rational. Lateral thinking is characterized by other features: a playful search for new paths, alternatives, and patterns. Lateral thinking is curious and asks where an idea can lead; it encourages mental leaps and unexpected ideas. Lateral and vertical thinking complement and alternate when it comes to creating innovations (Hauschildt et al. 2011, 264 f.).

Wellbeing

Six dimensions are provided, that aim to boost positive wellbeing by offering people choice and control over where they work and how they work: Optimism, Mindfulness, Authenticity, Belonging, Meaning, Vitality (Cooper et al. 2017, 62). A playful look of the rooms helps to approach project issues in a more joyful, experimental, and open-ended way (Brandes et al. 2014, 65). "Flexible spatial concepts are necessary for creative processes, e.g., movable furniture, standing tables, cushion landscapes, places of retreat, flexible partitions, whiteboards, presentation areas (...) are required" (Sauter et al. 2018, 47). This stimulates creative

thinking and strengthens well-being (Dopfer 2019, 121). Aesthetic buildings and design, colors, plants, daylight, wide spaces can have a positive influence on motivation and mood. These extraordinary places can create a “wow effect”, which would increase the intrinsic motivation to also create something extraordinary (Poguntke 2019, 84). Such places strengthen dialogue, an essence of Education 3.0 and 4.0 (Weis 2015, 226).

Methods and Techniques

There are hundreds of different learning or innovation methods: these should be used flexibly depending on the target group, objective, location in the innovation process, problem definition and the time and situation. Some methods are too simple, some are too complex, or some methods are not understood or simply not liked by the target group. The theory allows the statement that it is not about the one 100% correct method, but rather about the variety of methods used. The more different methods are used, the higher the probability that these methods will be accepted and applied by the target group and the more likely it is that the innovation will be successful. This conclusion also results from the theoretical realisation that heterogeneous groups of participants in an Innolab are more likely to achieve innovation success than homogeneous groups. At the same time, this increases the risk that the use of fewer methods would increase the probability of failure. It is therefore implied that the use of many methods increases the probability of success.

Educational Innovation

The research results on the young research topic of "Education 4.0" and the new methods developed for this appear convincing. They will influence the design and operation of the Education Innovation Lab planned by the authors and will be tested in a Real-Life Experiment. This experiment will be evaluated in the 3rd study of this dissertation.

After the analysis, the theoretical research results appear to be promising, recommendable, theoretically, and practically applicable. As the research design of this dissertation is exploratory in nature and in order to increase the chances of success for the conception and operation of an Innolab, the first qualitative study of this dissertation follows in the next chapter.

In this step, the success parameters from the literature are queried in the first qualitative study by means of Expert Interviews, checked for practical suitability, confirmed, partially confirmed or not confirmed, combined, supplemented, discarded or considered useful in order to incorporate them into the design of the Real-Life Experiment.

III – QUALITATIVE STUDIES & REAL-LIFE EXPERIMENT

III - QUALITATIVE STUDIES & REAL-LIFE EXPERIMENT

3.1. QUALITATIVE STUDY NR. 1: EXPERT INTERVIEWS

In this study, a qualitative expert interview was chosen to answer the research questions iteratively following the theoretical analysis. Expert interviews "aim to reconstruct particular bodies of knowledge or particularly exclusive, detailed or comprehensive knowledge about particular bodies of knowledge and practices, in short: the reconstruction of expert knowledge" (Pfadenhauer 2005, 113).

This chapter outlines the empirical questions on which the empirical analysis is based. In order to make a targeted contribution to the knowledge gained in this dissertation, these questions must be based on the guiding research questions. The questions are justified as to why they are relevant in the context of the knowledge objectives of this thesis. The relevance of the questions results from the alignment with the guiding research questions and the extent of the knowledge gain. The interview questions are formulated in such a way that they enable a gain in knowledge beyond the existing theoretical knowledge. "Speaking with selected experts helps to quickly view and reflect on the key technologies and state-of-the-art offerings, products and developments of a focus topic" (Van Aerssen et al. 2018, 759).

At the heart of the interviews are the questions of why and how innovation departments and, above all, Innolabs are initiated, equipped and how they are operated, and with what success. How were the innovation spaces designed and why were they set up in this way? Which methods were used and with what success. What methods are used to measure success. What obstacles are encountered. What competences do the operators and participants of the Innolabs need? What general recommendations for action can be derived from the experts' experiences in order to successfully design, implement and operate Innolabs.

The interviews aim to identify similarities and differences with regard to the explanatory reasons given when answering the questions and to show the structures of the arguments. The expert interviews are intended to evaluate and, if

necessary, supplement the theoretical findings from the previous chapters. "The special feature of qualitative interview techniques is that the course of the interview is less structured by the interviewer and more controlled by the interviewee. This is because in a qualitative interview, open questions are asked to which the interviewees respond comprehensively in their own words. In addition, the interview process is organised flexibly so that new questions can be raised spontaneously and followed up on if this arises from the interview situation" (Bortz et al. 2016, 365).

The aim of these expert interviews is to obtain combined and beneficial recommendations for action from theory and practice in order to conduct the qualitative real-life experiment, then to test and further develop this.

3.1.1. Study Design

3.1.1.1. *Expert Interviews in qualitative research, representativeness, and preparation of data collection - quality criteria*

"The research design (type of research, research plan, research design, study design) generally characterises the methodological approach of a study" (Bortz et al. 2016, 182). Sampling is the selection of a subset that is to be investigated: a subgroup of cases. These can be people, groups, interactions, or events, in certain places at certain times. They represent a population, a basic population, or a set of facts. Qualitative research "works with smaller samples or case studies. The selection of people or cases is based on the respective state of knowledge with the aim of capturing the entire subject matter as accurately, completely, and aspect-richly as possible (theoretical sampling)" (Berger-Grabner 2016, 128).

The selection and interviewing of experts could lead to the disadvantage that the results may be distorted. Generalizing or representative statements are only possible to a limited extent. It is not possible to make statements about distribution and frequencies in relation to the population. According to Merkens, however, the interviews in qualitative studies offer a representation of the content (Merkens 1997, 100). The author found and selected four experts. All the experts have different experiences and functions in various Innolabs throughout Germany.

3.1.1.2. *Conception of the Interview Guide*

The author of this dissertation chose the problem-centered interview method. “The aim of this interview is problem-oriented understanding of meaning: the most unbiased possible understanding of individual and subjective actions. The researcher's objective theoretical prior knowledge should be supplemented by the subjective view of the respondent” (Berger-Grabner 2016, 140). This type of interview represents a middle ground between semi- or fully standardized techniques and an overly rigid process of isolated questions and answers on the one hand. On the other hand, this type of interview avoids the sequence of unstructured narrative interviews in which the interviewees talk completely freely, and the interviewers do the talking primarily just listen.

Due to the research questions with the aim of determining Innolabs' success factors and the research gaps in this area, the author considers this semi-open approach to be the most sensible. The aim is to identify useful recommendations for action that the experts may not consider particularly worth mentioning because they are regularly used to them in their professional lives. Methods, tactics, or special courses of action that are second nature to experts and perhaps have already become a subconscious habit are intended to be filtered out using this type of interview. The problem-centered interview follows several phases:

- ⇒ Explanation phase: The objectives and process are briefly explained. The experts interviewed are told that their individual ideas and opinions are of interest and will be accepted unbiasedly.
- ⇒ Social data: the experts are asked to briefly state their name, their activities, and their employers.
- ⇒ This is followed by introductory questions as a narrative stimulus and then a narrative and understanding-generating communication strategy following the opening narrative as an interview phase to continue the thread.
- ⇒ Ad-hoc questions based on the interviewer's previous theoretical knowledge are recommended if these topics have not been raised by the experts themselves. The individual questions on the topic questions that serve to

answer the main research questions should be asked flexibly. The interview should not result in a query.

- ⇒ After the interviews, transcription and data analysis take place: The interview transcripts are subjected to qualitative data analysis. Different methods are possible (Bortz et al. 2016, 376 f.). First, the author brainstormed possible questions and collected as many questions as possible that could be useful for answering the research questions.

Research question 1:

The performance of Innolabs. How do they manage to improve their ability to innovate? Which success factors can be measured?

Research question 2:

What should a learning environment (spaces) look like to optimize learning success? What is the relationship between the design of the learning environment and the selection of learning materials and the ability to create innovations?

Research question 3:

What is the relationship between innovation techniques (activities), e.g., agile techniques such as creativity methods or design thinking and game-based learning via Lego Serious Play, and the ability to create innovations? Which success factors can be measured?

In the second step, these questions were reviewed. Which of them are useful, which could be distracting, and which are superfluous. Closed questions were reformulated as open questions. The aim of the questions is to determine which recommendations for action the experts can give for the design and operation of Innolabs based on theory and their own experience. In the third step, the questions were sorted by topic and reviewed again. These steps resulted in the following introductions and questions as an overall but flexible interview guide.

ORIGINAL INTERVIEW GUIDE

EXPERT INTERVIEWS APRIL 2021

A. INTRODUCTION

- a. Do you consent to this interview being recorded and transcribed? It is for the preliminary study of my dissertation in innovation management.*
- b. Warm up - who are you and what do you do where?*
- c. What have you done so far?*
- d. What training do you have?*
- e. What is your function?*
- f. The aim of this interview is to find out how Innolabs or similar institutions can be successful. What mechanisms of action can be identified.*

B. MAIN PART OF THE INTERVIEW

1. How is your innovation department structured? What do you call it? How do the processes in it work?

- a. Short seminars or longer research projects?*
- b. Open innovation (with external participants)?*
- c. Permanent staffing with your own innovation employees and participants only from within the company?*

2. Why were the innovation labs, think tanks or corporate start-ups founded and how do they work?

- a. What strategic goals are pursued?*
- b. Is it about business model innovation, product development or new services?*

- c. *How high is the budget and how is it distributed in percentage terms?*
- d. *How are these labs managed?*
- e. *What methods or techniques are used?*
- f. *Why exactly these?*
- g. *Where did you get them from?*
- h. *How were these techniques applied?*
- i. *In a specific order?*
- j. *Limited in time?*

Scientific studies show:

- a. *"The more methods used, the better the result".*
- b. *"The more heterogeneous collaboration, the better the result".*
- c. *"The more information flows between the participants, the better the result".*

How do you rate these recommendations?

3. How have these facilities been anchored in the company hierarchy?

- a. *Do you use the promoter model (team - consisting of the upper hierarchy)?*
- b. *If yes, how this it looks like?*
- c. *Is the lab located inside or outside the company? Why?*
- d. *What does the Innolab look like?*
- e. *Equipment?*
- f. *Infrastructure?*
- g. *Success factors?*

4. What kind of products or services have been created so far?

- a. How is success measured or evaluated?
- b. E.g., patents, property rights, KPIs, turnover, profit?
- c. According to which criteria do the innovations reach market maturity?
- d. Who decides how and why products are marketed?

5. What obstacles were identified in the innovation process?

How were they overcome?

6. There are hundreds of techniques and methods to find innovations:

Why did individual innovation techniques such as...

- Design Thinking
- Scrum
- Business Model Canvas
- Lego Serious Play
- Brainstorming and Creativity Techniques

... lead to success or why not?

Case studies:

- a. Do you have a best case and a worst case?
- b. Could you explain, please: What did you learn from it?

7. About people:

- a. Who manages or innovates in your facility? Why?*
- b. What skills do these people have?*
- c. What skills do you think these people should have?*
- d. Is there a co-creation model? If yes, how does it look like?*

8. Outlook:

Based on your experience, what recommendations would you make should a company wish to pursue innovation management through these institutions?

9. Please name specific success factors.

Thank you very much.

C. END OF THE INTERVIEW

3.1.1.3. *Pretests*

The interview guide was tested before the interviews were conducted. The author presented the questionnaire to three colleagues from the consulting and training sector before the expert interviews. He asked for comments or improvements to "correct sources of error in the instrument (e.g., incomprehensible questions, too much or too little detail in questions, too many or too few questions). A good instrument should be designed in such a way that the respondents can answer all questions at the first attempt without too much strain and answer distortions or interview dropouts are avoided" (Bortz et al. 2016, 364).

Some technical terms were simplified or translated, and some questions were rephrased or shortened to make them easier to understand. Other rather closed questions were reformulated as open questions, to allow the experts room for narratives and interpretations. The sequence was only logically structured to the extent that the experts were able to understand the questions and assign them more easily to the individual subject areas. In general, it is not relevant at which point in the answers meaningful explanations are given to answer the research questions, but that they are given at all. The classification then takes place in the data analysis by the researcher. Overall, the questionnaire was shortened slightly to avoid unnecessarily lengthening the interview.

3.1.2. Interview Participants - Sample

3.1.2.1. *Selection and recruitment*

To pursue the research questions as part of the qualitative expert interviews in this dissertation, the experts are defined as follows: people who had at least 5 years of professional experience in innovation and change management. They should have experience in the design, conception, establishment, and operation of innovation laboratories or innovation management departments. They should have dealt with the topic scientifically and practically.

There are various sampling strategies and sampling techniques for the process of sampling. According to Misoch there is targeted or purposive and theoretical sampling. It is possible to apply the fastball principle, an opportunity sample, or conduct a complete survey (Misoch 2019, 204). The author of this dissertation decided to use the targeted or purposive approach. It seems to be the most productive sample to answer the research questions. The other techniques seemed either too arbitrary, too complicated, or not meaningful enough due to randomness or rapid availability.

There are different strategies for targeted or purposive sampling: Quota sampling - systematic and deliberate sampling according to a fixed distribution of certain characteristics. Profile sampling - targeted search for persons with certain characteristic attributes with in-depth analysis. Extreme case sampling - search for unusual or extreme characteristic values. Drawing of a homogeneous sampling - targeted minimization of variance. Maximum variation - maximizing variance with cases that are as different as possible. Intensity Sampling - search for subjects with intense expressions (Misoch 2019). There are a few parameters to select suitable and meaningful experts. Having knowledge, that the researcher needs, the ability to reflect, enough time to be examined and the willingness to participate in at study (Merkens 1997, 101).

In this study, the author uses profile sampling combined with Merkens' recommendations and the author's own experiences, who maintains a network of innovators. "The expert knowledge collected through expert interviews refers, on the one hand, to structural specialist knowledge that is easily accessible in terms of thought and language, but, on the other hand, also to practical and operational knowledge. The knowledge of action is often strongly internalized and difficult for experts to put into words" (Bortz et al. 2016, 375).

The author already used to have contact with the experts before designing the real-life experiment. Some of them were fellow lecturers at a business school where the author taught, or they were booked as experts for individual innovation management seminars. Some of them were colleagues from other departments who had gained experience in Innolabs. Even though only four experts were interviewed, the selection was not random. All experts use to work in the areas of

innovation management and change management. They all have been working with or in Innolabs in theory and practice for years.

At the time of the interview, Expert Nr. 1 was working as an innovation manager at a Catholic Church Credit Institution; previously he was a consultant for innovation and change management at a German Continuing Education Provider. Expert Nr. 2 is founder and head of an Innolab in Northern Germany. He is an expert and trainer for change management, agile methods, and innovation management. Expert Nr. 3 is Head of Organizational Development and Digital Transformation Manager with a focus on New Work Methods at a Bank in Southern Germany. Expert Nr. 4 is a senior consultant at another Continuing Education Provider for managers including a Private Business School with bachelor's and master's degree programs. His focus is on innovation and change management and human resources development. Together with a team, he designed and operated an Innolab.

The author was looking for experts with several key competences. "Competence: The ability to find one's way around open and unmanageable, complex, and dynamic situations in a self-organized manner (dispositions to self-organization, self-organization dispositions). (...) Areas of competence: personal competences: act reflexively, self-organized; activity- and implementation-oriented skills: act actively and holistically in a self-organized manner; technical-methodological skills: solve problems mentally and physically in a self-organized manner and social-communicative skills: act communicatively and cooperatively in a self-organized manner" (Sauter et al. 2018, 266).



Figure 5: Competences (own graphic creation according to Sauter et al. 2018, 118)

According to figure 5 the experts should be passionate about innovation and change management and have years of theoretical and practical experience in these areas. According to the author's assessment, the experts have the necessary skills: personal skills such as intelligence, willingness to learn, flexibility and self-reflection. Social competences like emotional intelligence, communication skills, conflict resolution and team ability.

Their technical and methodological skills range from creativity, problem solving, innovation and change management, tactical and strategic thinking including market knowledge and product development. Their action and leadership skills range from service orientation, assertiveness, self-management, and a high level of intrinsic motivation to judgment, strategic foresight, and a high level of curiosity to put theoretical findings into practice. And they seem to want to satisfy their curiosity by continuously learning new things and using this for their personal development (Meiß 2015).

The prerequisite was that they were or are still working with or in Innolabs or similar organizational units. It was important that they initiated innovations together with as many other people as possible and had experience with the concept, processes, and methods. They should have expertise in infrastructure and the nature of the innovation process.

This means there is a high probability that they were able to name recommendations for action and success factors. All experts have the knowledge, that the researcher needs, the ability to reflect, enough time to be examined and the willingness to participate in at study. The experts were asked by the author by telephone or in person whether they would like to take part in an interview about the success factors of Innolabs.

The duration of each interview should range between approx. 45 to 70 minutes. All four experts agreed and were very interested in this research project.

3.1.3. Interview Situation

Due to the lockdown during Covid 19, the interviews were arranged as a ZOOM-online meeting via video link. All interviews took place in April 2021. Unfavourable framework conditions can lead to interview errors. For example, the wrong choice of time or location. For this reason, the interviews were conducted in the evening after regular working hours.

"Finally, especially in qualitative interviews, the relationship between interviewer and interviewee, the working alliance ("interview rapport") is of crucial importance for smooth and meaningful interviews. The aim is for the participants to both engage in the interview and the mutual understanding, so that a trusting (but not too confidential: "over-rapport") atmosphere is created" (Bortz et al. 2016, 364).

Some of the experts and the author had already been in contact for some time and maintained a collegial relationship at different levels of maturity. The participants were asked to switch on camera and microphone and to be alone in a separate room to ensure an undisturbed interview. From the author's experience as a lecturer in online seminars, Zoom appeared to be the safest, most stable, and

highest quality compared to other programs. At the beginning of the interviews that were recorded, the experts were asked whether they agreed that a recording would take place and their answers could be used and published in this dissertation. All four experts agreed.

Duration of the interviews in minutes:

Expert Nr. 1: 65

Expert Nr. 2: 68

Expert Nr. 3: 76

Expert Nr. 4: 41

Total: 250 minutes

3.1.4. Data Analysis

During data analysis and evaluation, the data collected in the expert interviews are analyzed and evaluated using suitable methods. The goal is either to answer the research questions with the help of the evaluated data or to generate correlations (propositions) or hypotheses through the corresponding data analysis (Bortz et al., 2016, 599). The research design of this dissertation is exploratory in nature. Therefore, the evaluation follows the methodology of Gioia combined with a qualitative content analysis according to Mayring (Gioia et al., 2013, 20 ff.; Mayring 2016, 114 ff.).

"In qualitatively orientated research, however, great importance is attached to the systematic derivation of evaluation aspects from the material, i.e., inductive category formation. This is also a central process within grounded theory (...), where there is talk of open coding" (Mayring 2016, 115). "While quantitative content analysis aims to use a research problem to measure certain formal and content-related characteristics of documents using a theory-based, fully standardised

category system and then evaluate them statistically (deductive approach), qualitative content analysis aims to use a research problem to work out the meanings of documents through data-driven step-by-step coding (inductive approach)" (Bortz et al. 2016, 541).

3.1.4.1. *Transcription*

The interviews were transcribed by the author using the software programme f4. With a total recording time of around 250 minutes, 73 A4 transcript pages were produced. They were anonymised before the data analysis in order to guarantee confidentiality. They were also roughly edited for readability, as the transcription programme is prone to errors. In order to keep the overall character and individual emotional and thought pauses or expressions of the experts as authentic as possible, the transcription was not converted into a pure continuous text. The detailed transcriptions can be found in the appendix.

The analysis follows an inductive-deductive approach. No firmly defined category system was developed and checked during coding. "The entire category system can be interpreted in relation to the research question and the underlying theory" (Mayring 2016, 117). The theory serves as the starting point for the analysis.

The first general categories were deductively developed from the theoretical foundations, then deductively expanded by working with the interview data. New categories are formed inductively. The main categories are first defined through a theory-driven determination of the structuring dimensions. The categories are further developed based on the interviews (Corbin et al., 2015, 220 ff.) in order to answer the research questions.

Categories from the first interview are incorporated into the coding of the subsequent interviews. This iteratively creates an overarching loop-like category system to simplify the analysis. The interviews were analysed with the aid of the MAXQDA software programme. This resulted in a comparison of the expert statements and an overall picture (Flick et al. 2004, 276 ff.; Meuser et al. 2002, 82). In vivo coding was used; the categories were selected according to and with the interview experts' own words (Flick, 2009, 309) in order to ensure authenticity.

3.1.5. Quality Criteria

In this dissertation, a qualitative real-life experiment is conducted and analysed. The expert interviews and the analysis of the resulting data in combination with the data from the theory form the foundation for the real-life experiment. "A key characteristic of qualitative research is its openness and interpretative nature. Every researcher has a selective perception due to their training and experience. However, empirical studies require reliable results that are free of subjectivity" (Berger-Grabner 2016, 129).

The criteria of objectivity, validity and reliability cannot be applied without restriction to the evaluation of qualitative research. Qualitative research examines contexts and phenomena in the environment and situation in which they occur and uses statements from the actors involved (Goldenstein et al. 2018, 92). In this case, the statements of the actors are the data obtained from the expert interviews. The methodological procedures can rarely be standardised in qualitative research. However, they can be supplemented by additional criteria. In the following, the 1st qualitative study is subsumed under the three criteria mentioned. This is followed by further scientific quality criteria for qualitative social research.

3.1.5.1. *Objectivity, Validity, Reliability*

Objectivity

Objectivity means independence from the people involved. No matter who measures, the result remains the same. It refers to the intersubjective verifiability of the results or the independence of the results from the researcher. A distinction is made between different forms: Evaluation objectivity, implementation objectivity, interpretation objectivity (Bortz et al. 2016, 442 f.). In the context of the 1st qualitative study, it is partially possible to confirm the objectivity of implementation, as the study results are largely, but not entirely, independent of the person conducting the study. (Bortz et al. 2016, 443). The objectivity of the

evaluation can be confirmed. The text evaluation (here: analytical categorisation of the categories) is specified in the study design. The evaluation is computerised. The objectivity of interpretation can be confirmed to a large extent. The procedure for the transcribed qualitative content analysis (here: determining the categories based on the theory and the text data) is specified in the study design and could also be implemented by other analysers in the same way, at least with the same or similar results.

Validity

Validity means that the findings should also apply independently of the individual case. A study is valid if the method is chosen in such a way that it optimally corresponds to the research objective and investigates what the research questions raise. The method measures what it is supposed to measure. Validity ensures that researchers can draw correct conclusions from the selected research methods (Bortz et al. 2016, 444; Berger-Grabner 2016, 29 f.).

Qualitative results can be said to have a high degree of validity. The data is usually generated closer to the social environment than in quantitative research, the relevance systems of the interviewees are included and there is a communicative exchange between researchers and interviewees (Lamnek 2005, 166). The interview data of the 1st qualitative study were collected during typical working weeks of the interview experts. They were allowed to co-decide which topics from their social environment in the field of "innovation" they wanted to explore in greater depth or not.

The interviewees' relevance systems are considered during the interview; in fact, they are the basis for relevant data. During the interview, there is a constant communicative exchange between the researcher and the experts. The expert interview study method measures what it is supposed to (Lamnek 2005, 168 f.).

Reliability

Reliability means that the method measures accurately and is reproducible. The research process should be accessible and reproducible for everyone. Reliability is therefore the replicability of the results under the same conditions. There are no or only minor distortions of the test values due to measurement errors; the test value precisely reflects the true characteristics of the test subjects (Bortz et al. 2016, 444; Berger-Grabner 2016, 29 f.).

Reliability refers to the reliability of the expert interviews. "High reliability is achieved when the repetition of the study under the same conditions produces the same result (replicability). The reliability of data analysis in qualitative studies can be ensured by stability and reproducibility: (...) Stability: the developed analysis instrument is used again to examine the same material. This can ensure intracoder reliability. (...) Reproducibility: This refers to the degree of agreement with which other scientists arrive at the same results. Intercoder reliability is ensured here. It is ensured that the analysis instrument is also comprehensible, conclusive, and understandable for others" (Goldenstein et al. 2018, 104). This could be measured with test repetitions or parallel tests.

In this 1st qualitative study, the reliability cannot be fully confirmed by the author in the scientific sense, as the procedure is not independent of the research object (the experts) and in this case not entirely independent of the researcher who prepared and conducted the expert interviews. Consequently, the study data must be seen in a situational context and cannot be duplicated without significant effort. Other researchers would have to conduct the interviews almost identically or at least similarly using the interview guide. This seems possible, but in the author's opinion, the re-generated interview data is likely to differ from the results of the original interviews, as the interview guide was not strictly "queried" during the respective interviews and was even changed spontaneously. The author adapted to the experts and their statements during the expert interviews in order to obtain relevant data.

Furthermore, the experts would not be in the same situation if the interviews were conducted again. The timing, wealth of experience, level of knowledge and trust or the subjective social relationship with the interviewer

would have changed over the course of time between the original interviews and a subsequent re-interview with other interviewers.

"In a test that cannot be fully standardised for reasons of content and therefore has less objectivity, reduced reliability must also be accepted" (Bortz et al. 2016, 444). In a qualitative study, fewer participants are usually interviewed than in a quantitative research method. In this study, there are four experts. It is therefore important to show which generalisations can be made from the results. The generalisations are discussed and explained in the next chapter. "A qualitative study also presents its results in an argumentative and illustrative way. This means that a large part of a qualitative study is devoted to presenting the results of the study to the reader and convincing them of their own, rule-based interpretation" (Goldenstein et al. 2018, 103).

However, reliability could be established by other researchers arriving at the same results by simply analysing the data from the author's transcribed interviews. This would ensure intercoder reliability. Naturally, the author cannot do this himself.

3.1.5.2. *Specific Quality Criteria related to Qualitative Content Analysis*

Mayring recommends six general quality criteria for qualitative social research. These criteria are intended to make the research process more transparent, reliable, and precise. The aim is to increase the scientific acceptance of qualitatively collected data.

1. Procedural Documentation
2. Interpretation Validation with Arguments
3. Rule-based Approach
4. Proximity to the Object
5. Communicative Validation
6. Triangulation (Mayring 2023, 122 ff.)

Procedural Documentation

The procedural documentation describes the documentation, presentation, and explanation of all elements of the research process. In the context of this work, this includes the research design, the explanation of the objectives of the expert interviews, the specific choice of methods, the evaluation, the sample specification, the analysis, and discussion of the results. The entire process of qualitative research must be documented in a transparent manner. It is explained step by step so that outsiders can understand it. The quality criterion of transparency overlaps with the quantitative quality criterion of validity. The research really measures the things that are to be measured. During the expert interviews, the experts being interviewed know that their interview statements are going to be scientifically investigated (Bortz et al. 2016, 329).

Argumentative Validation of Interpretations

Interpretations cannot be proven quantitatively but must be substantiated with arguments. The interpretations must be consistent in themselves. Alternative justifications must be sought and discussed. This is a central criterion in qualitative research, as distortions can exist regarding the validity of the interpretation. The argumentative validation of the interpretation takes place in the discussion of the study results.

Rule-Based Approach

To prevent an unsystematic approach and to make the research process transparent, a certain systematic and rule-based approach must be taken. To this end, the process must be planned in differentiated steps in the sense of a systematic approach. In this thesis, the literature analysis is followed by the expert interviews. The results of theory, the Qualitative Study Nr. 1, the Qualitative Study Nr. 2 are incorporated into the concept of an Education Innolab. A seminar room is then transformed, and a new seminar concept is developed. After the seminar weeks,

Qualitative Study Nr. 3 is conducted to analyze the changes. The results obtained must also be made plausible for outsiders so that the research is intersubjective.

Proximity to the Object

The research process should be as close as possible to the everyday world of the subjects being researched. This criterion refers to the open, equal relationship between the researcher and the participants, who are also the interviewees. The author of this dissertation is the researcher and conceptualizer of the Real-Life Experiment. The research process of the expert interviews takes place in an everyday working week. The world of the experts, their knowledge and opinions are being researched.

Communicative Validation

The validity of the results is checked by making the results available to the respondents and even discussing them. In this way, results are fed back directly to confirm their validity or to seek alternatives for them. This is more appropriate for expert interviews, as the questions are usually open-ended, and the answers can leave room for interpretation. In this study, the experts were asked before and after the interviews, whether they would like to check their statements after the interview and whether they would like to change them, if they wish. All four experts rejected the offer. The spoken word therefore applies to them.

Triangulation

Triangulation means that by using complementary methods, data and researchers, an attempt is made to limit and minimize bias and one-sided observations (Hussy et al. 2013, 288). "In qualitative social research, we speak of triangulation when different theoretical perspectives (theory triangulation), different researchers (researcher triangulation), different data sets (data triangulation) and/or different methods of data collection and data analysis (method triangulation) are combined

in the investigation of a research problem in order to increase the knowledge gain of the study" (Bortz et al. 2016, 600).

In this dissertation, a literature analysis is followed by two qualitative studies: the expert interviews and an opinion poll among regular participants. The results of these studies are incorporated into the concept of an Education Innolab. A seminar room is then transformed, and a new seminar concept is developed. After the seminar weeks, the 3rd Qualitative Study is conducted to analyze the changes. It can be concluded that data and method triangulation take place throughout this research process, which culminates in the discussion and conclusions, to answer the research questions. The author uses different data sources.

3.1.6. Discussion of the Results and Findings

In this chapter, the research questions are going to be discussed, relating to the results of the data analysis of the four interview transcripts as an exploratory study. "Qualitative content analysis aims to analyze texts systematically by processing the material step by step using category systems developed on the basis of the material and guided by theory" (Mayring, 2016, 114).

The deductively or inductively developed categories are then translated into propositions. Six reductive processes are applied in this context: omission, generalization, construction, integration, selection, and bundling (Mayring, 2016, 95). The propositions will accompany the two following Qualitative Studies and become part of the Qualitative Real-Life Experiment. "In qualitative studies, the joint interpretation and consolidation of all results is of great importance for the creation of an overall picture. This happens in conjunction with the research questions posed" (Goldenstein et al. 2018, 101). This will take place in the following discussion.

Research Question 1:

The performance of Innolabs. How do they manage to improve their ability to innovate? Which success factors can be measured?

The interviews initially confirm that Innolabs or similarly designated facilities can generally promote the creation of innovations. Based on the experts' different experiences with innovation management, they agree that the establishment and operation of an Innolab can be beneficial. The experts shed light on the success factors from different perspectives, depending on their experience and level of knowledge.

Expert #1: "If I associate a vision with the lab that I can work towards, that is tangible for people, where they can also realize their own attitude, their own vision. Then a lab topic like that is something I can live by."

Expert #2: "And this room concept and the energy that is released by this room concept is simply conducive to really working together at eye level, working together cross-functionally, breaking down the classic hierarchy, so there is always a dialogue culture here in the rooms and really working together from the trainee to the Management Board."

Expert #3: "We call it an innovation workshop. In our company (...). In principle, the innovation workshop consists mainly of my employees. The team. Developments are based there, today the process managers, the project managers and the employees for digitalisation and automation."

Expert #4: "So there is no classic Innolab at (...). There are, let's say, rooms where you can work on innovations quite well. So, it's all about the room setting, especially flexible room options, especially when you're involved in a process like this."

The experts' statements lead to the conclusion that there are six main categories for the success of Innolabs, that need to be considered primarily. The main categories are:

1. The infrastructure of the Innolab, the design and the equipment.
2. The way in which work, and development is carried out there.
3. The integration into the corporate strategy, the protection and promotion by the management.
4. Permanent provision of resources.
5. Heterogeneity of participants and employees.
6. An innovative corporate culture and a willingness to change with a smart and appropriate error culture.

1. The infrastructure of the Innolab, the design and the equipment

Expert #2 has designed and built an Innolab himself and runs it as Managing Director. He outlines the structure, possibilities and effects on the people who work there and work on innovations: "It's around 300 square metres. We have two large work areas. One area is the plenary, which is also outlined by a large grandstand, where teams can always network very, very well, exchange ideas, where things can be patched up and presented. And then there is the other large area. This is the sprint area, which is equipped with team workspaces where up to 30 people can work in parallel. It is primarily equipped for design thinking, as there is also a lot of prototyping material on shelves. But the room can also be designed very flexibly. Because the furniture, which we also bought from a Berlin designer, is on castors. It's all movable, so you can always create the setting you need for the process. And we also have an area for breaks or for the evening with a large kitchen. The Management Board has realised a bit more as a hobby chef, so that team events or cooking evenings would also be possible there, so that this can also be promoted again."

The expert also reports that these opportunities to cook are now being used for innovation seminars. Cooking together is used to create new products. This was not originally planned. However, it shows that the flexible and open design of the Innolab creates and recognises opportunities that were not previously on the radar of the operators. A new combination was created.

Expert #4 adds the area of interactivity and transparency: "I also think a high level of transparency is very important, even for employees who don't work directly in this team. Because the innovation department in particular is also very much scrutinised by other traditional employees: what are they actually doing there?"

Expert #3 reports on the innovation rooms, which have been continuously developed since 2016. Equipment, design and collaboration options: "For example, we've put in tables from the 180-degree design thinking programme, these hexagonal tables. There are no more seats, we only have standing aids. We have the magnetic board, we have big TVs, we work a lot with Meta-Plan, with flipcharts, we have a glass board inside, so it looks completely different. (...) So we have a big box of tools, of methods that we can teach, where we are fit, also in these methods, also for innovation work, where others can also benefit from it." This dimension is explained in more detail below under research question #2.

2. The way in which work is carried out and developed.

The way in which this is done depends, among other things, on the choice and application of methods and on the people involved. This dimension is explained in more detail below under research question 3.

3. Integration into the corporate strategy, protection, and promotion by the management.

The experts emphasise that the strategic direction of an Innolab should be clarified and secured together with the management. The Innolab should not be seen as a

flash in the pan or a playground, but as a development department to secure the future of the company (Augsten et al. 2017, 28 ff.).

Expert #4: "Yes, such an innovation strategy, to think up. Where do we want to go in the next one or two years? Maybe I wouldn't even look any longer than that. What, what goals I'm pursuing with it. (...) Not forgetting what cultural goals I am also pursuing. (...) And then also to consider which framework conditions and movements I need in order to establish sustainability in the organisation.

"Expert #1: "So commitment over a distance. In good times and bad. You also have to look at that. If innovation doesn't work. Then you must make adjustments."(...) "If I associate a vision with the lab. That I can work towards. That is tangible for people, where they can also realise their own attitude, their own vision. Then a lab theme is something I can live by. But if I say I'm going to build a lab on a greenfield site and five or six people are going to come in, or I'm going to build a lab in my established structure, then that's always difficult. Then the probability of failure is high."

Expert #2 explains the business aspect of an Innolab and emphasises that there is no guarantee that an Innolab will make a profit. It should rather be seen as an investment in the future of the entire company by changing the corporate culture to make the company more innovative and more willing to change. "We will never earn back the entire investment sum that has gone into this. So that, um, that's utopian. But that's never what the Executive Board was about. But it should be handled as a small business area, so that something flows back into it and that's why, above all, we're opening up to the outside world, so that we're now developing our own training programmes, which we're then also taking to the outside world."

This is in line with the statements in the literature. Namely, to carry out an innovation strategy process and to adhere to it. The following parameters are relevant here: Reviewing one's own self-image, reaching agreements on the concept of innovation, determining the need for innovation, defining strategic focus areas, formulating concrete innovation goals in connection with the focus areas and allocating resources (Augsten et al. 2017, 17).

"Managers should create a suitable framework (strategy, rules) for development and learning, contribute to a suitable atmosphere (culture, mindset), create stimuli (initiative, provocation)" (Kaudela-Baum et al. 2014, 65).

Combined with a deeper sense of purpose for the company, the Innolab can increase the likelihood of success: "Finding a purpose has to do with the brand essence, the history, the market development, the industry and, last but not least, the personal values of an entrepreneur/owner. A good purpose conveys all of this plus a look into the future" (Garzarolli et al. 2020, 17). In the field of education, supporting the management is one of three essential success factors. A team of researchers analysed this in the field of higher education and came to a clear conclusion - at least for German universities in 2015. "Firstly, the support from higher management. Without the support of higher management or high leadership, QM in teaching and learning is a 'toothless tiger'. Most probably, in such a case there would be only limited chances of competing and deliberating with other actors within the institution. Unsurprisingly, the relevance of the support by higher management levels is positively correlated with the perceived effectiveness of the QM approach" (Seyfried et al. 2018, 258-271).

4. Permanent provision of resources.

It's not just financial resources that are essential, but also modern, useful facilities, technical equipment and staffing in an Innolab. Expert #2: "And it was certainly beneficial, and it continues to be beneficial that the Executive Board was so supportive and then also provided the financial resources and was fully behind it until the last minute that it was here."

Expert #4 emphasises the staffing factor, not only from within, but also from outside: "So, of course, you also recruit external people from time to time, i.e., you really also install new people in the corridor. Only a few do that. But I think it's a very important key because these people have already seen different sectors and ideally also have a high level of expertise. I think you should also invest the money to have a key position and such a person should actually have a high level of

backing from the Management Board so that they also have - um, I'll say it now - certain freedoms to try things out."

Expert #3 explains the effects of the provision of resources and long-term controlling: "I have to say that we burnt a lot of money in the first year. Really seven-figure sums. That wasn't just hand money, it was real rubble. And then in the second year, where we are now, we had no budget left over to continue pursuing this model. And we did a lot of things wrong. Altogether, here we are. I don't exclude myself from that. I should have intervened in these processes again much earlier. I should have taken corrective action. But by the time they listened to me, I'd say, it was basically already over."

Expert #1 emphasises the importance of recognising that innovation work initially requires resources and should not be compared with day-to-day business. Innovations are not guaranteed, and success is not assured: "But I mean, at the beginning of the innovation you don't earn any money and you need completely different, completely different standards for measuring success compared to where I can measure the ROI."

5. Heterogeneity of participants and employees.

The experts confirm that there is a connection between heterogeneous participants and the success of the Innolab. The different perspectives, attitudes, character traits and behavioral styles of a heterogeneous group of employees or participants are promising. See Expert #4 above about external staffing or, as an example, the statement by Expert #1: "And dogmatism is just wrong. Criticism is part of it. When I talk to you now and we both might have like: You have an idea. I have an idea. And because we have different contexts, we reach higher levels together."

6. Innovative corporate culture and a willingness to change with a smart error culture.

„The culture that exists within the organization has a significant impact on efficiency. It can both strengthen and impede efficiency – and here we need to

remember that there are two dimensions: good solutions and good processes" (Sehested et al. 2011, 32).

Expert #1: "99% of all ideas fail. So, failure must be possible. It has to. And then I have to learn from it. So, it's not about celebrating failure, it's about celebrating learning and then I have to be able to grow." (...) "Doing things in small steps, especially as more innovation also involves a major cultural change. And the status we have now was the first thing I did within the (...) was ultimately to set up an innovation team, where different people were first taught skills." The aim is to get as many employees as possible on the side of the innovators, emphasises expert #4: "So it's also about preparing the culture for this. In other words, other employees who are perhaps not directly involved in the innovation process should be prepared for the fact that what is important is innovation work. But it can't be the case that every project with success is then also tainted. So it is the error culture - building on an error culture."

Expert #4 emphasises individual values of corporate culture that are important for the success of innovation activities, such as curiosity, willingness to learn, trust in employees and a move away from purely top-down decisions: "Freedom. You can't validate things, discuss them with customers and then come up with a result. But then only one person, perhaps the Management Board, says: "We won't do it. So, the customer says yes, but only the management board says no. So, there must be a lot of justification as to why the management board doesn't want to do it. It has something to do with commitment. Commitment - yes." These statements show that the individual categories are not separate from each other but can have an effect together.

Expert #2 reports on the connection between changed spatial conditions and the effects on corporate culture: "And this spatial concept and the energy that is released by this spatial concept is simply conducive to really working together at eye level, to cross-functional collaboration, to breaking down the classic hierarchy, so there is always a "you" culture here in the rooms and to really working together from trainees to the Management Board. This has also had a huge cultural impact, even if we haven't yet reached where we want to be. But cultural development takes time. But they were valuable steps that are now being supported again and

again by the spaces." This is in line with the literature, which recommends adapting the corporate culture. The following factors are recommended to promote an innovative climate:

- "1. The principle of permeability
2. The principle of being able to dream
3. Permanent personal learning
4. Dealing with diversity
5. A culture of cooperation
6. Time to mature
7. Willingness to take risks and a culture of error
8. Spatial culture" (Augsten et al. 2017, 147)

Research Question 2:

What should a learning environment (spaces) look like to optimize learning success? What is the relationship between the design of the learning environment and the selection of learning materials and the ability to create innovations?

The experts' statements serve to answer this research question in the overarching context. The research question asks about "learning success", "learning environment" and "learning materials", as the Real-Life Experiment is about an Education Innovation Lab, a special form of an Innolab.

The experts were asked about Innolabs in general, not about Education Innovation Labs in particular, as the aim is to identify overarching general categories that are then applied and refined to the Real-Life Experiment. The experts confirm that the infrastructure of the Innolab is one of the decisive success factors for the success of innovation activities in an Innolab (see above). However, they do not consider the design or equipment to be the only decisive factor, but this dimension is important.

Expert #2: "Or it's more open, it promotes creativity, (...) at eye level. More familiar. Even the biggest sceptics, which of course we also have (...), who can't imagine anything about the way of working or the concept beforehand, we have found that they simply have to experience it (...). And once they've jumped over the shadow and simply got into the action a bit, then you really notice how even, I would almost say, a classic dusty (...) suddenly blossoms and can then open up and simply be who he is as a person and not as the (...) with a tie".

According to their assessment, promising factors in design and equipment are flexibility, mobility, interactivity and a pleasant room atmosphere. The division into group work rooms and rooms for reflection are recommended. Or at least it is advised to design an Innolab in such a way that it can be easily converted during breaks.

Expert #4: "Well, basically it should be a space where you can work together permanently, where work results are very transparent for everyone and are also permanently available. Where you can change the working environment relatively quickly because you say okay, now we're working on a topic as a team of three or I'm working on a topic alone. I have to somehow pull myself out completely and have to focus somehow, I need a bit of silence. So, flexibility is very important."

Expert #4 emphasises the advantage of a flexible lab that promotes interactivity: "Let's say I somehow go on my lunch break and then suddenly meet a patent attorney or something like that. That's quite helpful, isn't it? There you go. And that's really important for networking alone."

Expert #2 reports on his experiences in terms of design, room layout and atmosphere: "It supports the process. I don't want to say whether it's really decisive, but you notice that it creates a different working atmosphere, that people interact differently here. The best example: even if it has nothing to do with innovation at all. A works council meeting was held here today with the Management Board, and it took place differently than if they had sat together in the meeting room (...). I always find that quite amazing, because somehow a different energy flows. And in projects it's completely different again because everything is mobile. You switch back and forth between the rooms, there are no doors here, everything is interconnected, and this also emphasises this cross-functionality once again or promotes this eye-to-eye contact." (...) He reports on colleagues who used the

Innolab for several weeks and came to this conclusion: "We no longer want to work at a traditional seminar table or in a meeting room, we want to work more freely."

Research Question 3:

What is the relationship between innovation techniques (activities), e.g., agile techniques such as creativity methods or design thinking and game-based learning via Lego Serious Play, and the ability to create innovations? Which success factors can be measured?

The experts generally confirm that the clever selection and the target group-orientated and flexible application of methods are two of the success factors. The experts point out that it is not necessarily about the number of methods that are used; it is more about whether the method "works" with and for the target groups and the extent to which the innovation coach, trainer, teacher, lecturer, or moderator is familiar with these methods, feels comfortable with them and is able to use these methods as tools.

The purpose of a method is a tool to create innovations. The method should not be used just so that a method is used at all, or because the method is perhaps currently fashionable or has been hyped. The experts recommend selecting and using the methods according to the strategic and operational goals of the Innolab, the equipment, the target group, the time, the resources, the personal experience and preferences of the user and the desired output. Above all, it is about the attitudes of the participants and the moderators:

Expert #2: "An open mind. Also, the ability to self-reflect and to change perspective, so that you can also include other aspects and other people. Yes, and the ability to think outside the box. In other words, to leave the beaten track. I'm thinking of the brainstorming headstand, i.e., really turning everything inside out and thinking in a completely new way, blocking out everything else." However, not every method works the same for everyone. People are too different for that. Methods can be tested like any tool. They can be replaced or supplemented by other more favorable or useful methods.

Expert #1: "It has something to do with the people who use these methods, as coaches or trainers or lecturers, as scientists, who practically make the pre-selection, i.e., with the success factors of the methods. (...) and then allow a selection of methods per step and situation that also suit the people, so that those who understand, internalise and also actually like a wine in the supermarket, that they say Hey, I have three or four methods to choose from, I understand them. And the one I like best is the one I want to use now, because they get on better with it. So, it's practically like a hammer. I don't get on with the hammer with the plastic handle, but I get on very well with one with a wooden handle."

Not just one method leads to the goal and the methods should be used carefully and adapted to the target group. The best method is useless if nobody knows how to use it or is unable to utilise it. According to the experts, Innolab operators should therefore provide a kind of method kit that can be used flexibly. And they should think carefully about which method is used when, for whom and for what purpose. Because every method works differently and has a different effect. One size does not fit for all.

Expert #2: "Of course, you have to look at where I am in the process with my idea - are we at the very beginning, that I have a pain point or field of action, which I then simply pour into the design thinking process in order to develop a prototype, an idea at the end. Or is it really about a specific topic, then I use (the customer focus method) to simply break it down, then I tend to use Scrum to create a backlog and define the individual work packages and then simply work through them in the solution team. So, we look at where we are in the process."

Expert #1: "Every situation, every context can be special. Even the team can be special and therefore may not be able to work with one method. And that is certainly another problem that can cause things to fail. Of course, it can also use the wrong methods. Because if you're in complex environments, you need different methods than if you're complicated."

The experts are familiar with the more specific methods of **Design Thinking** and **Game-Based Learning with Lego Serious Play** and have had good to very good experiences with these methods. With regard to these methods, the

assumptions that they can represent success factors for creating innovations are confirmed.

Expert #3 on his top 3 recommendations for the use of methods: "So for me it's quite clear. The first method, which of course suits me and which I also enjoy working with because I am an organisational developer, is Lego Serious Play. The second method is the business model canvas, which I really, really enjoy working with. For example, it has also helped us a lot in comparison with business model innovation. And the third method is ultimately Design Thinking, which I also really, really appreciate and like. Yes, those are my top three, i.e., the ones I use the most in my work."

Design Thinking is a very good overarching tool for creating innovations. Expert #2: "So when I'm at the beginning and I'm bringing people into contact with it for the first time, I find design thinking really good as an introductory method because I have this double diamond behind it as a principle. I can incorporate various creative methods. I can also use it to establish iterative working. I can establish a culture of error by allowing myself to fail and take a step backwards. So I think I can convey many of the agile principles well, especially when I'm starting out." It follows a logical and creative overall dramaturgy and can be broken down into clearly understandable individual steps. Expert #1: "Design thinking is always more like this, I adapt processes, I make things more pleasant."

It is not necessarily decisive whether this design thinking process is only used for a few days or over a longer period of time. This flexibility in terms of time is an advantage, as not every Innolab works full-time on innovations or individual employees only have a certain amount of time to work on innovations. This depends on the strategic organisation, the allocation of resources or even the type of business model of the respective Innolab.

In some, full-time employees work exclusively on innovations, while in others, internal or external participants are instructed and trained in seminars lasting several days or weeks to create innovations.

Expert #2 advises critically scrutinising the application and recommends combining or omitting parts of a method: "So things are actually always just repackaged and combined and then you write a new title over it and say you'll be even more successful with it. And that's why our approach is always to see what

the topic needs. And then I make a selection and maybe it's no longer design thinking in its purest form because I only need one aspect. Or we modify Scrum or (...) have also combined very different things in the Focus System. No, we always look at the topic. And what does it need?"

According to two of the four experts, **Lego Serious Play** seems to be a very suitable means of creating innovations. As a playful and tactile element that reminds adults of their childhood, it encourages creativity and collaboration among researchers. It appeals to several human senses at the same time. The other two experts have not yet gained any experience with this method but are familiar with it.

Expert #3: "We do (...) a lot of Lego Serious Play, where we repeatedly - in my opinion, this is one of the strongest methods in organisational development, which you can also use for prototyping or building for other topics, for target images, for strategic goals, for building images. We work very closely with this." The results can be communicated more easily by showing them and allowing others to touch and view them. This can serve the exchange and joint development of innovations.

Expert #4 underlines this: "Also to visualise things. Maybe also to show others a prototype like this and then get feedback. So, there is a lot to do with visualisation, communication, exchange and discussion." Complex product functions can be simplified and further developed in a playful process. Expert #3 summarises: "Lego is simply a really good method. But you need the mindset for it. And you have to create these foundations in-house first."

3.1.6.1. *Objectives of the Innolabs – Propositions*

In summary, five general propositions for the design, establishment, and operation of Innolabs and their embedding in organisational structures can be derived from the expert statements in combination with the current state of research from the literature.

The propositions are defined as suggestions, statements, or possible causal relationships. "A proposition is a link between at least two constructs (e.g., if-then, the more then-statement) that has the widest possible scope (little limited space-time reference) and a defined object area (e.g., young people aged between 14 and 19) to which it applies (...). Of particular importance are causal propositions that express cause-and-effect relationships and thus allow explanations and predictions" (Bortz et al. 2016, 56).

Proposition 1:

Strategic support and tactical innovation management are necessary

Establishment, equipment, maintenance, resource allocation and activities must be strategically decided and provided on a long-term basis (Hauschildt et al. 2023, 50 ff.; Garzarolli et al. 2020, 25). Management commitment to innovation activities as part of the corporate strategy must be in place (Blumenschein et al. 2015, 43 ff.; Totzauer 2014, 191 ff.). Vision and mission should be developed and communicated to the target group (Stolzenberg et al. 2023, 17 ff.).

Change communication with the core tasks of informing, involving and advising should be planned and implemented (Deutinger 2013, 8 ff.; Stolzenberg et al. 2023, 103 ff.). Individual perceptions of innovation have to be considered (Caraballo et al. 2012, 560 f.). For open innovation approaches, research has shown several implications for managers in order to promote the willingness, permission and ability of employees (Nedon 2015, 152 ff.).

Proposition 2:**Benefits and error culture must be clear**

The operation of an Innolab can be organised like a profit-oriented business unit of a company, but it does not have to be. However, experts advise caution with a profit-orientated approach, as the creation of innovations takes a lot of time, and the failure of innovation projects is part of the Innolab enterprise. Not all ideas or projects will be successful.

The uncertainty of employees who want to contribute to an Innolab should be taken into account. The key performance indicators of Innolabs cannot be equated with the key performance indicators of the previous business model (see "ambidexterity" above). This is because an Innolab will not achieve a return on sales in the short to medium term; on the contrary, it will initially incur expenses that, with a certain degree of uncertainty, will only be amortised in the long term for the benefit of the company's future (Doppler et al. 2014, 23 f.).

3.1.6.2. Resources and Design of the Innolabs**Proposition 3:****Infrastructure and design are relevant**

The equipment and design of an Innolab are key to its success. The main parameters are permanent material, financial and appropriate technical equipment, as well as **flexibility, mobility, interactivity** and a feel-good atmosphere for heterogeneous groups that is as target group orientated as possible and can promote creativity and interactivity.

3.1.6.3. *Methods and Techniques used in the Innolabs*

Proposition 4:

Design Thinking, Game Based Learning and other methods are relevant and useful.

The methods asked about in the interviews - Design Thinking, Game-Based Learning and a goal-orientated but open approach based on "management by objectives methods" - are conducive to innovation. The selection and use of methods must be flexible and target group orientated.

It is not about the quantity of methods, but about the intelligent, target group-orientated and goal-oriented selection and needs-based application of the methods. Methods can and should be shortened, cancelled, combined, or expanded as required.

The competences and also the personal preferences of the Innolab operators and moderators or consultants and those of the users are decisive for success. The further development of competences within the framework of training and further education is essential. Testing and practising the methods is recommended.

3.1.6.4. *Key success factors*

In this context, key success factors are seen as fundamental influencing variables that determine an Innolab. They can be seen as effective correlations that determine success or failure. Proposition 5 is based on the success factors in the literature and the main dimensions of the expert interviews.

Proposition 5:**Key Success Factors**

Strategic commitment, strategic alignment, long-term provision of resources, adequate design for a feel-good atmosphere, beneficial infrastructure, modern and contemporary way of operating from a scientific point of view, application of target group-flexible and situation-related scientific methods.

From a resource-based view of the company, the design, infrastructure, set-up, and operation of the Innolab must have the commitment and support of the management and be embedded in the company's long-term strategy. The allocation of resources must also follow this approach in the long term.

The operation of the Innolab, i.e., the way in which innovation activities are carried out, should follow scientific methods such as innovation and creation methods. Design Thinking, Game-Based Learning and Management by Objectives are useful. But so are other methods. In general, creativity, collaboration, co-creation, error culture, exchange, flexibility, mobility, and interactivity should be encouraged.

3.1.7. Conclusion of Qualitative Study Nr. 1

Six main categories can be summarised from the expert interviews in combination with the theory:

- 1. The infrastructure of the Innolab, the design and the equipment.**
- 2. The way in which work and development is carried out there.**
- 3. The integration into the corporate strategy, the protection and promotion by the management.**
- 4. Permanent provision of resources.**
- 5. Heterogeneity of participants and employees.**
- 6. An innovative corporate culture and a willingness to change with a smart error culture.**

The "heterogeneity of participants and employees" is not initially translated as a proposition in the further course of this dissertation. Reason: the propositions serve to prepare the real-life experiment. The operation of the planned Education Innolab will take place in a real education centre. The participants change automatically and regularly for legal and organisational reasons and are naturally heterogeneous in nature. Consequently, five propositions were formed from the main categories.

Proposition 1:

Strategic support and tactical innovation management are necessary

Proposition 2:

Benefits and error culture must be clear

Proposition 3:

Infrastructure and design are relevant

Proposition 4:

Design Thinking, Game Based Learning and other methods are relevant and useful.

Proposition 5: Key success factors

Strategic commitment, strategic alignment, long-term provision of resources, adequate design for a feel-good atmosphere, beneficial infrastructure, modern and contemporary way of operating from a scientific point of view, application of target group-flexible and situation-related scientific methods.

The six main categories and the five propositions are incorporated into Qualitative Study No. 2 as preparation for the Real-Life Experiment and into Qualitative Study No. 3 in order to answer the research questions more specifically (case-related) and iteratively. The research questions can already be considered partially answered at this point.

The author of this dissertation applies the general answers below to a specific and real case: The concrete conversion of an existing seminar room into an Innolab, in a real educational centre, with real teaching operations. Therefore, the propositions are applied to this real case and refined by real classroom participants through the Opinion Poll. The purpose is to apply the recommendations of the theory and those of the experts to the specific case in combination with the data from the Opinion Poll.

3.1.8. Derivations for Qualitative Study Nr. 2

Design, infrastructure and equipment

In preparation for the Real-Life Experiment, participants in an average and randomly selected classroom in an education centre should spontaneously evaluate the seminar rooms that have been used to date and have hardly changed for decades. In combination with the main categories and propositions mentioned, including the key success factors, this evaluation serves to develop and assess the parameters for the new Education Innovation Lab to be designed, set up and operated in this specific education centre. Research shows, that consumers play a very important role as product innovators (Hippel et al. 2011).

As a derivation of the expert analyses, it is necessary to check whether the existing spaces are conducive to innovation and, if not, to what extent the experts' recommendations are actually relevant for real users of such spaces. In the following, we therefore draw conclusions from the general to the specific.

Type and manner of operation

Since Qualitative Study No. 2 is about existing classrooms or seminar rooms that are to be converted into an Education Innovation Lab, the way in which they are taught would also be worth asking about. Nevertheless, there are four main reasons against asking about the way in which the lab is operated in the following survey:

Firstly, this is not yet an Innolab, but a normal seminar room. Secondly, the participants in the 2nd qualitative study are not (yet) familiar with the topics of innovation management and innovation methods, at least not in depth, as this is not taught in their subjects. Thirdly, it is a spontaneous flash survey in a real class break - about the opinions of the participants. This survey must not take much time and must therefore naturally be limited. Fourthly, questions about the manner of teaching could have aroused resistance and a suspicion of control among the teaching staff. The author wanted to avoid this so as not to cause resentment.

3.1.9. Limitations

"An offensive approach to the limitations of one's own study corresponds to the rules of good scientific practice, while uncritical generalisations and overinterpretations of one's own findings as universally valid explanations or incontrovertible certainties cast doubt on scientific seriousness" (Bortz et al. 2016, 92). Expert interviews are limited in their informative value, i.e., limited in their empirical significance.

Due to the limited data, they are not always suitable for quantifying results or making representative statements of a general nature. Nevertheless, although the necessary relationship of trust between interviewer and interviewee results in subjective and spontaneous statements, these are "generally more honest, more reflective, more precise and more open than with a questionnaire or a closed survey technique" (Mayring 2016, 69). In addition, its objective aspects were previously analysed in the theory section.

Another limitation could be that the focus on statements based on the experts' personal experiences and knowledge may be too narrow to lead to comprehensive scientific findings (Flick 2009, 169). Nevertheless, the interview is suitable for theory-led research, as the aspects of the previous theoretical problem analysis are incorporated into the interviews and the evaluation (Mayring 2016, 70). However, the statements should be interpreted appropriately in the context of the subjective views of the participants.

In these interviews, for example, only two of the experts had concrete personal experience with Game-Based Learning and Lego Serious Play. However, as this teaching, learning and development method is relatively new and research has only taken up this topic in recent years, the experts' specific experiences and statements may provide relevant information for this research process.

The same statement can also be made about experiences with "pure" Innolabs according to the above definitions. The experts' experiences in this regard are diverse and vary in degree. However, as they should form the basis for the design, equipment, infrastructure, and method of operation of a newly created Innolab alongside theory, the statements can provide relevant information and data for the real-life experiment.

The author also considered possible limitations and disadvantages of computer-aided analyses (Flick et al. 2000, 283). Weighing up these discussed advantages and disadvantages of expert interviews, the author decided to use them as a scientific method in the present research process in order to be able to derive meaningful recommendations.

3.2. QUALITATIVE STUDY NR. 2: GROUP OPINION POLL

3.2.1. Study Design

A qualitative research design is chosen for the following Group Opinion Poll, as this dissertation deals with a few very specific cases of open research questions, but with regard to many aspects (Bortz et al. 2016, 185). The author's plan to conduct a Real-Life Experiment in which an Education Innovation Lab is to be designed, built, operated and evaluated represents a change in the company (Kotter 2011, 15 ff.; Lauer 2019, 6 ff.; Doppler 2011, 6 ff.).

Because it is not just a seminar room that is being modernised. Rather: The infrastructure of the room is being changed so that it can be used as an innovation lab. The way in which innovations are to be created there is aimed at innovations in the field of education. These innovations are developed, tested, further developed, modified, adapted, and practised during the experiment in regular marketing and sales management lessons. In order to secure and promote the practical effect of this dissertation, the author chooses a change process and carries it out in practice.

On the one hand, the data from the Group Opinion Poll, before the conversion into a real Innolab, together with the theory and the data from the expert interviews, serve to generate categories and propositions for the future design and operation of the Education Innolab.

On the other hand, the data (as persuasive arguments) serve to maintain and ensure the short, medium, and long-term commitment and provision of resources by the management, as recommended in the literature and by the experts. This is because the data from the assessment of the actual and target situation of the previous seminar rooms can serve as a basis for argumentation in this real and not theoretical change process. According to Kotter and his recommended 8-point change process, the necessary "sense of urgency" can be created among management and communicated to employees (Kotter 2011, 31 ff.).

Analogous to Proposition No. 3 "Integration into the corporate strategy, safeguarding and promotion by the management", permanent innovation management through the operation of an Education Innolab could thus become part of the company's permanent strategy development, from which the vision and mission are developed and implemented (Kotter 2011, 59 ff.; Gassmann et al. 2013a, 55 ff.).

"The flash survey has proven to be useful in change: a short, quick way of generating information" (Deutinger 2013, 56). The open questions to the participants serve to open up new topics and content and to confirm, not confirm or modify the propositions from the previous chapters. "The opinion flash is well suited for evaluating and also for analysing a challenge or description in the first phases of a project" (van Aerssen et al. 2018, 545).

The participants are also interviewed because, alongside the trainers and lecturers, they have gained the most experience in the previous seminar rooms. They have already had lessons in these rooms for months or even years. They would possibly be affected by the change themselves. And finally, they are the customers who work in these spaces. Their opinions should be utilised to bring about customer-oriented changes (Ulwick et al. 2008, 68 f.; Ulwick 2002).

The desired innovation and change process to build and operate the Innolab is to be opened up in the direction of open innovation. "Open innovation describes the opening up of the company's innovation process in order to generate and develop new ideas with the support of external resources. The primary aim is to reuse, multiply and adapt solutions and ideas" (Hanisch et al. 2020, 15). Those affected should become participants (Doppler 2011, 24). Customer needs and their relevant benefits (in this case: those of the seminar participants) should be taken into account in order to avoid mistakes and maximise the benefits (Hanisch et al. 2020, 36). Users can compete with professionals in generating new product ideas (Poetz et al. 2012, 251 ff.).

"The easiest and most direct way to understand users? Ask them yourself and let them tell you. Qualitative and explorative interviews are the method of choice. The aim is to get the interviewees to talk about things that they rarely or almost never think about themselves: What motivates them? What do they really

want? Why do they decide in favour of certain things, why do they say no to others?" (Moring et al. 2018, 44).

The evaluation is based on a qualitative content analysis according to Mayring (Mayring 2016, 114 ff.). The coding is inductive, as the categories arise directly from the data material. In this case, theoretical concepts should not be included, at least in the survey itself. The survey participants should not approach answering the questions with a bias.

3.2.1.1. *Conception of the Opinion Poll Guide*

"Qualitative methods for collecting verbal data presuppose that the respondents are able and willing to think about their own motivations and views and to put them into words" (Hussy et al. 2013, 223). From the respondents' point of view, the survey is only about assessing the existing seminar rooms purely subjectively and suggesting changes or improvements. "The opinion poll is an open-ended written survey. (...) Participants are asked to answer questions in their own words in writing. The method is particularly suitable for data collection when the subject matter is sensitive or when cognitive processes are set in motion by writing them down; the respondents can then successively add to their answers" (Hussy et al. 2013, 234). The interviewees should think about what they think an optimal teaching and learning space should look like.

The author of this dissertation considers the object of investigation (old seminar rooms) to be a sensitive subject. From his subjective point of view, they are no longer modern. For the most part, they have not been changed or modernised for around 20-30 years. Colleagues and seminar participants confirmed this opinion in personal conversations, but this is not decisive from a scientific perspective.

This is one of the reasons for the data collection through the open survey in this 2nd qualitative study. As the seminar rooms in this training centre are designed and equipped almost identically, the survey is about what the participants generally think of the seminar rooms. "The researcher's objective theoretical prior knowledge should be supplemented by the subjective view of the respondent"

(Berger-Grabner 2016, 140). The survey takes place during regular class breaks and is anonymous. No social data such as name, gender, age, origin, level of education or similar is requested. The lecturers are not given any insight into the processing of the questions. Participants are asked to answer only two questions openly and in their own words.

Question Nr. 1: “What do you think of this seminar room?”

Question Nr. 2: “What should a modern seminar room have?”

3.2.1.2. *Pretests*

The opinion poll only consists of two questions. Nevertheless, pretests are an integral part of social science studies. The construction usually takes place in two steps, first as a rough draft and then as a detailed draft. The questionnaire is then subjected to a questionnaire pre-test and revised if necessary (Bortz et al. 2016, 405). Despite the brevity of the survey, a qualitative pre-test was carried out: For this, the questionnaire was presented to a small group of 8 participants from a parallel course. These did not take part in the main study. The participants were then asked: Were the two questions easy to answer, were they difficult to understand, did they seem nonsensical or which aspects were missed?

In addition, parameters such as reading comprehension of the questions, clarity of the question instructions and the questions, bias and sensitivity of the questions and other possible problems were shortly queried. Other questions refer to structure, completeness, length, instructions, and variety of the questionnaire (Berger-Grabner 2016, 192).

A meeting was also held with two specialist colleagues who have expertise in the survey topic and the questionnaire method. They also use to teach in the seminar rooms themselves. Due to its length, the questionnaire was only briefly discussed in order to identify and resolve discrepancies. The positive evaluation of the questionnaire by subject matter experts can be seen as a method of checking

content validity (Bortz et al. 2016, 411). The pretests revealed that the questions were precisely formulated.

Before the opinion poll was used, there was a technical functionality test of the online tool "answergarden". The focus was on the correct order of the questions, the display in the desired format and the completeness of the questionnaire. After the test run, it was also checked, if the answers were correctly reproduced in the output file. Furthermore, if the answers of the participants were correctly evaluated in the output file.

3.2.2. Opinion Poll Participants: Selection and Recruitment

Sampling is the selection of a subset to be analysed: a subgroup of cases. These can be people, groups, interactions or events, in certain places at certain times. They represent a population, a basic population or a set of facts. Qualitative research "works with smaller samples or case studies. The selection of persons or cases is based on the respective state of knowledge with the aim of capturing the entire subject matter as accurately, completely and aspect-richly as possible (theoretical sampling)" (Berger-Grabner 2016, 128).

The selected participants all had in common that they had been taking lessons in these similarly designed and old rooms for several months or even years. They should therefore be able to grasp the subject matter (seminar room) as accurately, completely and with as many aspects as possible. The participants were randomly selected on two consecutive days of lessons at the education centre.

In this group, 24 participants took part in answering the first question. A total of 44 participants in two groups took part in answering the second question over two days. The reason: the participants in the group on the second day only had limited time to answer the question, so the author decided to have only question 2 answered. $N = 44$.

The author can only estimate social data, as there was little time for questions during the survey: They were between the ages of around 25 and 40 and approximately 70 % male and 30 % female.

3.2.3. Survey Process Situation

The opinion polls took place in January 2023 over two days. It was a spontaneous survey via the online tool “answergarden” during and after seminars in existing spaces of learning. After consultation with the lecturers, the author of this dissertation used break times to ask the participants to answer two questions about the seminar rooms. He briefly explained the purpose of the survey and the procedure. The author and the lecturer colleagues informed the participants that the survey was voluntary and anonymous and extended the break times by around 20 minutes to answer the questions. Before the survey, the author generated two different QR codes for the two questions via "answergarden", checked them, saved them online and printed out several A4 copies. Once the participants had agreed to take part in the survey, the QR codes were projected onto the screen via a projector and handed out as A4 printouts. Participants could only complete the survey online using their smartphones, laptops or tablets. Neither the author nor the lecturers were present in the room during the questionnaire to ensure anonymity and prevent influence. After the responses (approximately 2 hours later due to the break), the author returned to the seminar room and thanked the participants and lecturers for their support. He then completed the survey via "answergarden", generated the survey data electronically and saved it on his PC, and printed out the answers on A4 pages. The answers can be found in the appendix of this dissertation.

3.2.4. Data Analysis

During data analysis and evaluation, the data collected in the opinion poll are analyzed and evaluated using suitable methods. The goal is either to answer the research questions with the help of the evaluated data or to generate correlations or propositions through the corresponding data analysis (Bortz et al., 2016, 599). The research design of this dissertation is exploratory in nature. Therefore, the evaluation follows the methodology of a qualitative content analysis according to Mayring (Mayring 2016, 114 ff.).

The analysis follows an inductive approach. "The entire category system can be interpreted in relation to the research question and the underlying theory" (Mayring 2016, 117). The categories can also be modified from the answers provided by the seminar participants through open questions (Corbin et al., 2015, 220 ff.) in order to refine the propositions or to answer the guiding research questions in a practical manner. Like the expert interviews, the opinion poll was analysed using the MAXQDA software programme (Flick et al. 2004, 276 ff.).

3.2.5. Quality Criteria

3.2.5.1. *Objectivity, Validity, Reliability*

Objectivity

Objectivity means independence from the people involved. No matter who measures, the result remains the same. It refers to the intersubjective verifiability of the results or the independence of the results from the researcher. In the 2nd qualitative study, it is possible to confirm the objectivity of implementation, as the study results are largely, but not entirely, independent of the person conducting the study (Bortz et al. 2016, 443).

The objectivity of the evaluation can be confirmed. The evaluation of the responses (here: analytical categorisation of the categories or dimensions) is specified in the study design (qualitative content analysis). The evaluation is computer-aided by MAXQDA and is presented in a comprehensible manner. The objectivity of interpretation can be confirmed to a large extent. The procedure for qualitative content analysis (here: determining the categories or dimensions on the basis of the theory and the response data) could also be implemented by other researchers in the same way, at least comprehensibly with the same or almost similar results.

Validity

Validity means that the findings should also apply independently of the individual case. A study is valid if the method is chosen in such a way that it is optimally suited to the research objective and what the research questions raise is investigated. The method measures what it is supposed to measure. Validity ensures that researchers can draw correct conclusions from the selected research methods (Bortz et al. 2016, 444; Berger-Grabner 2016, 29 f.). Qualitative results can be said to have a high degree of validity. The data is usually generated closer to the social environment than in quantitative research, the respondents' relevance systems are included and there is a communicative exchange between researchers and respondents (Lamnek 2005, 166).

The response data of the 2nd qualitative study was collected during typical seminar weeks of the participants. The respondents' relevance systems are taken into account; in fact, they are the basis for relevant data. This is because the interviewees use the real seminar rooms for real lessons. The communicative exchange consisted of explaining the research objective and giving the participants the opportunity to evaluate their classrooms and make recommendations for improvements. The Opinion Poll method measures what it is supposed to, namely the evaluation of the current state and concrete formulations for the target state.

Reliability

Reliability means that the method measures accurately and is reproducible. The research process should be accessible and reproducible for everyone. Reliability is therefore the replicability of the results under the same conditions. There are no or only minor distortions of the test values due to measurement errors, the test value precisely reflects the true characteristics of the test subjects (Bortz et al. 2016, 444; Berger-Grabner 2016, 29 f.).

Reliability refers to the reliability of the participants' responses to the opinion poll. "High reliability is achieved when the repetition of the study under the same conditions produces the same result (replicability). The reliability of data

analysis in qualitative studies can be ensured by stability and reproducibility: (...) Stability: the developed analysis instrument is used again to examine the same material. This can ensure intracoder reliability. (...) Reproducibility: This refers to the degree of agreement with which other scientists arrive at the same results. Inter-coder reliability is ensured here. It is ensured that the analysis instrument is also comprehensible, conclusive and understandable for others" (Goldenstein et al. 2018, 104). This could be measured with test repetitions or parallel tests.

In this 2nd qualitative study, the reliability can be confirmed by the author. The procedure is independent of the research object (the randomly selected respondents of the opinion poll). It is independent of the researcher who prepared and conducted the opinion poll. Although the study data must be seen in a situational context, it should be possible to duplicate it without significant effort. Other researchers could also conduct the opinion poll. In the author's opinion, the response data that is then generated again should not differ greatly from the results of the original responses.

As long as the seminar rooms remain unchanged and similarly randomised participants with similar experiences in these rooms are asked to take part in a new opinion poll, the data should show a high degree of consistency. 44 participants took part in this opinion poll.

It is important to show what generalisations can be made from the results. "A qualitative study also presents its results in an argumentative and illustrative way. This means that a large part of a qualitative study is devoted to presenting the results of the study to the reader and convincing them of their own, rule-based interpretation" (Goldenstein et al. 2018, 103).

The generalisations are discussed and explained in the next chapter. Reliability could be further increased by other researchers arriving at the same results by simply analysing the participant responses. This would ensure inter-coder reliability. Naturally, the author cannot do this himself.

3.2.5.2. *Specific Quality Criteria related to Qualitative Content Analysis*

Analogous to Qualitative Study No. 1, the expert interviews, this study also examines specific quality criteria regarding qualitative research. The above-mentioned definitions of the test criteria are adopted and tested for the examination of the quality criteria of Qualitative Study No. 2.

Procedural Documentation

The procedural documentation describes the documentation, presentation, and explanation of all elements of the research process. In the context of this study, this includes the research design, the explanation of the objectives of the opinion poll, the specific choice of methods (“answergarden” and qualitative content analyses), the evaluation, the sample specification, the analysis, and discussion of the results.

The entire process of qualitative research must be documented in a transparent manner. It is explained step by step so that outsiders can understand it. The quality criterion of transparency overlaps with the quantitative quality criterion of validity. The research really measures the things that are to be measured. During the opinion poll, the participants are aware that they are taking part in a survey regarding the current state of the seminar rooms and the subjectively desired target state from their point of view. They know that their answers will be scientifically researched (Bortz et al. 2016, 329).

Argumentative Validation of Interpretations

Interpretations cannot be proven quantitatively but must be substantiated with arguments. The interpretations must be consistent in themselves. Alternative justifications must be sought and discussed. This is a central criterion in qualitative research, as distortions can exist regarding the validity of the interpretation. The argumentative validation of the interpretation takes place in the discussion of the study results.

Rule-Based Approach

To prevent an unsystematic approach and to make the research process transparent, a certain systematic and rule-based approach must be taken. To this end, the process must be planned in differentiated steps in the sense of a systematic approach. In this thesis, the literature analysis is followed by the expert interviews.

The results of theory, the Qualitative Study Nr. 1, the Qualitative Study Nr. 2 are incorporated into the concept of an Education Innolab. A seminar room is then transformed, and a new seminar concept is developed. After the seminar weeks, Qualitative Study Nr. 3 is conducted to analyze the changes. The results obtained must also be made plausible for outsiders so that the research is intersubjective.

Proximity to the Object

The research process should be as close as possible to the everyday world of the subjects being researched. The author of this dissertation is the researcher and conceptualizer of the Real-Life Experiment. The research process of the opinion poll takes place in an everyday seminar week. The world of the participants, their knowledge, experiences, opinions, and wishes are being researched.

The survey participants were actually in one of the real seminar rooms to be examined while answering the opinion poll questions. This allowed them to combine their memories and experiences in real time with their current impressions and reflect on how the seminar rooms could be improved. The research process therefore takes place as close to the real world of the respondents as possible.

Communicative Validation

The validity of the results is normally checked by making the results available to the respondents and even discussing them. In this way, results are fed back directly to confirm their validity or to seek alternatives for them. This is more appropriate

for expert interviews, as the questions are usually open-ended, and the answers can leave room for interpretation. In this Qualitative Study Nr. 2, the participants were asked to take part in the opinion poll.

Due to the simple questions, simple answers were also given that were easy to understand. Most answers consisted of only 1 to 3 clear words. Questions as to how the answers could be meant do not appear to be necessary, at least from the author's point of view. They leave little room for interpretation. Therefore, the answers were not discussed again with the respondents. Another reason is the time factor. The survey was designed as a flash survey to be quick and not unnecessarily distract participants from real lessons. Further questions would have interrupted or restricted the lessons again.

Triangulation

Triangulation means that by using complementary methods, data and researchers, an attempt is made to limit and minimize bias and one-sided observations (Hussy et al. 2013, 288). In this paper, a literature analysis is followed by two qualitative studies: the expert interviews and an opinion poll among regular participants. The results of these studies are incorporated into the concept of an Education Innolab. A seminar room is then transformed, and a new seminar concept is developed.

After the seminar weeks, the Qualitative Study Nr. 3 is conducted to analyze the changes. It can be concluded that data and method triangulation take place throughout this research process, which culminates in the discussion and conclusions, to answer the research questions. The author uses different data sources.

3.2.6. Discussion of the Results and Findings

In this chapter, the research questions are going to be discussed iteratively, relating to the results of the data analysis of the opinion poll as an exploratory study. “Qualitative content analysis aims to analyze texts systematically by processing the material step by step using category systems developed on the basis of the material and guided by theory” (Mayring, 2016, 114). The deductively or inductively developed categories were translated into propositions. Six reductive processes are applied in this context: omission, generalization, construction, integration, selection, and bundling (Mayring, 2016, 95).

The propositions developed through the evaluation of the expert interviews in combination with the data from the theory analysis are now being further developed or confirmed using the Opinion Poll data. Then these propositions will become part of the Qualitative Real-Life Experiment, following the Qualitative Study Nr. 3.

The opinion poll is exclusively concerned with the participants' assessment of the seminar rooms currently in use. And it is about their wishes as to what a seminar room should "look like" for them personally as users. The goal of the real-life experiment will be to operate a learning lab or Education Innolab.

“This definition states that a learning lab is a physical, digital and human space for observation, experimentation and evaluation, to rethink and enrich learning and teaching attitudes and practices at the university” (Sanchez et al. 2021, 4511). Based on the current seminar rooms, this would be a significant leap in the maturity grid of learning and teaching towards the operation of an Education Innolab.

Answers to question Nr. 1: “What do you think of this seminar room?”

The theory and the expert interview analysis led to the conclusion that there are six main categories for the success of Innolabs, that need to be considered primarily:

1. The infrastructure of the Innolab, the design and the equipment.
2. The way in which work, and development is carried out there.
3. The integration into the corporate strategy, the protection and promotion by the management.
4. Permanent provision of resources.
5. Heterogeneity of participants and employees.
6. An innovative corporate culture and a willingness to change with a smart and appropriate error culture.

When asked about their current personal assessment of the existing seminar rooms, the participants gave a total of 39 answers. The answers were coded and assigned to the main categories using MAXQDA. Only the categories that could be affected by the answers are discussed.

Category 3 cannot be discussed because regular lessons in an educational center are indirectly influenced by strategic orientation and management, but according to the theory and the expert statements analyzed in this dissertation, this explicitly applies to the operation of an Innolab.

Category 5 cannot be discussed either because the composition of the class participants cannot be influenced by the participants themselves. In an Innolab, this could very well be done by the participants or employees themselves.

Category 6 cannot be discussed either. In this context, corporate culture, willingness to change and error culture only apply to the operation of Innolabs, not to regular lessons in an educational center.

Consequently, only the categories 1, 2 and 4 are coded and discussed. Most of the answers are assigned multiple codes because participants' individual requests can have multiple utility characteristics. Technology, for example, can include the utility elements of design, modern equipment and Infrastructure and may influence the way of teaching. Due to the possible higher costs of renewing the technology, this term can also be subsumed under permanent provision of resources.

Category 1:

The infrastructure of the Innolab, the design and the equipment.

Codes:

Infrastructure

Design

Equipment

Well-Being Atmosphere

Category 2:

The way in which work, and development is carried out there.

Code:

Way of Teaching

Category 4:

Permanent provision of resources.

Code:

Long Term Investment

Answers of the Group Opinion Poll Question Nr. 1: “What do you think of this seminar room?”	Codes	Categories
Chair is uncomfortable Not ergonomic Light too bright Not comfortable Ergonomics shit Ugly colors Uncomfortable light Waiting room style Too outdated Isolated from others Improve chairs Light very bright Isolated place Not so nice A bit old-fashioned Outdated technology So many tables Technology old Design better Colors (yellow) ugly Bald Technology bad Rooms are bare Light concept	Infrastructure Design Equipment Well-Being Atmosphere	Category 1: The infrastructure of the Innolab, the design and the equipment

Desolate Colors not nice Brightness is appropriate Fly screen More design Monotonous More color Back of the head ambience Old bean bag – butt pain		
To fall asleep Boring Tiring No exchange option Outdated technology So many tables Technology old Old-fashioned Too monotonous Design better Colors (yellow) ugly Technology bad Light concept Desolate	Way of Teaching	Category 2: The way in which work, and development is carried out there
Chair uncomfortable Not ergonomic Light too bright Not comfortable Ergonomics shit Ugly colors	Long Term Investment	Category 3: Permanent provision of resources

Uncomfortable light		
Waiting room style		
Too outdated		
Outdated technology		
Technology bad		

Table 1: Coding and Analysis of Question no. 1: "What do you think of this seminar room?"

The responses confirm that the main categories are not only theoretically relevant. They also confirm that the experts' statements are conclusive arguments in favour of the effectiveness and significance of the categories. This is because the statements are confirmed by the respondents' answers and applied to a specific practical problem. The answers are not categorised according to frequency in the discussion, as the sample is not meaningful for representative statements. Nevertheless, it is noticeable in the analysis that technology, equipment, design and the feel-good factor are mentioned more than once. The various subjective effects that the room has on the seminar participants are also mentioned more than once. This allows conclusions to be drawn about the relevant practical significance of the codes and categories.

Category 1: "The infrastructure of the Innolab, the design and the equipment" is a very relevant category for the respondents. The design of the classroom, colour scheme, decoration, technical equipment, furniture and its lack of ergonomics, the glaring light, the lack of flexibility and thus impaired interactivity and collaboration possibilities or simply the adjective "old-fashioned" speak for the importance of the category and the codes. The room does not appear to have a modern, creativity-enhancing or pleasant learning atmosphere.

Category 2: "The way in which work, and development is carried out there" - adapted to learning scenarios, seems to confirm the mutual influence of categories 1 and 2. The design, equipment and infrastructure prevent or hinder a pleasant learning atmosphere. Variety, interactivity and collaboration are hindered. The room favours a monotonous type of teaching such as frontal teaching. Missing or old technology does not promote digital collaboration and digital learning. The way of teaching seems to tire and bore the participants.

Category 3 "Permanent provision of resources" is interrelated with the other two categories. This is because without recognising problems and identifying possible remedial scenarios, no targeted allocation of resources for changes to the space can take place. The possible changes entail investment decisions that need to be prepared with arguments. Ergonomic furniture, modern learning technology or the design of the rooms cost money and time.

Answers to question Nr. 2 "What should a modern seminar room have?"

Only the propositions that could be affected by the answers are discussed. Proposition 2 „Values and Failure Culture must be clear“ has no code, because regular lessons for master students and business economists take place in the seminar rooms and no seminar room has yet functioned as an Innolab. Proposition 2 aims at the successful operation of an Innolab through a corporate culture that promotes innovation. When asked about their ideal vision of a learning space, the participants gave a total of 101 answers.

The answers were coded using MAXQDA and assigned to the propositions. Most of the answers are assigned multiple codes because participants' individual requests can have multiple utility characteristics. Tables, for example, can include the utility elements of ergonomics, flexibility, interactivity, mobility, design and even a mix of methods. Standing desks for lecturers can make lessons more interactive and varied.

Proposition 1:

Strategic Support and Tactical Innovation Management are necessary.

Furnishings, equipment, maintenance, resource allocation and activities must be decided strategically and provided on a long-term basis (Garzarolli et al. 2020, 25).

Code: Long-Term Resource Provision

Proposition 2:

Values and Failure Culture must be clear.

No Code

Proposition 3:

Infrastructure and design are relevant.

The equipment and design of an Innolab are the main deciding factors for success. The main parameters are permanent material, financial and appropriate technical equipment, as well as flexibility, mobility, interactivity, and a feel-good or well-being atmosphere for heterogeneous groups that is as targeted as possible and can promote creativity, collaboration, and interactivity.

Code: Equipment

Code: Design

Proposition 4: Design Thinking, Game Based Learning and other methods are relevant and useful.

Code: Mix of Methods

Proposition 5: Key Success Factors

Strategic commitment, strategic alignment, long-term provision of resources, adequate design for a feel-good atmosphere, beneficial infrastructure, modern and contemporary way of operating according to scientific aspects, application of target group-flexible and situation-related methods.

Code: Well-Being Atmosphere

Code: Flexibility

Code: Mobility

Code: Interactivity

Code: Collaboration

Code: Stimulates Creativity

Answers of the Group Opinion Poll Question Nr. 2: “What should a modern seminar room have?”	Codes	Propositions
Modern technology (new screens etc.) Tablets/laptops New PCs Laptops Tablets and no longer PCs New tablets More modern technology Whiteboard New windows Digital board Radiator Digital work Digitize Better chairs Balcony Ergonomic chairs Good chairs Better windows	Long-term Resource Provision	Nr. 1: Strategic support and tactical innovation management are necessary
Definitely not a blackboard Internet also for breaks New tables Better chairs Comfortable chairs	Equipment	Nr. 3: Infrastructure and design are relevant

Whiteboard Flipcharts Fly screen Wireless Internet access Better WiFi Table tablet Table covering Decent WiFi Whiteboard Sockets at the table Better lighting planning Soundproof windows Practical hangers New room ceiling Charging plug Inductive charging Ashtray Cell phone charging station Comfortable chairs Digital work Digitize Lockable lockers Better acoustics Water dispenser Better tables Beer fridge Curtains Ergonomic chairs Lecturer's chair	Equipment	Nr. 3: Infrastructure and design are relevant

More comfortable amenities Coffee machine Drinks vending machines Standing table for lecturer		
Paint walls white Nice color concept Make it brighter Paint walls differently More pleasant light Better coloring Redecorate Dimmable light Something for the eye (plants, etc.) Elegant sink Floor more beautiful Light controllable Wardrobe gone Color contrasts in the room Friendlier atmosphere Walls warmer tones Colored walls	Design	
Fewer posts (Frontal teaching) Digital board Digital work Digitize Larger boards Better lecturers Standing table for lecturer	Mix of Methods	Nr. 4: Design Thinking, Game Based Learning and other methods are relevant and useful.

Sofa for a break	Well-Being Atmosphere	Nr. 5: Key Success Factors
Cafe Machine		
Ergonomics		
Carpeted floor		
Sofa, bean bag for breaks		
Coffee Machines		
Plant Decoration		
Plants/Decor		
Comfortable chairs		
Drinks vending Machine		
New table covering		
Sitting balls		
Fly screen		
Better waste separation		
More comfortable chairs		
Better lighting planning		
Soundproof windows		
Hide cables		
Color contrasts in the room		
Comfortable chairs		
New windows		
Digital board		
Cleaning blinds		
More planting		
Lockable lockers		
Better chairs	Well-Being Atmosphere	
Better acoustics		
Water dispenser		
Curtains		

Ergonomic chairs Better sound atmosphere More comfortable amenities Friendlier atmosphere Coffee Machine Walls warmer tones Drinks vending machines Good chairs Colored walls Better windows		Nr. 5: Key Success Factors
Better arrangement of tables Digital board Digital work Digitize	Flexibility	
Better arrangement of tables Digital board Digital work Digitize	Mobility	
New tables e.g. group tables Better arrangement of tables Wireless Internet access Better WiFi Table tablet Sockets at the table Digital board Digital work Digitize Larger boards	Interactivity	

New tables e.g. group tables Table tablet Sockets at the table Charging plug Digital board Digital work Digitize Better chairs Larger boards Better sound atmosphere	Collaboration	Nr. 5: Key Success Factors
Wireless Internet access Better WiFi Sockets at the table Color contrasts in the room Digital board More planting Digital work Better chairs Larger panels Better sound atmosphere Walls warmer tones Colored walls	Stimulates Creativity	

Table 2: Coding and Analysis of Question no. 2: "What should a modern seminar room have?"

The answers to question 2 show that the participants in the survey are aware of the problem and have found their own concrete solutions. These possibilities correlate with the theoretical principles and with the data from the expert interviews. They confirm the application of the codes and correlate with the established propositions - practice-related in the sense of action research (Mayring 2016, 50 ff.).

Even if the participants did not explicitly mention the codes Flexibility, Interactivity, Stimulates Creativity or Mobility, their answers suggest that these codes were used. Ergonomic furniture, for example, is mobile and can be used flexibly (castors, height adjustability, angle change).

Digital boards, digitalisation, digital work, Wi-Fi, and power sockets stand for connectivity through digital access to virtual collaboration tools or search engines for research. The participants would like to move towards Education 4.0 or even a flipped classroom.

The answers to the "Well-Being Atmosphere" code initially appear to be subjective and of little relevance to proper teaching. However, research due to Education 4.0 and the design of Innolabs confirms the opinions and wishes of seminar participants (Cocu et al. 2015).

They want to feel "comfortable" during lessons and also during breaks. And in order to achieve this feeling (see the basics on "emotional intelligence" and "learning types" above), the survey participants suggest concrete solutions. They are based on the human senses and on their specific experiences and attitudes to learning. Individual answers/requests such as "beer fridge", "ashtray" or "balcony" overshoot the possible target but show that some participants have thought creatively and in a problem-solving orientated way.

The answers that were coded towards proposition no. 4: "Design Thinking, Game Based Learning and other methods are relevant and useful" can only be considered indirectly implied. The participants were not confronted with closed questions such as "Would you like to use Game-Based Learning?" or "Do you like to play Lego?". This option was not available in the opinion poll.

Nevertheless, it can be concluded from the answers ("less frontal teaching, boring, more digital, digital boards") in conjunction with the other proposition answers that the participants would like to see the way of teaching changed.

Game-based learning is one of the ways to make teaching more efficient and effective while increasing the feel-good atmosphere. The analysis of the survey can confirm the propositions. The answers can be applied specifically to the individual case in combination with theory and expert data.

3.2.7. Conclusion and Derivations of Qualitative Study Nr. 2

3.2.7.1. *Derivations for the Conception, Design and Operation of an Education Innovation Laboratory*

Based on participants' responses about how they find the current seminar room, its design and equipment, it can be concluded that the main categories do not need further refinement. They are consistent and can be used sufficiently for analysis. The answers can be logically subsumed under the categories and propositions.

Together with the theoretical parameters for innovation management, combined with the expert interviews and the answers from the opinion poll participants, they can now be used for the conception, construction, and operation of an Innolab for the specific case. The propositions are applied to the real-life experiment in the next chapter.

As this is a direct approach to a concrete social problem and a practice-changing implementation of the results in the sense of action research, the answers of the interviewees are taken into account as far as possible and necessary (Mayring 2016, 51).

Proposition 1:**Strategic Support and Tactical Innovation Management are necessary.**

Furnishings, equipment, maintenance, resource allocation and activities must be decided strategically and provided on a long-term basis (Garzarolli et al. 2020, 25).

Proposition 2:**Values and Failure Culture must be clear.****Proposition 3:****Infrastructure and design are relevant.**

The equipment and design of an Innolab are the main deciding factors for success. The main parameters are permanent material, financial and appropriate technical equipment, as well as flexibility, mobility, interactivity, and a feel-good or well-being atmosphere for heterogeneous groups that is as targeted as possible and can promote creativity, collaboration, and interactivity.

Proposition 4: Design Thinking, Game Based Learning and other methods are relevant and useful.**Proposition 5: Key Success Factors**

Strategic commitment, strategic alignment, long-term provision of resources, adequate design for a feel-good atmosphere, beneficial infrastructure, modern and contemporary way of operating according to scientific aspects, application of target group-flexible and situation-related methods.

3.2.8. Limitations

"An offensive approach to the limitations of one's own study is in line with the rules of good scientific practice, while uncritical generalisations and overinterpretations of one's own findings as universally valid explanations or incontrovertible certainties cast doubt on scientific reliability" (Bortz et al. 2016, 92).

Flash surveys such as group opinion polls are limited in their informative value, i.e., their empirical significance is limited. Due to the limited data, they are not always suitable for quantifying results or making representative statements of a general nature.

Nevertheless, the Group Opinion Polls serve to verify and refine the theoretical findings, combined with the experts' statements, in order to operate a real Innolab as promisingly as possible. According to the concept of action research, the procedure is based on practical circumstances. The practical problem must be defined (suitability of current seminar rooms) and the goal of the practical change (Education Innolab) must be worked out (Mayring 2016, 50 ff.). In addition, its objective aspects were previously analysed in the theory section.

A further limitation could be that the focus on statements based on the personal experiences and knowledge of the opinion group pool respondents may be too narrow to lead to comprehensive scientific findings (Flick 2009, 169).

Nevertheless, the answers are suitable for theory-led research, as the aspects of the previous theoretical problem analysis are incorporated into the two questions about the actual and target situation of the seminar rooms and into the evaluation. This is a survey based on the assessment of those affected (Mayring 2016, 52).

The answers were interpreted appropriately in the context of the subjective views of the respondents. The answers provide relevant information and data for the real-life experiment. The author also considered possible limitations and disadvantages of computer-assisted analyses (Flick et al. 2000, 283).

Weighing up these discussed advantages and disadvantages of group opinion polls, the author decided to use them as a scientific method in the present research process in order to be able to derive meaningful recommendations in terms of action research, as a concrete practical problem is being addressed here (Mayring 2016, 53).

3.2.9. Derivations concerning the Real-Life Experiment

Based on the group opinion poll, it can be concluded that the existing spaces are not or hardly conducive to innovation. This can be described as a problem definition, initiative or fuzzy front end and thus as the start of an innovation process (Hauschildt et al. 2023, 236 ff.). The theoretical foundations and the experts' recommendations are actually relevant for real users of such spaces. Conclusions were drawn from the general to the specific. The leading research questions can be answered even more decisively by the answers to the group opinion poll.

Research Question 1:

*The performance of Innolabs. How do they manage to improve their ability to innovate?
Which success factors can be measured?*

The seminar room, analyzed in the poll, is not an Innolab, but the preliminary stage to an Education Innolab. Therefore, the answers cannot be used directly to answer the research question in full. However, in addition to the basic theory and the expert interview data, they show a high correlation with the parameters Equipment, adequate design for a feel-good atmosphere, beneficial infrastructure, modern and contemporary way of operating according to scientific aspects, application of target group-flexible and situation-related methods.

However, the parameters strategic commitment, strategic alignment, long-term provision of resources can be inferred indirectly from the answers. If changes actually take place, then these parameters must be taken into account. Without commitment, strategic alignment and provision of resources, change cannot take place.

Research Question 2:

What should a learning environment (spaces) look like to optimize learning success? What is the relationship between the design of the learning environment and the selection of learning materials and the ability to create innovations?

The responses of the poll participants allow clear conclusions to be drawn about the learning-promoting appearance of a learning environment: appealing design, a modern, pleasant infrastructure with ergonomic equipment and digital options for interactivity and collaboration can create a feel-good atmosphere that promotes learning. The desire for digital equipment and digital connectivity as "learning material" in combination with the design suggests that innovations can be created more effectively and efficiently in a future Education Innolab. This question will be finally answered after the real-life experiment in the next chapters of this dissertation.

Research Question 3:

What is the relationship between innovation techniques (activities), e.g., agile techniques such as creativity methods or design thinking and game-based learning via Lego Serious Play, and the ability to create innovations? Which success factors can be measured?

This question has been answered by theory. The experts' data also indicate that the clever, flexible and target group-oriented selection and application of these methods can promote the creation of innovations. So far, these methods have not been used in the classroom. The statements of the opinion poll participants allow only an indirect conclusion that these methods can be useful. They would like to see a change in teaching. Teaching could be changed by using these methods. It should be emphasized at this point, that it was a real classroom that was surveyed. Innovation could therefore be compared with learning success. However, the seminar room can be defined as a preliminary stage of an Education Innolab.

This leading research question will finally be answered after the operation of the new Education Innolab discussed in the next chapter and the 3rd Qualitative Study on the Real-Life Experiment. In this experiment, some techniques such as Game Based Learning, Lego Serious Play and Design Thinking are used in the real operation of the Education Innolab and then evaluated in the final study.

3.3. REAL-LIFE EXPERIMENT

The Real-Life Experiment is based on the previous chapters, the findings and propositions that were excerpted from them: Current theoretical foundations on management, innovation management, innovation labs, their design types and their various manifestations, Education 4.0 in combination with transformation. It incorporates findings from interior design, furnishings, (lighting) design and technological developments that can have an impact on well-being, meaningful collaboration and people's creativity.

The expert interviews (1st qualitative study) were analysed, and the propositions are incorporated into the parameters of the Innolab design and its actual operation. The survey results and the analysis (2nd qualitative study) of the existing seminar rooms (which have remained unchanged for around 20 to 30 years) also influence the new design and operation.

The experiment attempts to take metatrends into account: Demographic Change, Neo-Ecologisation (Sustainability) and Powershift, Safety and Health, Digitalisation, Artificial Intelligence, Connectivity, Knowledge Culture, Individualisation, New Work, Gender Shift, Mobility, Emotional Intelligence, Post-Corona.

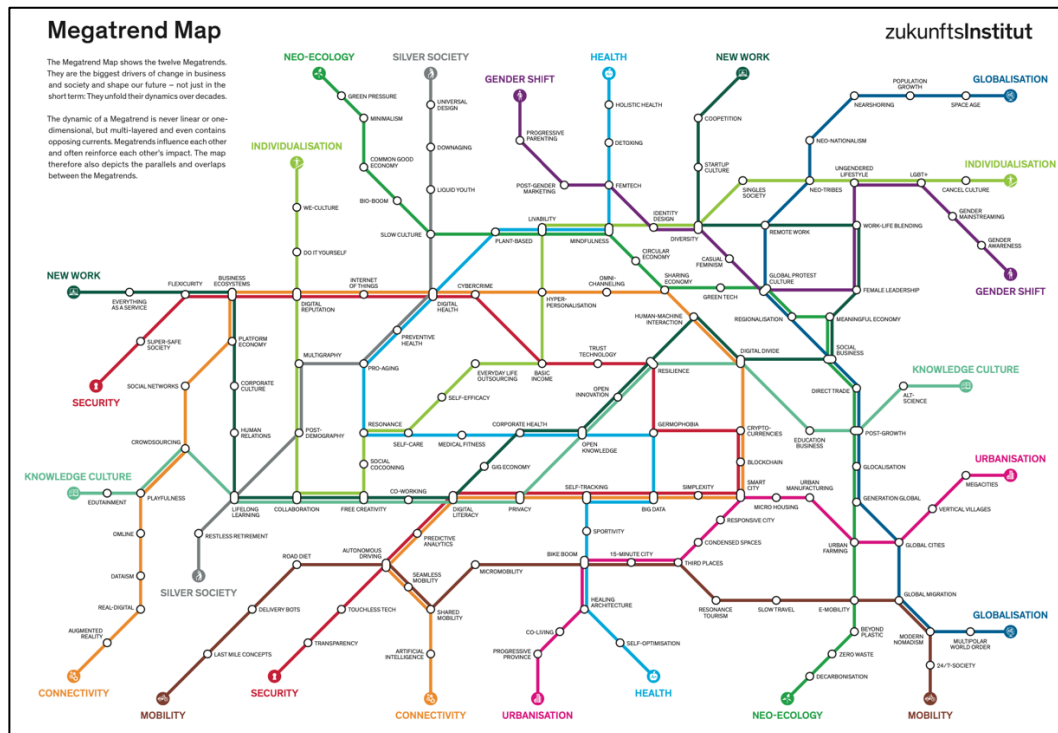


Figure 6: Megatrend Map. Source: <https://www.zukunftsinstitut.de/artikel/the-megatrend-map/> (last download 12.08.2023)

A Qualitative Real-Life experiment is carried out

"Experiments are there to reject or confirm deductively gained knowledge, on the other hand they provide a basis for the abstraction of observations. In both variants, the core is the questioning of reality. (...) The aim is to discover something useful new or something no longer useful old" (Kaduk et al. 2019, 16). Through the experiment, the author of this dissertation attempts to uncover connections and mechanisms of action (Thomke 2003).

"The qualitative experiment is the intervention in a (social) object carried out according to scientific rules in order to investigate its structure. It is the explorative, heuristic form of experiment" (Kleining 1982, 724). Heuristic means discovering. "Qualitative research aims to describe lifeworlds from the inside, from

the perspective of the people involved. In this way, it aims to contribute to a better understanding of social realities and to draw attention to processes, patterns of interpretation and structural features" (Flick et al. 2005, 141).

The experiment cannot be defined as a pure field experiment, as the explorative nature of the research design argues against this (Yin 2014, 14). The interventions in the object, in this case the educational infrastructure and the way of teaching, are new for the target groups. A control group to control confounding variables cannot be organised during real seminar weeks without fundamentally changing the curriculum and without disrupting ongoing teaching in this educational centre due to its character as a real experiment.

"In the experimental group, the independent variables are varied, while the original conditions remain the same in the control group. Due to the structural equality of the experimental and control groups, the cause of any different reactions lies solely in the experimental variable" (Wöhe 2008, 398).

Furthermore, due to the nature of the interventions, a control group would only be comparable to a limited extent. The questions asked in the 3rd qualitative study relate to the interventions or changes. The control group would not be able to answer these questions as the changes would not have been implemented in their rooms and seminars.

For example, it would be pointless to ask how well they would rate the new writable whiteboard walls, as they would not have found them in their seminar rooms. The same applies to the technical equipment in the Innolab: the control group would not be able to provide any information about the close-range projector used in the Innolab. This is because they do not have one in their seminar rooms.

The Qualitative Real-Life Experiment consists of two parts: Changing the "educational infrastructure" and changing the "way of teaching and learning".

**Part 1 of the Education Innovation Lab experiment:
Changing the Educational Infrastructure**

On the one hand, the educational infrastructure is being changed: the classroom, its design and equipment.

In addition, the material and technical teaching and learning facilities such as blackboards, flipcharts, projectors, whiteboards, teaching materials such as paper, presenter's case, Lego Serious Play, PC, tablet or laptop or document camera.

New technical developments such as electronic whiteboards in combination with digital self-learning phases are to be used in the next stage of development (digital education infrastructure) if possible and if resources are available. This creates a need for further research.

**Part 2 of the Education Innovation Lab experiment:
Changing the Way to Teach and Learn**

On the other hand, the way of teaching and learning is being changed: scientific findings on Education 4.0 are to be applied. An instructional design plan is conceived and applied (Morrison et al. 2019, 3 ff.)

Collaborative, co-creative, flexible and interactive learning should be promoted. Teaching methods such as GBL, design thinking and agile working, self-learning phases and group work should be used. Monotonous frontal teaching should be avoided. The biorhythm of the participants should be considered. The different learning types should be taken into account.

3.3.1. Avoiding Subjective Decisions

The focus is on uncovering structures within the Education Innolab. The object, an about 25-year-old classroom (84 sqm) for up to 16 participants, is changed into an Innolab, i.e., the area of investigation is intervened. The object or area of investigation is changed and what then happens is checked. It is important that manipulation is not arbitrary; the altering interventions should be carried out in as controlled a manner as possible and under conditions that are as natural as possible. A single intervention is not enough to explore the structure. Several modifying interventions are necessary (Mayring 2016, 58 f.).

The experiment is regarded as the ideal way to test causal hypotheses in research. In an experiment, the theory and the postulated cause-and-effect relationships are emphasised as actively as possible.

Within social psychology, experiments are considered to have the greatest explanatory power. Causal assumptions are possible through the experiment (Spieß 2014, 74).

As far as possible, personal and study-related confounding influences should be eliminated (Döring et al. 2016, 194). "The most reliable prediction of future behaviour is what you observe people doing when they don't know they are being tested" (Bland et al. 2020, 52 f.). The aim is therefore to create conditions that are as natural as possible.

The procedure is not deductive-hypothesis-testing, but inductive-discovery. The structures of the object should be made visible (Hussy et al. 2013, 213).

"Roughly speaking, one of the decisive factors for scientific experiments is that they are carried out in a "controlled" manner, i.e., only the variable (or variables) of interest is (are) varied and the (potential) influence of all others is kept constant. In this way, active data can be generated, i.e., data that - to put it bluntly - only reflect the influence of one (or a few selected) variables" (Stier 1999, 209).

When transforming the old classroom into an Education Innovation Lab, various techniques can generally be used for the required interventions. Common techniques of qualitative experimentation: Structure (separation, segmentation, or combination), Limitation (reduction or attenuation), Expansion (adjection or intensification), Conversion (substitution or transformation) (Kleining 1985, 737).

In the case of combination, subject areas are recombined. It is checked whether and how the changes are compatible and what benefits these elements can provide through the combination. In the case of substitution, individual parts of the object are exchanged and replaced by new parts. The effects of these substitutions are analysed. In transformation, almost the entire object is transformed. It more or less retains the characteristics of the old form.

The process of a qualitative experiment consists of four steps (Mayring 2016, 59-60, Hussy et al. 2013, 213 f.):

- (1) Description of the object**
- (2) Experimental intervention**
- (3) Description of the altered object**
- (4) Conclusions about its structure**

3.3.2. Description of the Existing Room

- ⇒ What does the room look like before the experimental intervention?
- ⇒ What does the equipment look like?

The answers from the Group Opinion Poll in the previous chapter are illustrated by the following pictures of a typical seminar room before transformation.



Figure 7: Description of the existing rooms (The photos were taken by the author)

The previous classrooms are almost identical and have remained unchanged for around 25 years. There are 19 rooms in three education centres. Some of them have been aesthetically (colour-wise) upgraded or equipped with the necessary technology such as PCs, monitors, or projectors. By and large, the photos represent a sample of the rooms.

- ⇒ The primary colours of the room are grey and white.
- ⇒ The room is approximately 3.5 metres high.
- ⇒ Maximum number of participants: 16 - 30
- ⇒ The floor and skirting boards are covered with grey PVC.
- ⇒ The tables should not be moved. A sign on the wall explicitly states this.
- ⇒ The tables and chairs have no castors.
- ⇒ The chairs are not ergonomic.
- ⇒ The tables are not height-adjustable.
- ⇒ The teaching set-up consists of a table, chair, document camera, projector screen and a projector. The lecturer's table is not height-adjustable. The lecturer's chair is not ergonomic. A paper flipchart and a chalkboard are available.
- ⇒ The trainers are almost "forced" to sit at the lecturer's table. There are generally no mobile standing desks. The setting does not invite a "change of stage".
- ⇒ The room is equipped with a guest Wi-Fi. Lecturers and participants can dial in via QR code to use the Wi-Fi. The bandwidth is low.
- ⇒ Lecturers and participants are only partially provided with equipment such as PCs or laptops. This depends on the type of teaching.
- ⇒ Freelance lecturers are not provided with technical equipment. They must use their own equipment. Only employed lecturers receive service equipment.
- ⇒ There is no separate digital customer portal and no digital learning management system (LMS). The digital scripts are made available online by a

co-operation partner (an educational publisher). Participants are given access to this portal, can download these scripts and work with them. The scripts are therefore textbooks in digital form. No more and no less.

- ⇒ The light in the room consists of daylight and non-dimmable neon tubes on the ceiling. There is no indirect or warm light.
- ⇒ The acoustics are reverberant due to the straight walls, edges and elements.
- ⇒ The sound usually comes from the projectors themselves. The quality is low. Loudspeakers have been installed in some rooms.
- ⇒ There is no air conditioning. In the summer months it is often over 30 degrees.
- ⇒ There are washbasins, mainly to use sponges for the chalkboards.
- ⇒ There are usually no plants or pictures.
- ⇒ The grey cupboards for teaching materials and students' clothes are mostly open. The white plastic clothes hangers are fixed to protect them against theft.
- ⇒ There are no designated options for group work, e.g., lounge furniture, high tables for standing or learning islands as group workstations.
- ⇒ There are no opportunities to take breaks on comfortable sofas or lounge furniture, to work in groups or alone. During breaks, participants can remain seated or leave the room.
- ⇒ There are no lounges.
- ⇒ There is hardly any visual variety.

3.3.3. Description of Existing Workshops

Up to now, on average around 50 - 70% of lessons have consisted of frontal teaching. This is the classic lecture, which aims to impart theoretical knowledge. Participants are expected to work through this specialist knowledge, e.g., by reading and internalising scripts or specialist books. In the next step, tasks are to be solved in order to establish a rudimentary practical relevance. The knowledge is tested in written exams. Participants spend the rest of the time working on tasks. The trainers or lecturers stand or sit in front of the class and provide information frontally. Discussions or group work are rarely carried out. For the most part, participants work through tasks on their own.

Some instructors place teaching material under the documentation camera and let the participants copy it. Participants receive scripts for the self-study phase.

The lessons usually follow the classic lecture structure, which has been criticised by academics for years. This is because the focus is largely on imparting theoretical specialised knowledge.

The content should be learnt (by heart) for exams or tests in order to then ideally be able to apply it. Practical skills are only developed to a limited extent in this way. The secure and sustainable anchoring of knowledge or competences is not guaranteed. Due to this system, participants are encouraged to focus on the exam content when planning their learning (Kauffeld et al. 2019, 128 f).

3.3.4. Transformation into a new Education Innovation Lab

3.3.4.1. *Description of the new Education Innovation Lab*

On (2) Experimental interventions and (3) Description of the modified object

- ⇒ What does the experimental intervention in the room itself look like?
- ⇒ What does the experimental intervention in the room's furnishings look like?
- ⇒ What does the altered space look like?

Experimental interventions mean what is changed and how. The description of the changed object (what does it look like after the intervention?) follows. For the sake of user-friendly readability and the logic of the intervention, the author of this dissertation has decided to summarise the experimental interventions and the resulting changes. According to Mayring, this approach is appropriate for qualitative experiments. This is because the methods of analysis should be adapted to the respective conditions and needs.

This is one of the strengths of qualitative research, as the results can become more appropriate to the subject matter through flexibilisation (Mayring 2002, 65). The "teaching test room" (as the Education Innovation Lab is known internally) was redesigned and equipped according to the following parameters, visualised for internal use in a maturity grid:

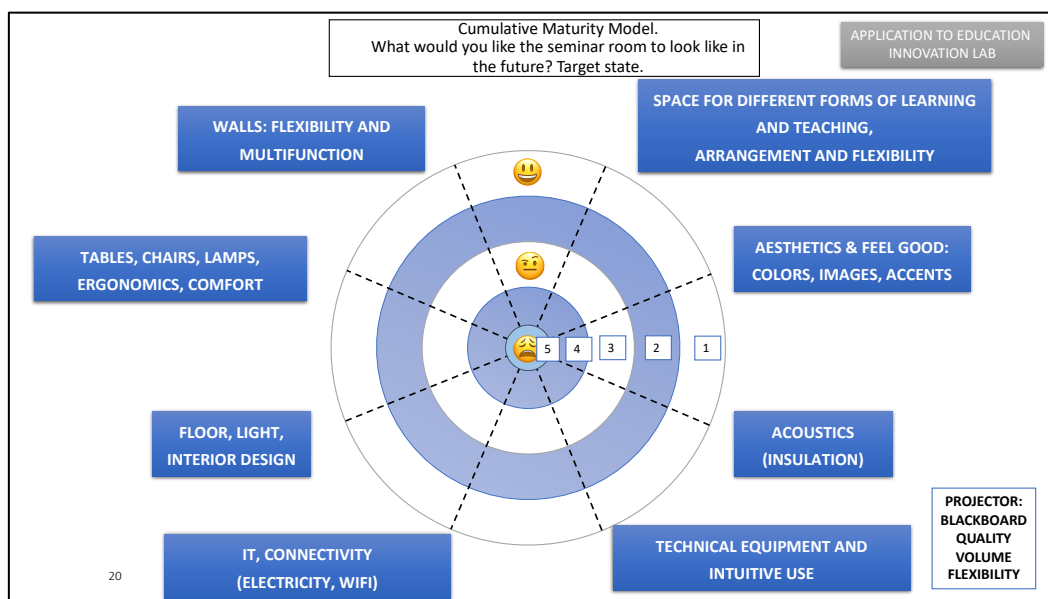


Figure 8: Maturity Grid Model of the Education Innovation Lab (own representation)

- ⇒ Flexibility
- ⇒ Multifunction
- ⇒ Interactivity
- ⇒ Aesthetics

- ⇒ Interior design
- ⇒ Well-being
- ⇒ Variety
- ⇒ Pleasant acoustics
- ⇒ Modern ergonomics
- ⇒ Comfort
- ⇒ Technology, IT
- ⇒ Visualisation of learning content
- ⇒ Connectivity
- ⇒ Lighting design
- ⇒ Furnishing

The maturity grid was used internally for the subjective item construction of the relevant parameters, for as-is analysis and visualisation for change communication purposes in the change process and evaluation by the author and his colleagues (Leimeister et al. 2016, 177 ff., Habicht et al. 2016).

Specific interventions and changes

Note: the interventions (conversion work and equipment) should be carried out as cost-effectively as possible. The experiment is intended to show that change can work with limited financial resources (De Massis et al. 2017).

Common techniques of qualitative experimentation: Structure (separation, segmentation, or combination), Limitation (reduction or attenuation), Expansion (adjection or intensification), Conversion (substitution or transformation) (Kleining 1985, 737). Five of them were used: combination, reduction, intensification, substitution, and transformation.

Walls:

All walls were repaired and painted white. The columns of the walls were painted in graduating shades of blue. One of the main changes in the new Education Innovation Lab is the front wall, in front of which the lecturers normally sit or stand and which the participants used to look at from the front.

The previous setting of the room stipulates that the tables may not be moved. The reason for this is that the tables need to be wired for power connections. The front wall is painted white and a projector screen is placed in front of it, onto which the image from the projector or a document camera is projected.

The intervention in the object under investigation consists of several combinations. The wall was levelled to create a flat surface. A blue-coloured frame was then applied. This frame resembles the frame of the screen in 16:9 format cinemas. This was carried out by master painters and attention was paid to the proportions of the frame in order to achieve a pleasant viewing experience.

A rectangle measuring approx. 5 x 2 metres was cut out in the middle of the wall. This rectangle was partially covered with magnetised plaster in order to magnetically attach sheets or foils to the wall, similar to a refrigerator.

The entire rectangle was painted with an innovative white colour, which on the one hand replaces the projector screen and on the other serves as a writable whiteboard. This was combined and innovative colour was discovered, tested and applied by the training masters. The advantages: a separate screen and whiteboard are no longer required.

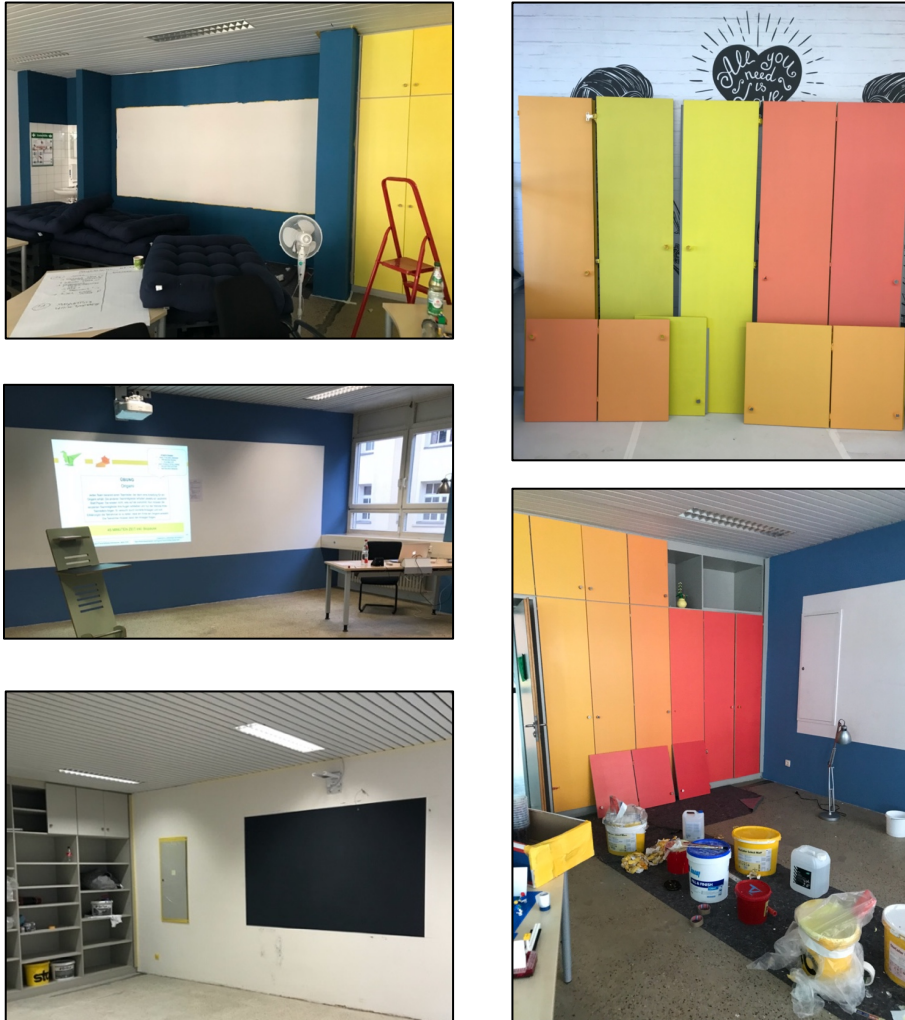


Figure 9: Transformation in progress (The photos were taken by the author)

The newly designed wall thus combines four functions: A projection surface for the projector image, magnetic wall, writable whiteboard and, thanks to the colour and shape design of the blue frame, aesthetics with a changed sense of space.

The remaining 4-metre-long wall unit was painted in 8 graduated colours from yellow, orange to red to simulate a sunset and create a sense of well-being. Time and effort: The painting work took four people around four days.

Floor:

The old grey PVC floor was removed, the concrete floor was sanded and given two coats of transparent protective paint: The training masters for flooring and painting call this style "used concrete look". The floor can be written on. Time and effort: The flooring work took six people around five days.

Lounge furniture:

Half of the open grey cupboards were removed. In the resulting niche, dark grey painted wooden pallets from the DIY store were converted into seating. Commercially available oversized dark blue seat cushions invite you to linger. The aim was to create opportunities for breaks, but also to facilitate group work or discussions. This is not communicated to the participants.

The experiment should also show whether participants utilise this offer of their own accord. Effort: It took two people around two days to work on the lounge furniture. It also took two days to remove the cupboards.



Figure 10: Transformation in progress (The photos were taken by the author)

Chalkboard and document camera:

Hauschildt et al. warn against resistance from those affected by change. "If you want to innovate successfully, you should realise what you are asking of those affected" (Hauschildt et al. 2011, 114).

For this reason, the chalkboard and document camera were left in the room. The lecturers consist of a heterogeneous group, some of whom have decades of experience.

Tables and chairs:

Curved tables and at least slightly ergonomic chairs have been removed from old offices and placed in the centre of the room. At the beginning of each seminar week, participants are asked to arrange their tables and chairs as they see fit. This is intended to create a relaxed, personal atmosphere and make the participants feel involved. It is also considered that all the experiences and emotions of those affected can have a direct impact on the course of the change process.

The consequences could be resistance (Klinkhammer 2015, 21). In order to avoid resistance, those affected (participants in the lesson) should be made participants (in the design of the lesson) (Stolzenberg et al. 2023, 174 ff.). As a rule, the tables are no longer positioned at a straight angle to the projection screen or the lecturer but are distributed around the room at different angles and at different distances. Looking at the "back of the head of the person in front" is avoided.

Hybrid setting and blended learning (digital education infrastructure):

During covid 19 and the restrictions on face-to-face teaching, online teaching emerged as an alternative in education. After the state-imposed lockdowns in Germany and during the easing of restrictions, hybrid formats developed. In some cases, participants attend classes in person, while in others they take part online via a meeting platform such as ZOOM, MS Teams, Vimeo, GoToMeeting, Skype, Webex or Google Meet.

The lecturers therefore have people in front of them in the classroom, and participants are also connected online. "(...) hybrid spaces composed of physical and digital spaces, which define the third dimension. The physical space encompasses different rooms designed to accommodate the activities and the community they aim to host. The digital space takes the form of a digital platform allowing communication (webinars, meetings) and storing and dissemination of pedagogical resources" (Sanchez et al. 2021, 4510).

Blended learning has an additional component. People learn (mostly) regardless of location, and they are flexible in terms of time because it is (also) possible digitally. Methods: Small learning units such as videos, online forums for exchange or joint learning or webinars, as well as digital scripts, quizzes, and access to online libraries, but also face-to-face events with digital self-study phases. To a large extent, this means learning whenever, wherever and however you want.

Social blended learning adds another component. The aim is to learn collaboratively using agile methods and software. "Social blended learning is value- and competence-orientated blended learning, i.e. the combination of workshops and self-directed learning phases with a challenging practical project (or practical task) involving social software that enables agile learning" (Sauter et al. 2018, 76).

Agile development methods include design thinking, Kanban, Scrum or PULSE. Places can be separate, flexible and attractive co-working spaces. New forms of learning and exchange such as meet-ups, bar camps, „hackathons“ or “working out loud processes” can take place here to enable collaborative learning and development.

Even "MOOCs" (Massive Open Online Courses) or presentations similar to TED Talks can be organised (Sauter et al. 2018, 77-82). As a consequence of the digital transformation alone, the researchers recommend the use of "social blended learning" for agile skills and values development. This is because digital transformation is a metatrend that will accompany us in the future. The transformation does not end with the "Internet of Things", "cloud computing" and "big data", but is now shifting towards "augmented and virtual reality", "artificial intelligence" and "deep learning" (Sauter et al. 2018, 82).

These new ways of teaching and learning are challenging for both sides, teachers and learners, as firstly the technical equipment is necessary and secondly the use of this equipment must be learnt and confidently applied.

Thirdly, communication with people who are connected online in hybrid lessons should be done in a different way to face-to-face teaching. Human proximity in the classroom is no longer necessary and must be compensated for.

Fourthly, these changes must be able to generate sustainable benefits for those affected. In the case of practised, practice-oriented and interactive teaching, "blended learning forms" or hybrid teaching can be promising (Franken et al. 2020, 184).

A rudimentary hybrid setting was initially set up in the test classroom to at least enable hybrid teaching: An additional laptop with camera, microphone, light, a second projector with a second screen to show online-connected participants. The camera is set up so that the online participants can see the lecturers. The online participants are projected onto the second screen so that the lecturers can see the online participants and the participants in attendance at the same time.

3.3.4.2. *Conclusion concerning its Structure.*

This chapter summarizes structural conclusions (Mayring 2016, 59 f.; Hussy et al. 2013, 213 f.). "The methodology includes its careful application: the adaptation of the procedures to the object, the testing of limits, the gradual maximization or minimization of aspects in the object of study, the constant question-answer game in the dialogue principle, if possible, with the direct participation of those affected" (Kleining 1986, 744 f.).

Five techniques of qualitative experiments were used: combination, reduction, intensification, substitution, and transformation. Educational innovations should improve learning quality (Serdyukov 2017, 8). Five components are relevant: the novelty, the object, the change, the finalized action, and the process (Sanchez et al. 2022, 4503 f.). Positive design can be viewed as a framework that encompasses designing for pleasure, function, personal significance, and virtue (Cooper et al. 2017, 25).

The users need to be in a space that reduces hierarchy and supports participation, dynamism, playfulness, and communication. It should encourage creative behaviours and support innovative projects with all needed resources, visualization-tools, and the ability to prototype (Lewis et al. 2005, 4).

It should stimulate the creativity (Moultrie et al. 2007). The design, equipment and furnishings of the rooms can set the direction for the desired emotional behaviour. A culture of joy should be conveyed.

A culture of fear arises when signs show prohibitions, rules of conduct or the consequences of violations (Barsade et al. 2013, 24). Six dimensions are provided, that aim to boost positive wellbeing in the work environment by offering people choice and control over where they work and how they work: **Optimism, Mindfulness, Authenticity, Belonging, Meaning, Vitality** (Cooper et al. 2017, 62).

A playful look of the rooms helps to approach project issues in a more joyful, experimental, and open-ended way (Brandes et al. 2014, 65). "Flexible spatial concepts are necessary for creative processes, e.g., movable furniture, standing tables, cushion landscapes, places of retreat, flexible partitions, whiteboards, presentation areas (...) are required" (Sauter et al. 2018, 47). This stimulates creative thinking and strengthens well-being (Dopfer 2019, 121). Such places strengthen dialogue, an essence of Education 3.0 and 4.0 (Weis 2015, 226).

The goals of the changes in the new Education Innolab are to provide collaborative, flexible, and interactive learning with a feeling of well-being; this should be promoted and tested. "Qualitative experiments are interventions in a social object; like all experimental techniques, they change it. But their exploratory aim should prevent them from destroying it in the process" (Kleining 1986, 744). The room was slightly changed, not destroyed.

It can be said that the room represents a lifelike prototype to test lifelike solutions with a smaller sample (Bland et al. 2020, 254 ff.). The qualitative study no. 3 shows the results of the changes, and conclusions about its structure are then drawn in the discussion.

3.3.5. Experimental Design of a New Workshop

3.3.5.1. *Description of New Workshops*

On (2) Experimental interventions and (3) Description of the modified object

As part of the reorganisation of the Education InnoLab, the author of this dissertation has designed a new seminar week to change the way teaching is conducted in the direction of Education 4.0.

- ⇒ Up to 12 participants complete the entire week together.
- ⇒ Duration: approx. 40 hours/week.
- ⇒ Topic: Marketing, Sales, and agile Project Management for Office Management clerks.
- ⇒ Lecturers: Three lecturers who alternate on a half-day or daily basis.
- ⇒ Room: The new Education InnoLab

CONCEPT OF THE NEW SEMINAR WEEK

The concept includes the integration of elements from Education 4.0 research. The concept of Game-Based Learning and the concept of constructive alignment are applied in combination. Design Thinking and OKR are integrated as methods with the overarching concepts.

The didactics of problem-based and project-based learning are applied (Lee et al. 2016; Savery 2006). An attempt is made to apply the interdisciplinary approach to teaching - by combining marketing, sales, agile project management, Design Thinking and GBL (Braßler 2020).

The dramaturgy of the seminar week follows recommendations from action theory and experiential education (Späth 2012, 238 ff.). It includes an experience arc and a logical path so that the participants can recognise the structure of the week (Duarte 2012, 128 ff.).

"Innovation processes are interest-led and therefore also have an internal dramaturgy, whether intentional or not. They take the form of dramatic curves with arcs of tension, action sequences and representative role patterns. If it is possible to make the dynamic arc of tension of an innovation process transparent in its subtle, multi-layered dramaturgy, the participants gain the opportunity to exert an identified and reflected creative influence. By releasing emotions and energy, the dramaturgical approach enables the natural integration of contradictions into the development process (...). A dramaturgy that is harmoniously adapted to reality provides important pillars for the innovation process" (Trobisch et al. 2017, 47).

GBL is a method of active learning and consists of the use of games as a method and medium of learning with clearly defined objectives. Games are intended to stimulate the imagination and motivation of the players in order to achieve complex cognitive learning objectives through active application. Social skills are also promoted.

The learning process is cyclical. The tasks and problems should reflect reality, making it easier to memorise and retrieve knowledge. The result: the ability to solve problems is increased.

Playing in teams promotes social skills such as teamwork and negotiation skills. By playing, knowledge can be acquired in a transfer-oriented manner in an application context (Kauffeld et al. 2019, 250 ff.).

The didactic **concept of Constructive Alignment** supports the design of courses through a holistic approach. The learning outcomes are placed in an overall context with teaching and learning methods and the examination situation:

Learning outcomes:

What will teachers be able to do after attending the courses?

Teaching-learning methods:

What methods lead to the achievement of the intended learning outcomes?

Examination methods:

How must the examination situation be designed so that the achievement of the learning outcomes is assessed (Kauffeldt et al. 2019, 128; Mappes et al. 2011, 1-18)?

Design Thinking:

This method is used in the seminar week for education and is combined with LSP. The individual steps consist of challenge, persona, point of view, prototyping, and testing (Freudenthaler-Mayrhofer et al. 2017, 201-210; Poguntke 2020, 113-120; Franken et al. 2020, 335 f.; Sauter et al. 2018, 47-49). Design thinking can also be used for social innovations (Brown et al. 2010, 30-35).

OKR und Management by Objectives:

Setting targets for lessons instead of going through the subject matter procedurally, analogous to the OKR method (Objectives and Key Results). According to this method, the employees of a company are given targets with key figures as a guideline so that they can then achieve these targets independently in agile teams (Dopfer 2019, 38; Sehested et al. 2011, 175 f.).

Analogous to management, this method can also be seen as "management by objectives". This promotes performance motivation, initiative, a willingness to take responsibility and the ability of employees to self-regulate. Actions are aligned with clear objectives, assessed objectively, promoted according to ability and rewarded in line with performance (Schierenbeck et al. 2008, 182 ff.).

In this seminar week, these methods will be adapted for training and combined with LSP: At the beginning of the week, the participants are given the main task of developing a new product or service. During the week of instruction, the participants receive reduced knowledge and methods for product development (Ematinger et al. 2020, 3-22).

Further parameters for the design of the new seminar week

- ⇒ Mix of knowledge and method transfer, discussion for understanding, transfer-oriented and, if possible, practice-relevant tasks for the direct implementation of what has been learned in order to internalise the benefits. Fewer facts, more meaning: factual knowledge is necessary. However, the lessons are structured in such a way that as few facts as possible are presented as simply as possible so as not to overburden the participants or overstretch their concentration span. What is important must be recognisable and understandable. The means of communicating numbers are, for example, changing the scales, using comparisons and establishing a connection or context (Duarte 2012, 117).
- ⇒ Interaction
- ⇒ Flexibility
- ⇒ Variety
- ⇒ Rest periods that respect the participants' biorhythms
- ⇒ Little frontal teaching, do a lot yourself
- ⇒ Competence-orientated teaching
- ⇒ Alternating group work: The respective group is determined at random or puts itself together. Different group compositions should ensure variety, excitement, heterogeneous exchange, social interaction and diverse group discussions with different perspectives.
- ⇒ Rules apply: All learners, their goals and interests are equal. Leadership and moderation functions should alternate. The learners make an appropriate and complementary contribution. Conflicts are addressed and resolved (Töpfler 2010, 45).
- ⇒ Application of methods mainly from the fields of innovation and change management, marketing, product development, sales, negotiation, presentation and communication.

⇒ **The following scientific fields are used as sources to develop a product iteratively and agilely in the first four days:**

- Integrated marketing (and marketing innovation)
- Product development
- Innovation management
- Sales management and sales psychology
- Digital marketing
- Team building
- Conflict management
- Negotiation skills
- Personality basics for own skills development
- Copywriting, developing advertising slogans
- Developing product names
- Creating key visuals
- Classic project management methods are explained. New methods from agile project management such as Scrum are also explained. The selection and application of the methods are left to the participants themselves.
- The pure "frontal" knowledge transfer should not last longer than about 20 - 30 minutes in order not to strain people's attention span. This is because people's concentration and attentiveness usually wane after just 10 minutes. Concentration depends heavily on the situation, intrinsic and extrinsic motivation. Among other things, variety is necessary. The participants' attention can be challenged by other elements by creating an arc of suspense (Lienhart 2017, 41).

- Whenever possible, varied interactive and moderated transfer exercises should be incorporated. For example, in the area of team building, the participants should put together a new team and actively do and evaluate this using the methods from science that they have previously heard.
- Or they can take a personality test to explore their own behavioural styles and then apply them to other people, whether in negotiations or exams.
- Fun creative exercises can be helpful before group work, which can make participants laugh through playful hand-foot combinations. Laughter in turn stimulates the brain's oxygen supply. This facilitates the subsequent concentration phase and the solving of analytical tasks.
- Group work is used to work out, compare, discuss and further develop ideas. This takes place after the participants have developed their own ideas, as this is more efficient according to the latest research (Schirr 2012, 482 ff.).

The overall concept of the new seminar week is about creating harmonious interaction between lecturers and participants. The psychologist Robert Rosenthal believes that three elements are necessary to create harmony between people: mutual attention, shared positive feelings and a well-coordinated duet on a non-verbal level (Goleman 2008, 48).

⇒ **The following scientific fields are used as sources to present and pitch their own product on the fifth day:**

- Communication basics, rhetoric, presentation, and moderation with the help of Power Point in a free speech.
- The topic of "nervousness" before presentations or examinations is dealt with if necessary. If necessary, participants are coached to combat nervousness.

⇒ **These scientific fields serve as transfer-oriented preparation for the last day of the week:**

- "Die Höhle der Löwen" (The Lion's Den), analogous to a TV programme in which investors interview start-up founders and have products presented to them in order to possibly invest in the new product or business model. On this day, the participants are asked to pitch their product in an approximately 5-minute presentation.
- All participants and the lecturers evaluate and award "grades" together at the end of all presentations. "If you awaken desires in the audience and then show them how their ideas help to fulfil these desires, you will get people to adopt your perspective" (Duarte 2012, 27). The point of the shared grading is that the participants know from the outset what the goal is and how they will benefit from learning and co-creating, analogous to Constructive Alignment, OKR, Management by Objectives methods.
- "Hook your audience fast by stating or implying the benefits that listeners will get by paying attention to what you have to say. The most compelling benefits inform people about issues that matter to them and make them healthier, happier, or more successful" (Donovan 2014, 81).

3.3.5.2. *Game Based Learning and Education 4.0*

For the entire week of the seminar, the main method used is Game-Based Learning (GBL) using Lego Serious Play (LSP), several times a day. This is because LSP is an effective method for identifying potential innovations, as the process encourages creativity and out-of-the-box thinking. The ideas can be evaluated and further developed collaboratively.

LSP can be used during a design thinking process in the ideation and prototyping phases (Hillmer 2023, 21). „The LSP method was primarily developed in response to the need for a system to facilitate creativity and imagination for innovative and dynamic business strategies. These same theoretical frameworks have also been used in the educational domain where they have been adopted for what are arguably different purposes. The idea of ‘play’ in education is well explored; it describes a process in which a person (most commonly a young child) learns to make sense of the world around them” (McCusker 2014, 28). Various success factors ensure that the game in GBL succeeds in attracting attention, maintaining it over a longer period of time and experiencing self-efficacy.

The author of this dissertation summarises the success factors of GBL from a general perspective according to Kauffeld et al. and explains how they apply to the seminar week in particular (Kauffeld et al. 2019, 250 ff.). The success factors of LSP are then also explained and summarised from a specific perspective. The analysis includes some examples of participant results in the form of photos. They show new product developments that the participants created during the seminar week.

In accordance with the applicable data protection laws in Germany, neither the product ideas nor the names of the participants are mentioned. The photos were taken by the author himself, who therefore holds the copyright and is authorised to publish these photos.

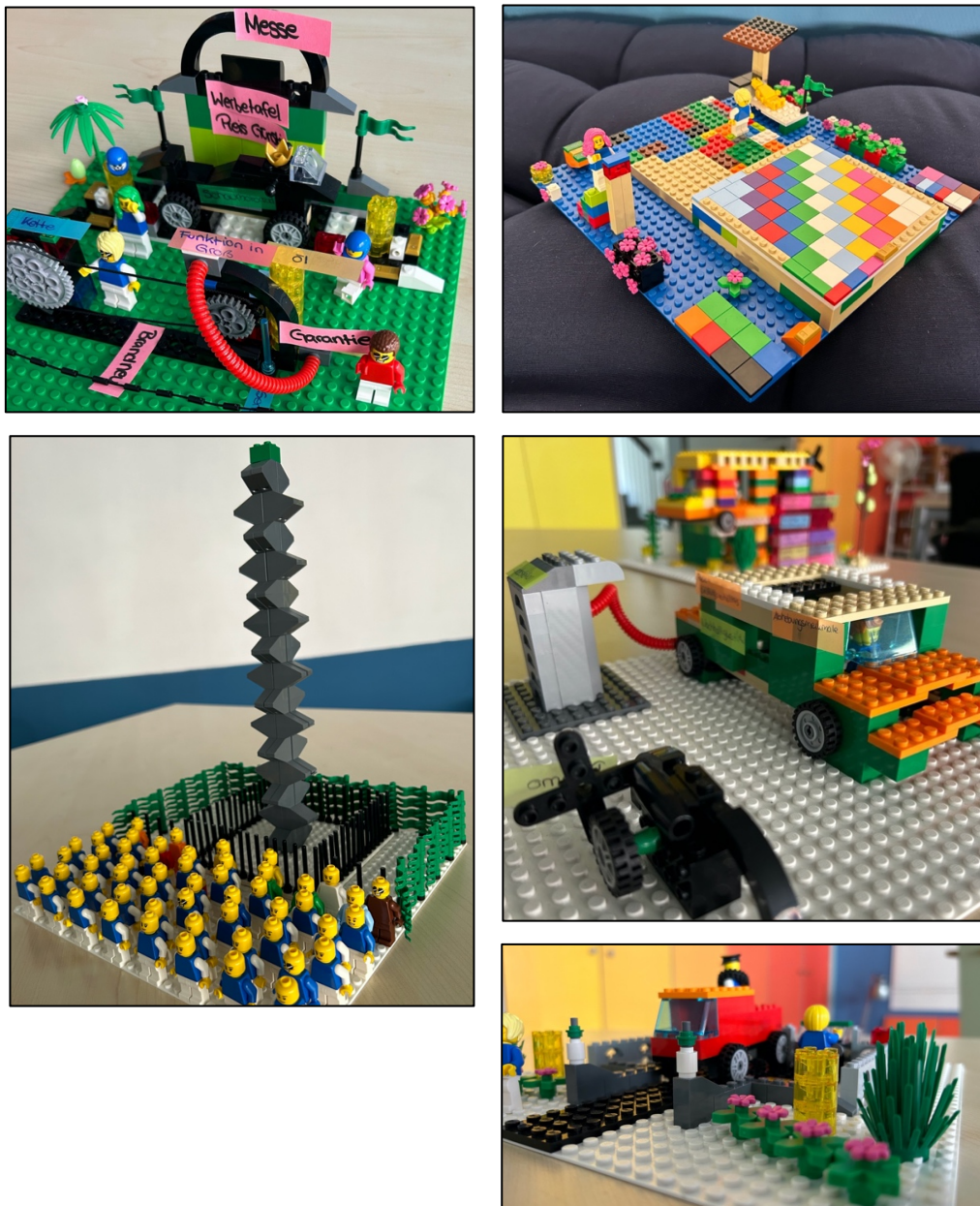


Figure 11: Examples of prototypes, built with Lego Serious Play (The photos were taken by the author)

Success factor 1:

The game stimulates imagination and curiosity through sensory appeal.

Realisation:

The main method used LSP activates various human sensors. Haptics (touch), sight, hearing (through the exchange with the other participants), colour variety and creativity. "Even more effective than good stories are experiences in the brain that are linked to personal action - especially in community. Those who literally form and "grasp" connections activate significantly more regions of the brain than if they only read or hear the same content" (Brandes et al. 2014, 214).

Success factor 2:

The game has clear rules and objectives.

Implementation:

At the end of the week, a product should have been created. Objectives are agreed for this using the OKR method, which are essential when using CSP. The expected goal should be formulated as clearly as possible (Hillmer 2023, 187). The participants are given a checklist for product development and five days to achieve the goal.

Success factor 3:

Achieving the goal is an interesting and rewarding challenge.

Realisation:

At the end of the week, grades and participation assessments are awarded. It is made clear from the outset that 2/3 of the assessment will be based on the application of what has been learnt. The manner of pitching accounts for 1/3. Grades and assessments are awarded democratically and jointly.

According to Kotter, this can be described as "achieving rapid success", analogous to change management processes in companies. The participants have the opportunity to reward themselves together (Kotter 2011, 101 ff.).

Success factor 4:

The players have control over how they play.

The effects are comprehensible and logical.

Realisation:

The participants use their Lego constructions to explain what the new product is, what it looks like, what it can do, what it cannot do, what it is called, what benefits it should have for which customers, how functions and structures are implemented, what it costs, what product types there are, how the marketing mix could be implemented, why customers should buy it.

Success factor 5:

Difficulty level - The game must not be too easy (consequence: boredom), but it must not be too difficult either (consequence: excessive demands).

Implementation:

This is adapted differently from target group to target group during the seminar week and is done through subjective observation and questioning by the three lecturers or is objectively surveyed from the participants.

Success factor 6:

The right balance creates a so-called flow state, which has a positive effect on learning.

Implementation:

In order to recognise a state of flow, the instructors need to have a keen sense of observation. This is also achieved through subjective observation and questioning by the three lecturers or by asking the participants objectively.

Success factor 7:**Playing should be fun.****Implementation:**

The lecturers endeavour to create a relaxed atmosphere at eye level. Humour should and may be present. The lecturers try to incorporate different types of humour into the lessons (Donovan 2014, 131-137).

Success factor 8:**An evaluation, reflection or assessment should take place after the game.**

This enables the players to realise their actions and their consequences and to consider alternatives.

Realisation:

Joint assessment and grading on the last day of the seminar week.

Success factor 9 LSP:**Constructionism****Realisation:**

LSP promotes active learning. Knowledge is never transferred 1:1 from one person to another. The absorption of knowledge is always subjective. "Abstract and theoretical thoughts become literally tangible and help all participants both to describe and to understand and comprehend the thought models" (Hillmer 2023, 14 f.).

Success factor 10 LSP:**Hand-brain principle****Realisation:**

In the context of LSP, we can talk about "thinking with your hands". Touching things helps people to concentrate and focus. An interaction is created between rational logical thinking and creative inspiration. The builder subjectively associates the meaning of the individual Lego bricks. Their own thoughts are

sorted, structured and visualised as a 3D model or prototype. This then facilitates the exchange and communication with other people, who in turn can incorporate their ideas and suggestions (Hillmer 2023, 15 ff.).

Success factor 11 LSP:**Simplification and thinking in comparisons****Implementation:**

"The radical simplification of complex problems and thinking in metaphors lead to the need to prioritise and structure one's own thoughts" (Hillmer 2023, 17). Using metaphors protects shy or introverted people who are afraid to open up to other people. Metaphors make it easier for these people to express their feelings. Metaphors create images in people's minds. These images stick longer than words (Lienhart 2017, 189).

Success factor 12 LSP:**The changes are visualised****Implementation:**

In an organisational context, the visualisation of changes through innovations helps to understand and convince those affected. They can then recognise what implementation progress has been achieved (Springer 2004, 157 ff.). LSP allows participants to observe and compare their own implementation successes and those of other course participants. This also serves to generate ideas and critically scrutinise new products.

Other variable methods used during the test weeks:

- ⇒ PESTEL analysis (Van Aerssen et al. 2018, 600)
- ⇒ Business model canvas (Van Aerssen et al. 2018, 185 f; Osterwalder et al. 2011, 18 ff.)
- ⇒ BCG portfolio matrix (Weis 2015, 212 f.)
- ⇒ 5 Why method (Van Aerssen et al. 2018, 72)
- ⇒ A-Z repetition method (Lienhart 2017, 202 f.)
- ⇒ Mind mapping (Nöllke 2015, 60-67; Franken et al. 2020, 328-330)
- ⇒ Brainstorming (Nöllke 2015, 50-58; Weis 2015, 237 f.)
- ⇒ Brainwriting (Weis 2015, 238 f.)
- ⇒ Morphological box (Nöllke 2015, 100-105; Van Aerssen et al. 2018, 565 ff.)
- ⇒ DISG personality profile test (Dauth 2012, 49 ff.)
- ⇒ Disney's thinking chairs - creativity method (Nöllke 2015, 83 ff; Van Aerssen et al. 2018, 835 ff.)
- ⇒ Card technique (Van Aerssen et al. 2018, 470 ff.)
- ⇒ Determination of buying motives (Schneiderhanze et al. 2017, 87 ff.)
- ⇒ Development of key messages (Schoof et al. 2017, 51 ff.)
- ⇒ Osborn checklist (Nöllke 2015, 87-90; Van Aerssen et al. 2018, 598 f.)
- ⇒ A child wants to know (Lienhart 2017, 214)
- ⇒ Team building - making origami
(https://www.besserbasteln.de/Origami/origami_tiere.html. Last download 15.10.2023)
- ⇒ Idea runs with the headstand method - reverse brainstorming (Van Aerssen et al. 2018, 493 f.)

- ⇒ Mind mapping (Weis 2015, 239 ff.; Van Aerssen et al. 2018, 552 ff.)
- ⇒ Storytelling (Meschkat 2015, 115-120; Trobisch et al. 2017, 29 ff.)
- ⇒ Pyramidal structuring; logical groups and logical chains (Schoof et al. 2017, 51-87)
- ⇒ Facial action coding system test (Limbrecht 2012, 27 ff.; Test: <http://www.mifor.de/kultur/anleitun.htm>. Last download 15.10.2023)
- ⇒ The pyramid of utility elements (Almquist et al. 2016, 1-9)
- ⇒ Presentation with and without video analysis (Meschkat 2015, 24 ff.)
- ⇒ Silent dialogue or silent writing conversation (Van Aerssen et al. 2018, 757 f.)
- ⇒ Product-market matrix according to Ansoff (Van Aerssen et al. 2018, 644 f.; Weis 2015, 213 f.)
- ⇒ Kanban board (Franken et al. 2020, 336 f.; Sauter et al. 2018, 37-42)
- ⇒ Scenario technique (Weis 2015, 231 ff.)
- ⇒ Scrum (Sutherland 2020, 28-35; Franken et al. 2020, 334 f.; Sauter et al. 2018, 35-37)
- ⇒ SWOT analysis (Weis 2015, 211 f.)
- ⇒ (Elevator) pitch (Lienhart 2017, 92 ff.; Van Aerssen et al. 2018, 319)
- ⇒ Ethos, Pathos, Logos-Method (Van Aerssen et al. 2018, 337)
- ⇒ Porter's Five Forces (Weis 2015, 215 f.)
- ⇒ Breathing techniques (Meschkat 2015, 42 ff.)
- ⇒ Resistance principle (Van Aerssen et al. 2018, 847)
- ⇒ V-Method Amy Cuddy
(https://www.ted.com/talks/amy_cuddy_your_body_language_may_shape_who_you_are. Last download 15.10.2023)
- ⇒ Yes but - Yes and-Method (Van Aerssen et al. 2018, 858)

3.3.5.3. *Conclusion concerning its Structure*

The concept of the seminar week follows the overarching GBL approach combined with the concept of constructive alignment, flanked by the design thinking method and an OKR and management by objectives approach as target definition. These elements and approaches are brought into an overall didactic dramaturgy.

This type of didactics can therefore be described as enabling didactics. It is based on the self-determination and self-direction of the learners. "The process facilitator creates the necessary framework conditions for the learning processes and assumes the fundamental control and support".

The enabling framework is the planned learning arrangement that "organises didactic, methodological, material and media aspects in such a way that the probability of the desired learning processes is as high as possible" (Sauter et al. 2008, 257). All other methods used during lessons are used flexibly and as required. They flank and support the pedagogical rhythm of knowledge transfer and practice-relevant, transfer-orientated implementation and application. These elements are "juggled" in the classroom.

- ⇒ The knowledge transfer should be as short and concise as possible.
- ⇒ The methods should be communicated briefly and clearly.
- ⇒ The focus is on application, namely prototype construction with LSP. Knowledge should be communicated, understood and transferred.
- ⇒ The methods are used in the various phases of the design thinking process for further development. In this way, knowledge should be anchored in a playful and effortless way.

The main method, the use of LSP, is specifically queried in the qualitative study. Constructive Alignment, Design Thinking and OKR or Management by Objects were not specifically asked about. The benefit is revealed by the combination with the main method Lego Serious Play and thus correlates with the survey data on this main method.

All other methods used are not specifically surveyed, as this dissertation is not concerned with the concrete selection, application, and success of these individual methods. This would go beyond the scope of this dissertation but could represent a need for further research. After all, there are thousands of learning, teaching, and innovation methods.

However, Graner and Mißler-Behr have confirmed that the more different methods are used, the greater the success of innovation. This appears to be due to the fact that in heterogeneous cross-functional innovation teams, different methods appear to be most suitable for each member personally. The decisive factor is that innovation and other learning methods are used at all. In addition, the methods should be different and offer variety in order to achieve different learning objectives and learning types (Graner et al. 2014, 15). The other methods used were listed above. These methods are applied flexibly during the seminar week as required or on request from the participants.

3.3.5.4. *Limitations of the new workshop concept*

Education 4.0 envisages the merging and application of several, primarily technological possibilities. While the third industrial revolution developed and utilised electronics and IT to automate industrial production, the fourth industrial revolution is improving on these developments. It blurs the boundaries between physical, digital and biological worlds (Hussin 2018, 92). For example, online education through mobile devices as an ideal education model or purely virtual learning are already possible (Aithal et al. 2015, 2467 ff.).

The seminar week and the test classroom cannot yet offer the possibilities of an inverted classroom or a flipped classroom due to a lack of resources (Kauffeld et al. 2019, 46 ff.). The author of this dissertation plans to set up and test a digitalised test room in the next stage of development. This creates a need for further research.

3.3.6. Experimental Operation of New Workshops

3.3.6.1. *Parameters: duration, methods, flexibility, interactivity, using the spaces, atmosphere, dramaturgy, recreation, co-creation, collaboration, change, fun*

Duration in months (planning until the final seminar in October 2023)	10
Seminar weeks - full-time (8 hours per day):	12
Number of participants:	124
Number of participants who completed the questionnaire:	94
Age of the participants in years:	18-36

The main methods are explained to the participants of each new seminar week until they are able to apply them themselves (Poguntke 2020, 120-127; Ematinger et al. 2020, 25-45). Lego building blocks worth around € 650.00 were invested in the experiment.

On the morning of the first day, the participants are allowed to look at the products built by the preliminary group (if available), touch them and ask questions. The first phase of working with LSP consists of the "creative destruction" of the Lego products from the previous group. The concept of creative destruction has been consolidated by the economist Schumpeter:

"This refers to the fact that companies, for better or worse, are dependent not only on constantly developing and implementing new product ideas, but also on constantly changing their technical and organisational structures and processes in order to further develop their productivity in this way. Organisational

innovation involves the development and implementation of new combinations of tasks and competencies that serve to improve the use of resources and thus rationalisation. This process is creative because new combinations have to be constantly created; it has a destructive effect because this is not possible without questioning and changing what already exists" (Springer 2004, 9).

This first task thus introduces a fundamental scientific part of innovation management, as the construct of creative destruction is explained and discussed before the actual "destruction" of the new products created by the previous group.

On the afternoon of the first day, the participants are then given a random construction kit with which they can build their own product. They are allowed to seek independent co-creative dialogue with the other participants to find ideas, as not every participant has an idea straight away. Not every participant receives the same bricks for the construction, but only a box of randomly selected Lego bricks. The exchange is therefore useful and intentional.

During the seminar week, the participants are given regular time to internalise the individual knowledge and method elements from the "lessons", discuss them and then incorporate them into their own "Lego product". They can and should share and discuss the products with the other participants. The idea is that many perspectives and ideas should lead to inspiration and further development.

Anything that cannot be built (e.g. product prices, payment methods, customer benefits, advertising, logistics, etc.) can and should be labelled using post it notes. The purpose of this concept is the transfer-orientated, varied transfer of knowledge and methods, which should appeal to as many people's senses as possible. The individual "Lego product" remains on the participants' tables throughout the week so that they can be seen at all times.

The construction phases during the day are flexible in terms of time. There are no specifications for the respective duration. This depends on individual receptiveness, individual progress of the products, emotional and physical condition and is intended to be open. Sometimes the instructors ask: "How long would you like to build Lego now?"

After the individual teaching units for knowledge or method transfer, the participants are asked whether or when they would like to continue building. They can build alone, in pairs or in groups and decide for themselves. During the building phases, the participants should also decide for themselves when and how they want to take breaks and do so. There are also no fixed break times during the lessons. Participants are encouraged to suggest break times themselves or to ask for breaks spontaneously.

Similar to the design thinking process, the participants' own Lego product serves as a prototype. Testing on the customer is simulated by the pitch or the presentation of the product to the group on the last day.

Further rules and instructions for the test week

- ⇒ Lessons at eye level. At the beginning of the seminar week, participants are offered the "you". People ask to be allowed to call each other by the first names.
- ⇒ From the outset, participants are free to choose how they place their tables and chairs, whether they want to sit alone or together.
- ⇒ Participants can decide for themselves when, how long and where they want to take breaks. They are allowed to eat and drink during lessons.
- ⇒ What the participants can read themselves should not be read by the lecturers.
- ⇒ Participants do not (yet) receive scripts. Knowledge and method sections are prepared and communicated as briefly and concisely as possible. Only occasionally are participants expected to work independently on passages from textbooks, scientific articles or the Internet. They are encouraged to take notes if they wish. Only afterwards will the participants receive more detailed information in the form of a digital script.
- ⇒ The use of PowerPoint as a "presentation tool" for the presentations is possible, but not obligatory.

- ⇒ Participants will receive laptops with Office 365 for research, editing the product checklist and independently creating a PowerPoint presentation.
- ⇒ Participants have access to the internet via Wi-Fi.
- ⇒ Grading at the end of the week: The grades are determined jointly in the group.
- ⇒ Lecturer team: the five consecutive days of lessons are led by three different lecturers. They alternate between full and half days. The author is one of these lecturers. The purpose of this division is, on the one hand, to provide variety for the participants and, on the other hand, to reduce the workload and provide flexibility for the lecturers. The lecturers should be able to complement and replace each other, for example in the event of illness. It is also intended to ensure that the survey results of the third qualitative study are not distorted by the performance of just one lecturer.

3.4. QUALITATIVE STUDY NR. 3: SURVEY

3.4.1. Study Design

3.4.1.1. *Conception of the Questionnaire: Quality Studies, Literature*

At the end of each one-week seminar, the participants were invited to take part in a survey. The questionnaire (36 questions) was standardized in German using "Microsoft Office Forms" to ensure equal conditions for all participants: period and time, wording, rating scale and order of questions. This ensured that the statements could be compared.

"The degree of standardisation of a survey refers to the degree of freedom of the respondent. In a standardised survey, answer options are given (in the form of closed questions) from which the respondent chooses (Hussy et al. 2013, 74). This is a standardised survey. The participants receive 36 questions. They can answer these with school grades on a unipolar rating scale. The survey was carried out using a numerical scale from 1 to 5.

1 = "very good" or "very important"

2 = "good" or "important"

3 = "satisfactory" or "neutral or irrelevant"

4 = "sufficient" or "not very important"

5 = "inadequate" or "unimportant"

"Rating scales provide equally sized marked sections of the attribute continuum. Respondents are asked to tick the level of the rating scale that corresponds to their personal perception of the characteristic expression of the item being assessed" (Hussy et al. 2013, 77).

The school grade scale was selected because the target audience is familiar with these ratings from their educational and vocational experiences. This scale can measure the opinions and behaviors of respondents (Berger-Grabner 2016, 118). The average time to answer was around 6 minutes. Of 124 participants, 94 completed the questionnaire. Response rate: 75.8 %. Theoretical sampling is given (Berger-Grabner 2016, 117). All participants in the survey were guaranteed anonymity. The importance of unbiased assessments was emphasised. "Such measures are particularly essential in surveys where personal opinions, attitudes or other sensitive data are requested and the researchers are dependent on the honesty and co-operation of the respondents" (Hussy et al. 2013, 60). During the survey, the participants are alone. The lecturers have no influence on the completion of the questionnaire.

3.4.1.2. *Item Construction*

"The questions in questionnaires are also referred to as items. (...) An item is a statement formulated as a question or as a judgement to which the respondent can express their agreement or disagreement - possibly with varying degrees of intensity" (Hussy et al. 2013, 74).

The questions were selected based on these parameters: the research questions (Bortz et al. 2016, 409), the literature analysis and the theoretical framework, the evaluation of the expert interviews and the evaluation of the survey of previous seminar participants in the existing seminar rooms. Parameters for the transformation of the educational infrastructure and the way of teaching were worked out from this. The resulting concrete changes were analysed.

The content-related questions were organised into thematically related blocks. The order of the blocks and the individual items within the blocks were logically optimised with regard to the cognitive processing of the respondents (Bortz et al. 2016, 407).

3.4.1.3. *Pretests*

Pretests are an integral part of social science studies. The construction takes place in two stages, first as a rough draft and then as a detailed draft. The questionnaire is then subjected to a questionnaire pre-test and revised if necessary (questionnaire revision) (Bortz et al. 2016, 405). A qualitative pretest was conducted: For this, the questionnaire was presented to a small group of 11 participants from a parallel course. They did not take part in the main study. The participants were then asked: Which questions were easy to answer, which were difficult to understand or seemed nonsensical and which aspects were missed?

In addition, parameters such as reading comprehension of the questions, clarity of the question instructions and the questions, bias and sensitivity of the questions and other possible problems were queried. Other questions refer to structure, completeness, length, instructions, and variety of the questionnaire (Berger-Grabner 2016, 192).

In addition, a questionnaire conference was held with three colleagues who have expertise in the survey topic and the questionnaire method. The questionnaire was discussed item by item in order to identify and eliminate inconsistencies. The positive evaluation of the questionnaire by subject matter experts can be seen as a method of checking content validity (Bortz et al. 2016, 411).

The pretests revealed that some questions were imprecisely formulated. Other questions were too similar and needed to be sharpened. In addition, the order of the questions was changed slightly to make the context easier to understand. A final technical pre-test followed the pre-tests and the changes and adjustments to the questions.

Before the questionnaire was used, there was a technical functionality test of Microsoft Office Forms. The focus was on the correct order of the questions, the display in the desired format and the completeness of the questionnaire. After the test run, it was also checked, if the answers were correctly reproduced in the output file. Furthermore, if the answers of the participants were correctly evaluated in the output file.

3.4.2. Sample – Characteristics of the Survey Participants

Sampling is the selection of a subset to be analysed: a subgroup of cases. These can be people, groups, interactions, or events, in certain places at certain times. They represent a population, a basic population, or a set of facts. Qualitative research "works with smaller samples or case studies. The selection of persons or cases is based on the respective state of knowledge with the aim of capturing the entire subject matter as accurately, completely, and aspect-richly as possible (theoretical sampling)" (Berger-Grabner 2016, 128).

- ⇒ **124 participants passed 12 weeks of the new Seminar**
- ⇒ **94 participants of 124 completed the questionnaire**
- ⇒ **The participants were between 18-36 old**
- ⇒ **96 of them were female**
- ⇒ **28 of them were males**
- ⇒ **The sample was not random**

Participants are required by law to attend six different seminar weeks at this training centre as part of their two to three-year training. They do not attend classes voluntarily. Their training companies must pay seminar fees and give participants paid time off work. The lessons are a compulsory part of their training. Each individual seminar week is graded by the lecturers. The selection of participants in the survey is therefore not random. It is a partial survey (Wöhe et al. 2008, 402 f.).

The participants learn content and methods here that they do not learn in the training company or at vocational school. Attendance is compulsory. Participation in the various seminar weeks is organised by training year, as the weeks build on each other and have different levels of difficulty.

3.4.3. Quality Criteria

Quality criteria have been established in science according to which the quality of research can be assessed. The quality criteria of empirical and above all quantitative research must be fulfilled in order to be able to generalise as accurate and true. Three criteria must be met: According to Bortz et al. and Berger-Grabner, these are objectivity, validity and reliability.

Objectivity (independence of persons) means independence from the people involved. No matter who measures, the result remains the same.

Validity means that the findings should also apply independently of the individual case. A study is valid if the method is chosen in such a way that it optimally corresponds to the research objective and investigates what the research questions raise. The method measures what it is supposed to measure. Validity ensures that researchers can draw correct conclusions from the chosen research methods.

Reliability means that the method measures accurately and is reproducible. The research process should be made accessible and comprehensible to all. Reliability is therefore the replicability of the results under the same conditions. There is little or no distortion of the test values due to measurement errors; the test value accurately reflects the true characteristics of the test subjects (Bortz et al. 2016, 444; Berger-Grabner 2016, 29 f.).

In this dissertation, a qualitative real-life experiment is conducted and analysed. The participants of this experiment are also the interviewees of this 3rd qualitative study. "An essential characteristic of qualitative research is its openness and interpretative character. Every researcher has a selective perception due to their training and experience. However, empirical studies require reliable results that are free of subjectivity" (Berger-Grabner 2016, 129).

The above criteria cannot be applied without restriction to the evaluation of qualitative research. Qualitative research examines contexts and phenomena in the environment and situation in which they occur and uses perceptions or their reproduction through observations and statements by the actors involved (Goldenstein et al. 2018, 92).

The methodological approaches used in qualitative research can rarely be standardised. However, they can be supplemented by further criteria. In the following, the 3rd qualitative study is subsumed under the three criteria. This is followed by further scientific criteria of qualitative social research.

Objectivity:

It refers to the intersubjective verifiability of the results or the independence of the results from the researcher. A distinction is made between different forms: Evaluation objectivity, implementation objectivity, interpretation objectivity (Bortz et al. 2016, 442 f.).

In the context of the 3rd qualitative study, it seems at least possible to confirm the objectivity of interpretation. The test interpretation procedure (here: the classification of a test value as a very good to very poor result based on norm values analogous to school grades from 1 to 5) is precisely specified in the study design and could also be implemented in this way by other test users.

The objectivity of the evaluation can be regarded as given. The test evaluation (here: the allocation of school grades to specific questions) is predefined in the study design. The evaluation is computerised and automated using Microsoft Office Forms.

The objectivity of the test can be confirmed, as the test results are independent of the person carrying out the test. Microsoft Office Forms was used to create a QR code that participants could scan. This gave them access to the anonymous questionnaire on their own devices such as laptops or smartphones (Bortz et al. 2016, 443).

Validity:

In general, qualitative results can be said to have a high degree of validity. For example, the data is usually generated closer to the social environment than in quantitative research, the relevance systems of the interviewees are included and there is a communicative exchange between researchers and interviewees (Lamnek 2005, 166). The data for the 3rd qualitative study was collected after each seminar week, which the participants went through together.

For example, the participants were allowed to decide for themselves how they wanted to sit, when they wanted to use GBL or when they wanted to take breaks and for how long. They are allowed to co-decide how they want to utilise the opportunities for flexibility, variety, interactivity or collaboration. The respondents' relevance systems are very much taken into account. There is a constant communicative exchange between the researcher and the interviewees. The study method survey at the end of the seminar week measures what it is supposed to (Lamnek 2005, 168 f.).

Reliability:

In this paper, reliability refers to the reliability of the survey. This can be measured with test repetitions or parallel tests. In this qualitative experiment, however, this is difficult to establish as the procedure is not independent of the research object (the Education Innolab and the way of teaching) and in this case not entirely independent of the researcher, who is part of the teaching team.

The study data must therefore be seen in a situational context and cannot be duplicated without significant effort. A similar room would have to be changed immediately. The new seminar concept would have to be applied by other lecturers in almost the same way. This alone seems difficult, as the way of teaching depends heavily on the lecturers, their character traits and behaviour. Especially as the concept and content were developed by the author of this dissertation.

Adopting and applying teaching concepts and content that are not the author's own is possible, but involves effort. The participants, on the other hand, would have to have similar private and professional life situations, a similar age and a similar gender distribution.

"In a test that cannot be fully standardised for reasons of content and therefore has less objectivity, reduced reliability must also be accepted" (Bortz et al. 2016, 444). In a qualitative study, fewer participants are usually interviewed than in a quantitative research method. It is therefore important to show which generalisations can be made from the results. The range shows similarities to the quantitative quality criterion of reliability. In this study, 94 participants answered the questionnaire. Response rate: 75.8 %. Theoretical sampling is given (Berger-Grabner 2016, 117).

3.4.3.1. *Special Quality Criteria: Qualitative Research*

"Qualitative researchers need to apply the suitable evaluation criteria based on the specific research at hand and the appropriateness of the evaluation criteria in the specific situation and context" (Mandal 2018, 595). According to Steinke, it is more about a system of quality criteria that covers as many aspects of the qualitative research process as possible (Steinke 2000, 322 f.). Mayring recommends six general quality criteria for qualitative social research. These criteria are intended to make the research process more transparent, reliable, and precise. The aim is to increase the scientific acceptance of qualitatively collected data.

1. Procedural Documentation
2. Interpretation Validation with Arguments
3. Rule-based Approach
4. Proximity to the Object
5. Communicative Validation
6. Triangulation (Mayring 2023, 122 ff.)

Procedural Documentation

The procedural documentation describes the documentation, presentation, and explanation of all elements of the research process. In the context of this work, this includes the research design, the explanation of the objectives of the qualitative experiment and the associated survey, the specific choice of methods, the evaluation, the sample specification, the analysis, and discussion of the results. The entire process of qualitative research must be documented in a transparent manner. It is explained step by step so that outsiders can understand it.

The quality criterion of transparency overlaps with the quantitative quality criterion of validity. The research really measures the things that are to be measured. In this qualitative experiment, the people being observed know that their behavior is being scientifically investigated (open observation; "overt observation") (Bortz et al. 2016, 329). They also know that they can conduct a survey at the end of the seminar week, which is part of this experiment.

Argumentative Interpretation Validation

Interpretations cannot be proven quantitatively but must be justified by argument. The interpretations must be consistent in themselves. Alternative justifications must be sought and discussed. This is a central criterion in qualitative research, as distortions can exist regarding the validity of the interpretation. The argumentative validation of the interpretation takes place in the chapter „discussion“ of the study results.

Rule Based Approach

In order to prevent an unsystematic approach and to make the research process transparent, a certain systematic and rule-based approach must be taken. To this end, the process must be planned in differentiated steps in the sense of a systematic approach. In this thesis, a literature analysis is followed by two qualitative studies:

expert interviews and opinion polls among the participants. The results of these studies are incorporated into the concept of an Education Innolab.

A seminar room is then transformed, and a new seminar concept is developed. After the seminar weeks, the 3rd qualitative study is conducted to analyze the changes. The results obtained must also be made plausible for outsiders so that the research is intersubjective. Various possible interpretations are offered. In the case of intersubjectivity, links to the quantitative quality criterion of objectivity can be recognized. "Tests that consist of items with predefined answers are objective, i.e. they enable an intersubjectively unambiguous evaluation" (Bortz et al. 2016, 455). This is the case in the present study. Participants in the survey can choose between school grades 1 to 5.

Proximity to the Object

The research process should be as close as possible to the everyday world of the subjects being researched. This criterion refers to the open, equal relationship between the researcher and the participants, who are also the interviewees in the study. The author of this dissertation is the researcher, conceptualizer of the new seminar week and at the same time the main lecturer of the seminar participants in real compulsory seminars.

The participants must attend these seminars because they are legally obliged to do so. The research process in this real-life experiment thus takes place in the everyday learning world of the subjects being researched. Equality is not completely guaranteed, as there will always be a lecturer-student imbalance and a moral dependency due to grading.

Communicative Validation

The validity of the results is checked by making the results available to the respondents and even discussing them. In this way, results are fed back directly in order to confirm their validity or to seek alternatives for them. This is more

appropriate for expert interviews, as the questions are usually open-ended, and the answers can leave room for interpretation.

In the case of a questionnaire with well-structured questions that can be graded from 1 to 5, this would not be appropriate in the present case. This is because clear and comprehensible decisions are collected from the respondents (Bortz et al. 2016, 83), which are automatically evaluated by Microsoft Office Forms.

Triangulation

Triangulation means that by using complementary methods, data and researchers, an attempt is made to limit and minimize bias and one-sided observations (Hussy et al. 2013, 288). "In qualitative social research, we speak of triangulation when different theoretical perspectives (theory triangulation), different researchers (researcher triangulation), different data sets (data triangulation) and/or different methods of data collection and data analysis (method triangulation) are combined in the investigation of a research problem in order to increase the knowledge gain of the study" (Bortz et al. 2016, 600).

In this dissertation, a literature analysis is followed by two qualitative studies: expert interviews and opinion polls among the participants. The results of these studies are incorporated into the concept of an Education Innolab. A seminar room is then transformed, and a new seminar concept is developed. After the seminar weeks, the 3rd qualitative study is conducted to analyze the changes with the method qualitative evaluation. It can be concluded that data and method triangulation takes place throughout this research process, which culminates in the answers to the research questions.

3.4.4. Discussion of the Results – Qualitative Evaluation

As a reminder, the qualitative experiment consists of four steps (Mayring 2016, 59-60; Hussy et al. 2013, 213 f.):

1. Description of the subject
2. Experimental intervention
3. Description of the altered object
4. Conclusions about its structure

The scientific method for analysing the survey follows evaluation research in order to evaluate the data from the survey and draw conclusions about the structure of the changed object, i.e. the Innolab and the way it is taught. Evaluation research strives for a scientifically sound assessment of products, measures, or other objects (Bortz et al. 2016, 975 ff.). The changes to the educational infrastructure and the way of teaching in the real-life experiment are measures and (educational) products and innovation processes in this sense.

"Evaluation is the critical assessment of the outcome of a work process, in our case: the innovation process. (...) Evaluation is a formal, emphasised control activity" (Hauschildt et al. 2023, 318). Different concepts are used in empirical research to measure innovation success. The qualitative approach is used in this dissertation. The judgement of practitioners, in this case participants in real lessons, is obtained and analysed (Hauschildt et al. 2023, 322; Bortz et al. 2016, 995 ff.). "Qualitative evaluation places more emphasis on the perspective of the participants (actors, users, target groups) and the description of the processes of a programme" (Flick 2009 b, 11).

Argumentative interpretation validation: Interpretations cannot be proven quantitatively but must be substantiated by argument. The interpretations must be consistent in themselves. Alternative justifications must be sought and discussed. This is a central criterion in qualitative research, as distortions can exist regarding the validity of the interpretation. The argumentative validation of the

interpretation takes place in the chapters "discussion" of these results and in the "limitations" (Mayring 2023, 122 ff.).

The 3rd study is about changing the educational infrastructure and the way of teaching through the use of GBL in combination with a design thinking approach. The success of this educational concept is to be measured or evaluated. The definition of evaluation in educational change is appropriate: "The methodical recording and well-founded assessment of processes and results and a better understanding and design of a practical measure in the field of education through impact monitoring, control and reflection" (Reischmann 2002, 18).

The following criteria are used to evaluate the success of an innovation: Indirect technical effects such as learning success, experience, knowledge, transfer effects and knowledge of weak points. In addition, possible economic effects such as possible advertising effects and an increase in contribution margins. Finally, there are system-related effects such as social effects within the education provider's organisation (Hauschildt et al. 2023, 321).

In order to analyse data, it is necessary to "count, dissect and group data at very descriptive levels. Interpreting essentially means ascribing interpretative or explanatory meaning to the existing context in the data" (Balzer et al. 2015, 113).

"Evaluation research or scientific evaluation uses social science methods to assess an object of evaluation (e.g., a product or a measure), taking into account the relevant stakeholder groups (e.g., patients, relatives, product developers, evaluation clients) on the basis of specific evaluation criteria (e.g. acceptance, effectiveness, efficiency, sustainability) and measures of their characteristics. The assessment obtained as a result of the evaluation research process should fulfil various evaluation functions in practice (e.g., legitimisation or optimisation function), which requires active evaluation use, i.e., practical use of the ongoing and/or final evaluation results (e.g., supported by written reports, oral reports and/or workshops by the evaluation team for the relevant stakeholder groups). Evaluation research is committed to the usual principles of scientific rigour as well as scientific and research ethics, which for the special conditions of evaluation research have also been formulated in binding evaluation standards as quality standards for evaluation studies. In addition to social science methodological

expertise, evaluation research places special demands on the qualifications of the evaluators" (Bortz et al. 2016, 978).

The propositions developed in the previous chapters are to be reviewed, refined and adapted in the following analysis and discussion in order to answer the leading research questions in more detail and to make empirically based recommendations for practical action in the conclusion chapter. This is precisely one of the strengths of qualitative research, as the data collection, processing and evaluation techniques can and should be adapted to specific questions and to the respective conditions and needs (Mayring 2016, 65).

After the last week of the seminar in October 2023, the survey was stopped electronically via Microsoft Office Forms so that no one was able to take part in the survey anymore. The evaluation function of the survey program was used to generate evaluation diagrams and an Excel list. Both were checked for completeness and saved. From a visualization point of view, the diagrams were used for the evaluation, enlarged and the questions were translated into English. In the following visualization, the questions represent the titles of the figures to increase comprehensibility for the reader.

N = 94

"The so-called theory-based evaluation examines the question of which intervention components work for which target group under which circumstances and how, and why. Instead of an output orientation, the focus is on a process orientation with the aim of theoretically modelling the impact processes. In theory-based evaluation, the epistemological function of evaluation is therefore particularly emphasised and evaluation research is designed both as theory-building and theory-testing, with theories of action and change being particularly relevant" (Döring 2009, 118).

3.4.4.1. *Part 1 of the Experiment: Changes in the Educational Infrastructure*

This chapter summarizes structural conclusions (Mayring 2016, 59 f.; Hussy et al. 2013, 213 f.). “The methodology includes its careful application: the adaptation of the procedures to the object, the testing of limits, the gradual maximization or minimization of aspects in the object of study, the constant question-answer game in the dialogue principle, if possible, with the direct participation of those affected” (Kleining 1986, 744 f.).

The first part of the experiment deals with the educational infrastructure, its changes, and the effects of the changes. The classroom, its design and equipment are surveyed. In addition, the material and technical teaching and learning facilities. The reference variables for evaluating the success of innovation are comparisons with certain conditions:

1. The comparison with a specific goal, namely, to implement and test the theoretical findings and propositions from the expert interview analysis and the group opinion poll in the Real-Life Experiment.

2. The comparison with certain conditions, namely the comparison to an earlier point in time without the changes in the seminar rooms and the way of teaching and learning. And the comparison with the fictional state of an Education Innovation Lab - developed through the analysis of scientific theory (Hauschildt et al. 2023, 324).

All of the following evaluation diagrams of the answers concerning the educational infrastructure and Game Based Learning show the data in absolute frequency, i.e., the total number of respondents who gave a specific grade between 1 for “very good” or “very important” and 5 for “inadequate” or “unimportant”.

The respective mean value is shown below the individual answer diagrams. The mean is also called the arithmetic mean or average. The arithmetic average values were rounded to 2 decimal places. The average values indicate the average

grade of the participants' answers. This analysis does not calculate a median value for the data, although the survey results show some "outlier values" (Bortz et al. 2016, 636). This is not a quantitative analysis. The study design is exploratory in nature.

The survey was carried out using a numerical scale of 1 to 5. The grades have different meanings, according to the questions. For descriptive purpose, the following grades and their meanings are colour coded. The colours correspond to the colours in the following evaluation diagrams for better readability and comprehensibility:

1 = "very good" or "very important"

2 = "good" or "important"

3 = "satisfactory" or "neutral or irrelevant"

4 = "sufficient" or "not very important"

5 = "inadequate" or "unimportant"

The first finding to emerge from the responses is that 27 of the 28 interventions surveyed were given an average score of between 2.13 and 2.76 and were therefore rated as "good". Not "very good", i.e. grade 1, but "good", i.e. grade 2. Only one question was answered with a mean value of 3.09 and thus "satisfactory".

The 8 criteria asked about their importance were given an average score of between 2.03 and 2.76 and were therefore rated as "good".

Problems of interpretation and possible solutions

Problems of interpretation may arise when discussing the results. The criteria surveyed in the study can be categorised as relevant. From the evaluator's perspective, it can therefore also be concluded that, firstly, the evaluation criteria were adequately selected, secondly, the item construction was consistent with the research purpose and the target group and, thirdly, the changes and interventions in educational infrastructure and in the way of teaching were beneficial for the participants. From the subjective point of view of the participants, who are used to school grades between 1 and 5, the grade 2 is not a very good result, but a good one. It is more good than bad. It is more beneficial than obstructive. It is more useful than useless.

Problem number 1: Why were none of the questions given an average score of 1?

The comparability of results makes interpretation easier. Comparative studies in Germany have shown that courses at universities rank in a corridor between school grades 2 and 3. "The vast majority of courses achieve average grades between 2 and 3 in the evaluation, which means that measurable and statistically significant improvements can only be achieved to a limited extent" (Döring 2005, 16).

Problem number 2: Why are there outlier values in the data and how should they be assessed?

International research on teaching evaluation data shows that at least student evaluations are subject to systematic bias. There are therefore bias variables that can also be applied to this evaluation data. Although the participants in the survey are not students, they are nevertheless obliged to take part in lessons and have what they have learnt assessed in examinations. Their situation is similar to that of students at universities, only shorter. The following biases were identified:

"Reason for attendance:

Compulsory courses are rated more negatively than elective courses.

Popularity of topics:

Courses with popular topics are rated more positively than courses with unpopular topics.

Study behaviour:

Courses in which students act more actively as a collective are rated more positively than courses with more passive study behaviour" (Döring 2005, 14 f.).

The seminars are compulsory courses. The author of the dissertation cannot state with certainty whether the contents of the newly designed seminar weeks are popular or unpopular topics. The participants were not asked about this. An assessment would be speculative. From the author's subjective point of view, it could be confirmed that the participants acted more actively as a collective. As the data show, interactivity is an important criterion. But the participants were not asked about this.

With regard to the three distortions, it could now be argued that the courses were rated more negatively due to the reason for participation as a compulsory course. The popularity of the topics cannot be assessed with empirical certainty and must therefore be categorised as neutral. Study behaviour as a collective, on the other hand, could be assessed as positive. In total, the distortions would therefore cancel each other out and the overall effect of the distortions would be zero. This cannot be proven empirically in this dissertation. This is an interpretative argument.

Problem number 3: The average time required for the answers per participant in the survey with 36 questions is 6 minutes. Are the answers meaningful?

Converted, this means that participants took an average of 10 seconds per question to read it, understand it, think about a rating and then type the rating into the survey form online and then click on the next question. In the case of questions that

are difficult to understand, it could be concluded that the participants made hasty decisions in order to get through the survey quickly. The evaluation shows that, for example, in the questions on logical, analytical, critical and problem-orientated thinking, a score of 3 is awarded comparatively often, in the sense of "I don't know exactly" or "3 is neither good nor bad, i.e., neutral".

From the author's subjective point of view, the time taken per answer may have been too short, the answers superficial and the questions sometimes too complicated. However, an assessment of this problem would be speculative in nature. Further research could attempt to clarify this.

It should also be noted that the responses to this survey should not and cannot be used to evaluate the course as a whole or the teaching staff. And that the evaluation of a course should not automatically be regarded as an evaluation of the teaching staff. A correlation or even causality cannot be assumed across the board. "In order to avoid erroneous conclusions, only comparable courses may be measured against each other in the standards-based interpretation. In addition, the results of several courses must be taken into account and other data sources (e.g., peer review) must be used to evaluate a person's teaching performance" (Döring 2005, 15).

In order to obtain a more meaningful evaluation, research recommends that possible bias variables should at least be taken into account in an evaluative argumentative manner and that conclusions should be "cautious".

On the other hand, the results of the evaluation by 94 participants in the survey who attended the same course are summarised. "If questionnaire results from at least 20 students are available for a course, reliable mean values usually result" (Döring 2005, 14).

The mean values can be used to draw conclusions about the effectiveness of the educational infrastructure changes and the interventions in teaching and methods. As the survey ran over several months and 12 similar seminar weeks, individual outliers are statistically mitigated.

The following data is not purely a course evaluation. Rather, criteria relating to the infrastructure of the Innolab and criteria for LSP in combination with design

thinking were surveyed. Neither the entire weekly event was surveyed in an overarching question nor the "quality" of the teaching staff. For the most part, the interventions in the educational infrastructure were surveyed in order to answer the research questions of this dissertation. Nevertheless, these possible distortions are considered in the "discussion" of the results, otherwise the cost-benefit ratio for changes and the quality of seminar design and implementation are mainly discussed and categorised in order to develop practical recommendations for action (Döring 2005, 16). Only the results that are ambiguous, unclear, or open to interpretation are discussed below.

The majority rated the overall room design (55 %) and the feeling of well-being (60 %) as good to very good (see figures 12 and 13).

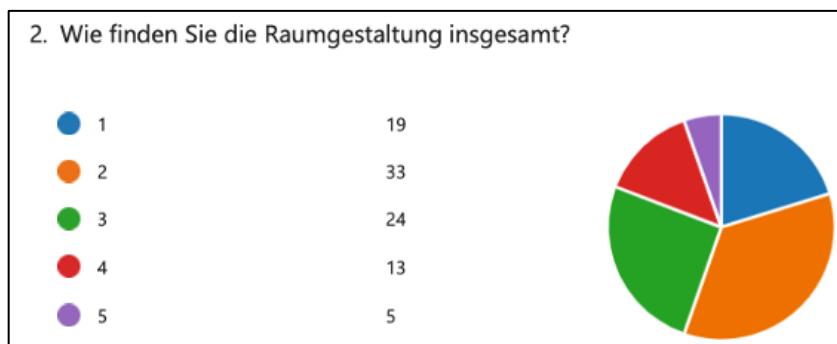


Figure 12: How do you rate the room design?

Average Value: 2,49

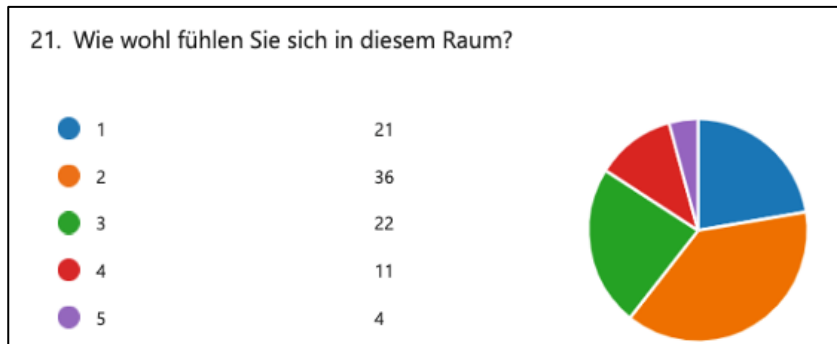


Figure 13: How comfortable do you feel in this space?

Average Value: 2,37

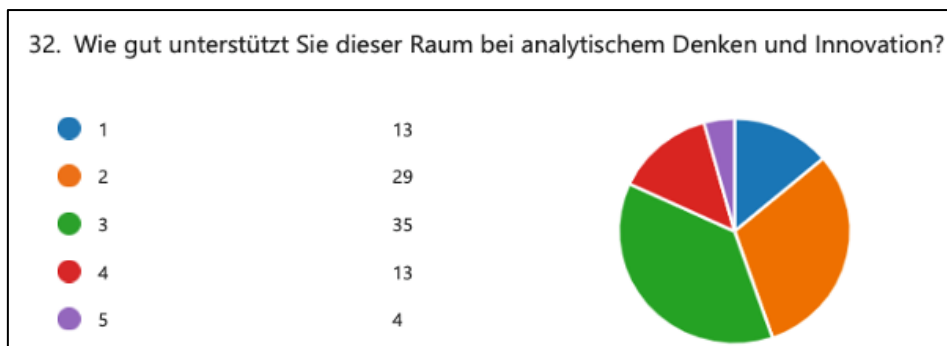


Figure 14: How well does this space support you in analytical thinking and innovation?

Average Value: 2,64

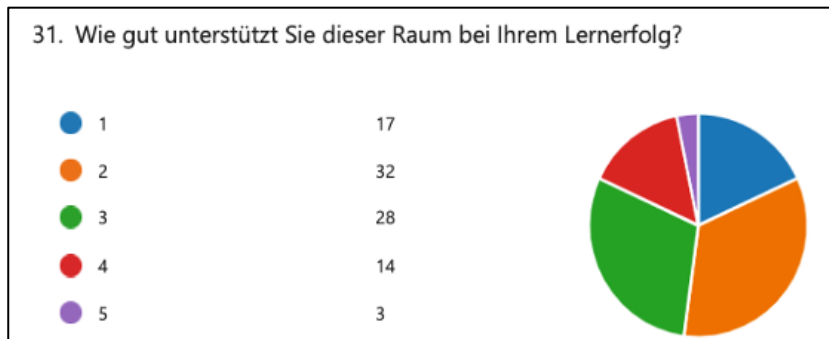


Figure 15: How well does this space support you in your learning success?

Average Value: 2,51

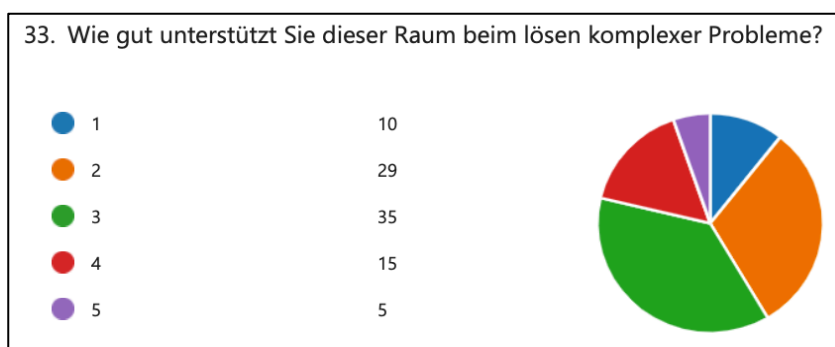


Figure 16: How well does this space support you in solving complex tasks?

Average Value: 2,74

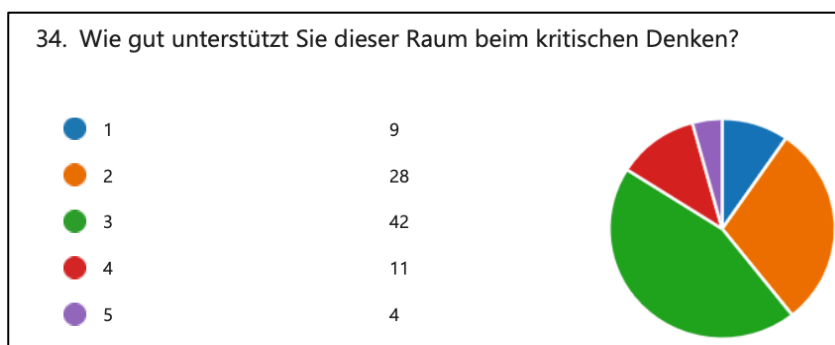


Figure 17: How well does this space support you in critical thinking?

Average Value: 2,71

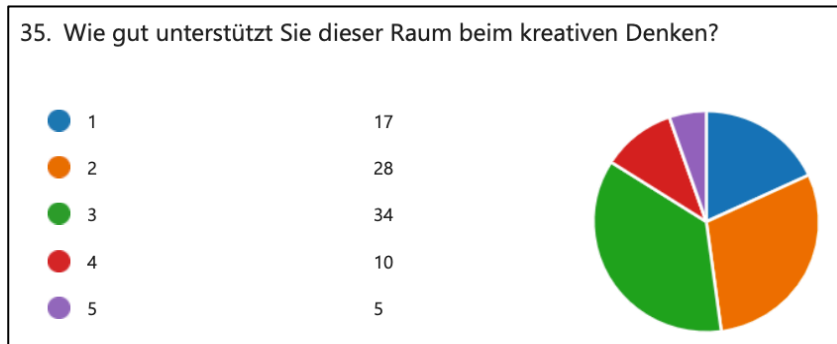


Figure 18: How well does this space support you in creative thinking?

Average Value: 2,55

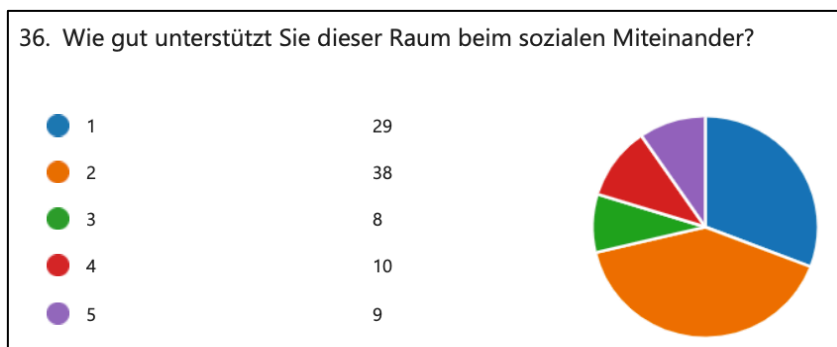


Figure 19: How well does this space support you in socializing?

Average Value: 2,28

All responses show that most of the changes were rated very good to good (1 to 2) by the majority of respondents, over 50%. There is an associative relationship between the changes and the user acceptance.

The following changes were best received:

⇒ "How useful is the writable whiteboard wall?":

Very good = 43; good = 22. Total: 69 %

⇒ “How well does this space support you in socializing?”:

Very good = 29; good = 38. Total: 71 %

⇒ „How important is the flexibility of the furniture to you?”:

Very good = 33; good = 32. Total: 69 %

The following ratings stand out:

⇒ “How important are the additional seating options (upholstered furniture, sofas) to you?” and “How comfortable do you feel in this learning space (well-being)?”: over 60% rated this as very good or good.

This shows that the functional and emotional design changes are perceived as useful and lead to better well-being (Cooper et al. 2017, 25). The associative relationship between the changes and the user acceptance is even more significant.

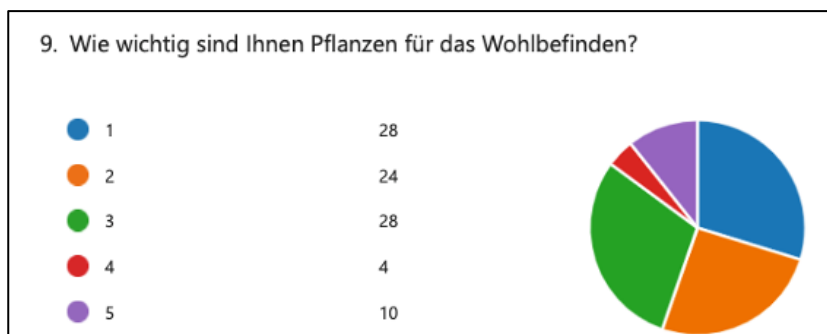


Figure 20: How important are plants to your well-being?

Average Value: 2,40

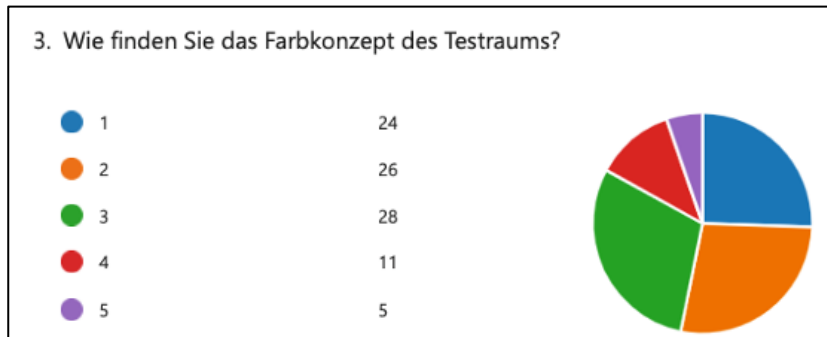


Figure 21: How do you rate the colour concept of the test room?

Average Value: 2,44

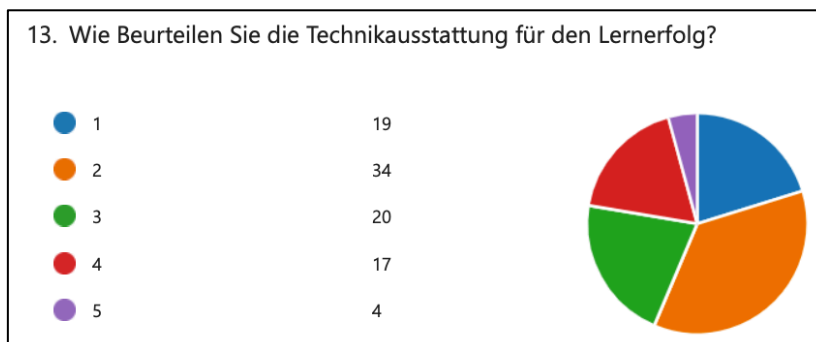


Figure 22: How do you assess the technical equipment for learning success?

Average Value: 2,50

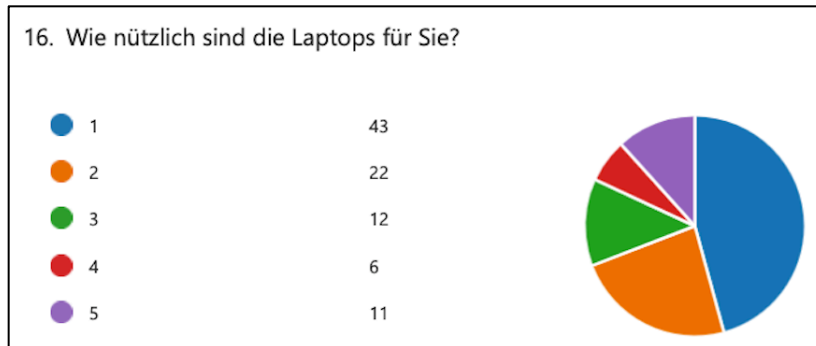


Figure 23: How useful are the laptops?

Average Value: 2,15

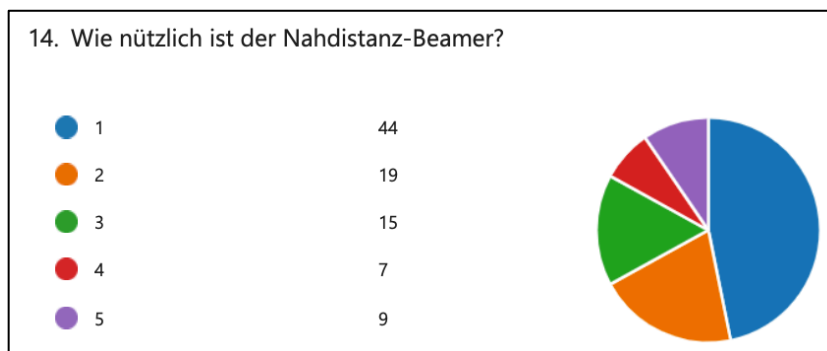


Figure 24: How useful is the close-distance projector?

Average Value: 2,13

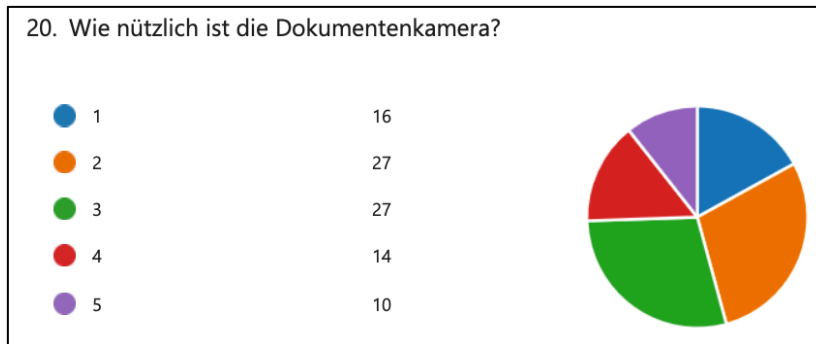


Figure 25: How useful is the document camera?

Average Value: 2,73

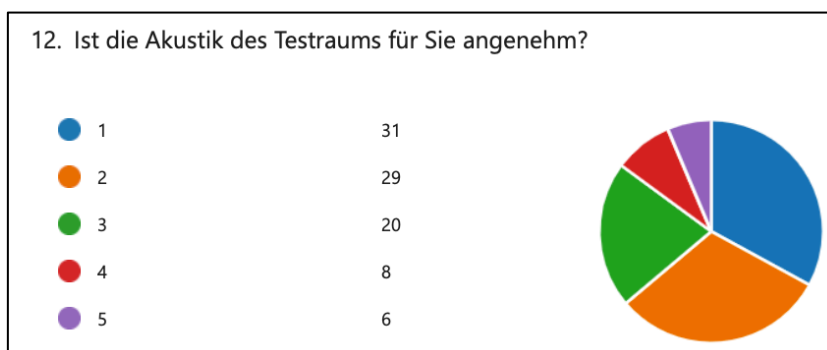


Figure 26: Are the acoustics of the test room comfortable for you?

Average Value: 2,24

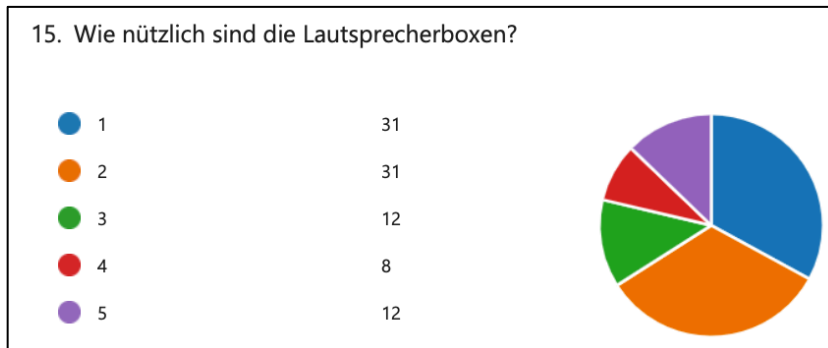


Figure 27: How useful are the additional speakers?

Average Value: 2,35

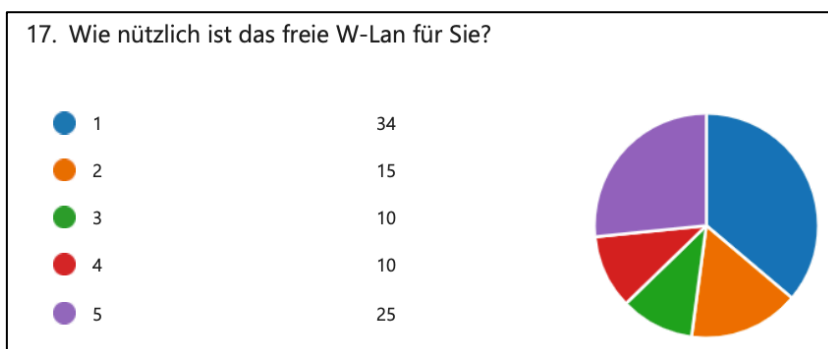


Figure 28: How useful is free WiFi for you?

Average Value: 2,76

It should be noted that a very high proportion of participants do not consider the WiFi to be useful (see figure 28). 25 out of 94 gave it a score of 5, which does not seem plausible given the heavy use of smartphones, tablets and laptops during lessons and breaks.

Based on subjective experience with the room and its connectivity, the author can explain this assessment as follows. On the one hand, the question can be understood in general terms, namely how useful free WiFi is in general. Or on

the other hand, it can be interpreted as an evaluation of the existing free WiFi in the seminar room, namely how useful the WiFi is due to its performance. In the author's experience, the WiFi is not consistently powerful with a high bandwidth and wide coverage. The more participants log in, the slower and more unstable the connection is. From the author's point of view, this results in a recommendation for action to improve the WiFi and an explanation for the assessment by the participants. This is an argumentative interpretation.

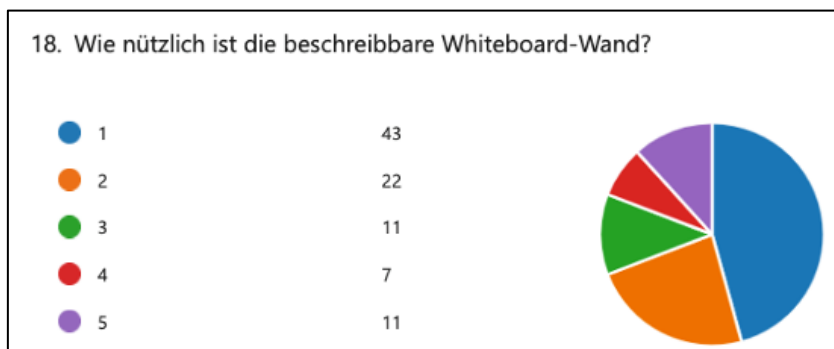


Figure 29: How useful is the writable whiteboard wall?

Average Value: 2,16

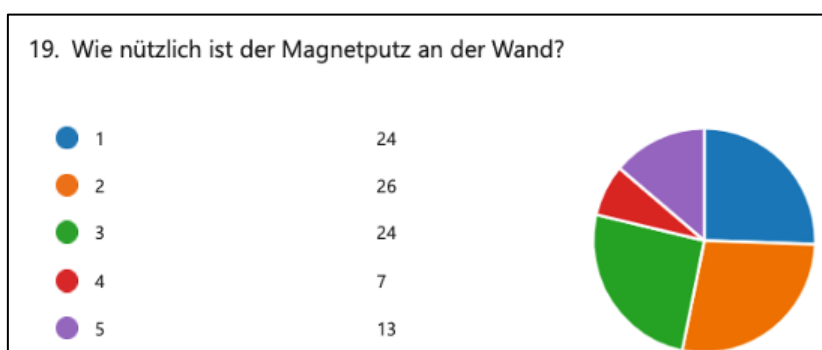


Figure 30: How useful is magnetic plaster on the wall?

Average Value: 2,56

Compared to the whiteboard wall, it could be concluded that the magnetic plaster is not as useful and could therefore be removed (see figure 30). As a design component, visualisation option and collaboration surface, the magnetic plaster serves as a partial element and flexible option for the overall benefit of the InnoLab.

The author and the participants, who rated the magnetic plaster with an average of 2.56, consider the magnetic plaster to be more useful than useless. Not as useful as the whiteboard wall with a score of 2.16, but useful (see figure 29).

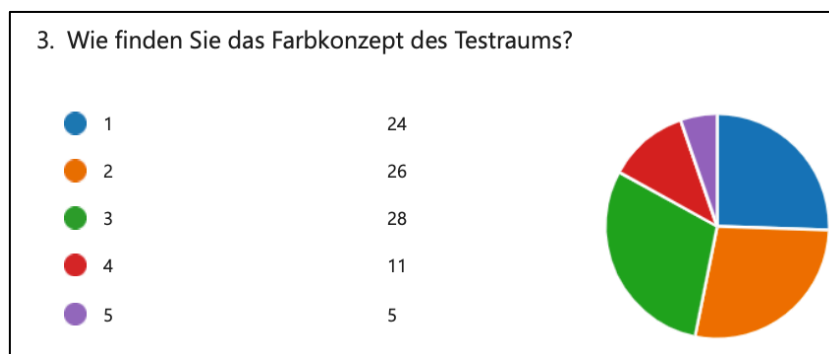


Figure 31: How do you rate the colour concept of the test room?

Average Value: 2,44

The concept of colour can be judged very subjectively. Although colour concepts follow painterly rules such as the interplay of complementary colours or visualisation proportions, colour concepts are a matter of taste from a certain point onwards. On average, the participants rated the colour concept as 2.44, i.e., good (see figure 31). It can therefore be stated that colours are "useful" and that colour concepts are recommended for success, even according to theoretical findings.

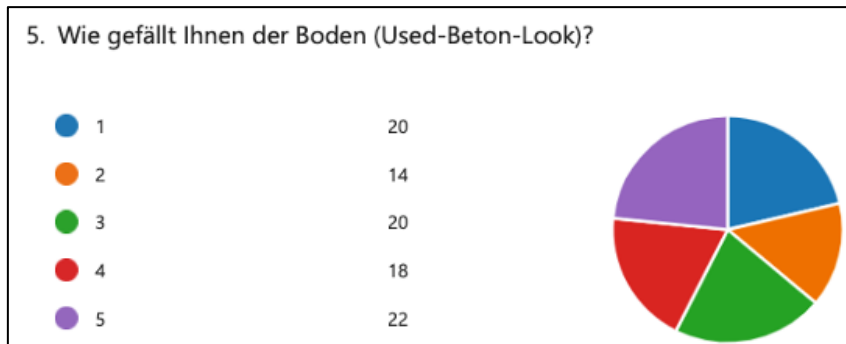


Figure 32: How do you like the floor (used look)?

Average Value: 3,09

The concrete floor received an average score of 3.09, the worst score of all the responses (see figure 32). As a reflex, it could now be concluded that the floor should be replaced urgently. There are several arguments against this:

Firstly, a score of 3 means "satisfactory" or "neutral". The floor is therefore neither good nor bad - on average.

Secondly: from a research point of view, the design of the floor is part of the overall and important room design, but as part of the design it is not decisive. It is a question of taste. The floor was changed by removing the old and dirty PVC floor, sanding and varnishing the concrete floor and can therefore be seen as a partial project success as part of a change process (the PVC floors in the other 18 seminar rooms remained unchanged) (Lies et al. 2011, 61).

Thirdly: the floor does what it is supposed to do - it is the basis of the room and holds the room together, the room does not collapse, the statics are secure. The floor works.

Fourthly, another reason is the allocation of resources for changing the space. A new floor would have a significant impact on costs, the effect would not be in proportion to the benefits. "Moreover, improvement initiatives are only rational if they are in a justifiable cost-benefit ratio" (Döring 2005, 19).

Fifthly, it should be added that the new space as an InnoLab must never be finished in order to make it easier to convince stakeholders and shareholders that further funding is required. The concrete floor, which immediately catches the eye,

seems to be a suitable means and argument to achieve this effect. This visibility supports the change process to initiate further changes (Lies et al. 2011, 13).

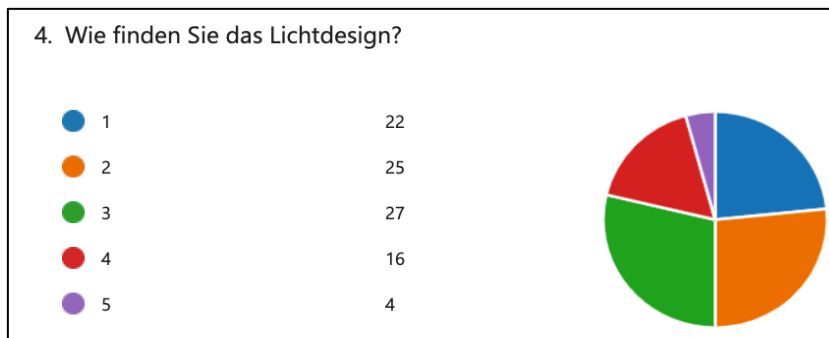


Figure 33: How do you rate the lighting design?

Average Value: 2,52

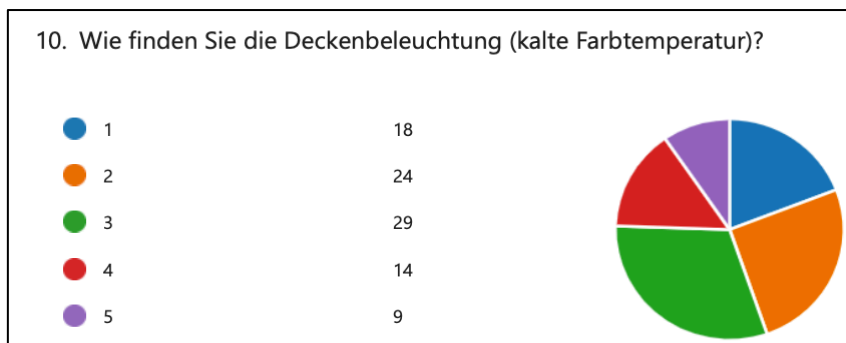


Figure 34: How do you find the ceiling lighting (cold colour temperature)

Average Value: 2,70

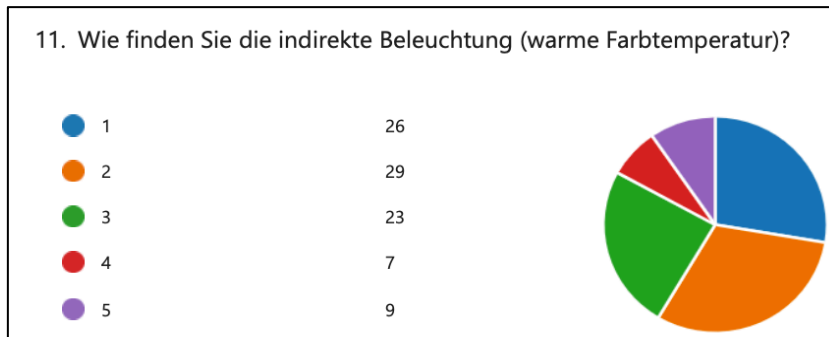


Figure 35: How do you find indirect lighting (warm colour temperature)

Average Value: 2,40

These figures (33 and 35) show that participants prefer warm indirect light to cold, direct, and non-dimmable ceiling light. 45 % rate cold light as good or very good. 58 % rate warm light as good or very good.

As a conclusion, it can be recommended to combine cold, warm, direct, and indirect light. And the light should be dimmable. This is a recommendation for action.

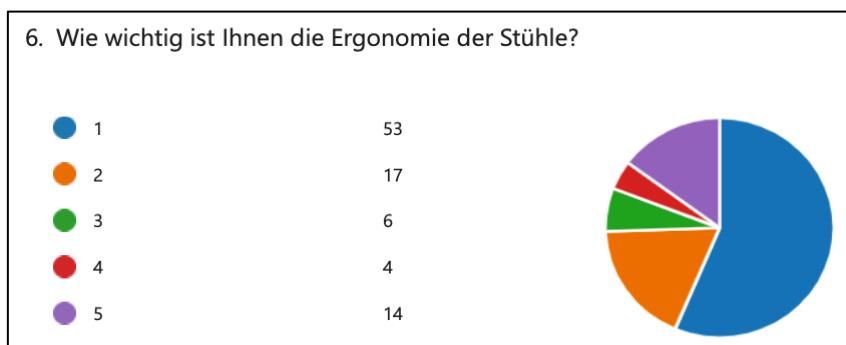


Figure 36: How important is the ergonomics of the chairs to you?

Average Value: 2,03

The ergonomics of the chairs are extremely important for the participants (see figure 36). It should be noted that the chairs currently available are not very ergonomic. They do not have castors, high adjustable backrests or armrests or breathable fabrics as covers. As a recommendation for practical action, it can be concluded that ergonomic chairs are beneficial, and that the fulfilment of ergonomics is a success factor in itself.

The following figures (37 and 38) show that flexibility is a very important parameter for the learning environment. 63% rated the importance as very high to high. 55% rate the current flexibility as very good to good. As a recommendation and for the further development of the Innolab, further work should be done on this parameter in order to increase flexibility. The furniture seems to have an effective impact of increasing flexibility. 69% answered that the flexibility of the furniture is very important to important. Note: The flexibility of the teaching staff was not surveyed.

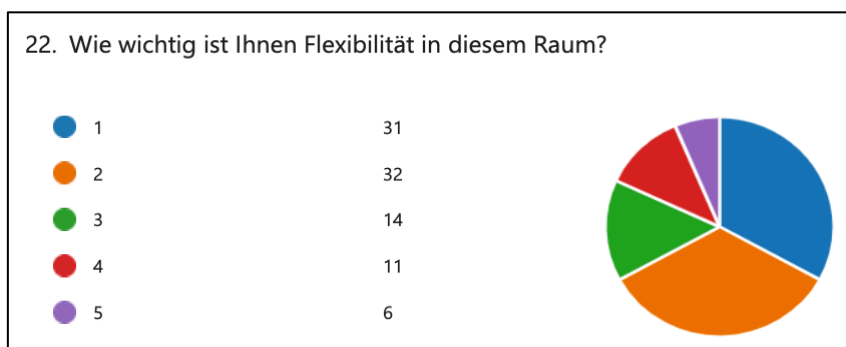


Figure 37: How important is flexibility in this room?

Average Value: 2,24

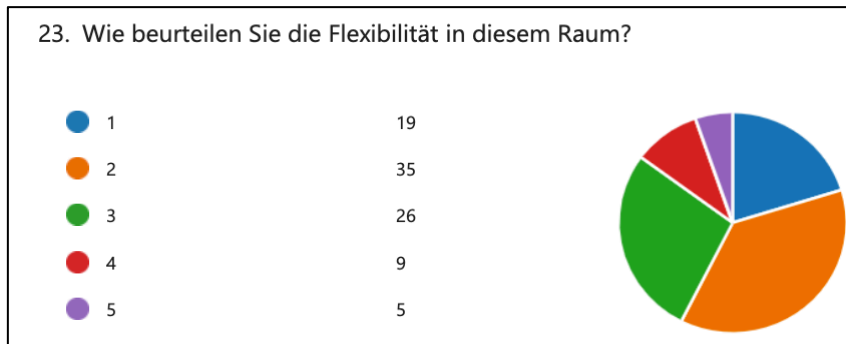


Figure 38: How do you rate the flexibility in this room?

Average Value: 2,43

Question 23 (figure 38) is a control question for question 1 (figure 41). The control question is used to check the quality of the answers, for example as a consistency check.

Control questions should only be used very sparingly, as they could "annoy" the survey participants because they could feel "scrutinised" (Bortz et al. 2016, 408). In this survey, therefore, only one control question was asked regarding perceived flexibility.

According to theory, the expert interviews and the findings from the Group Opinion Poll, this parameter appears to be one of the most important parameters for learning success.

The flexibility of the room also appears to be very important for the participants in the Real-Life Experiment survey - with an average score of 2.24. The number of participants who answered this with a poor score of 5 is low compared to the other results, with six participants. The mean values of 2.43 and 2.40 for the two questions are very similar, meaning that the significance of the answers regarding room flexibility is consistent.

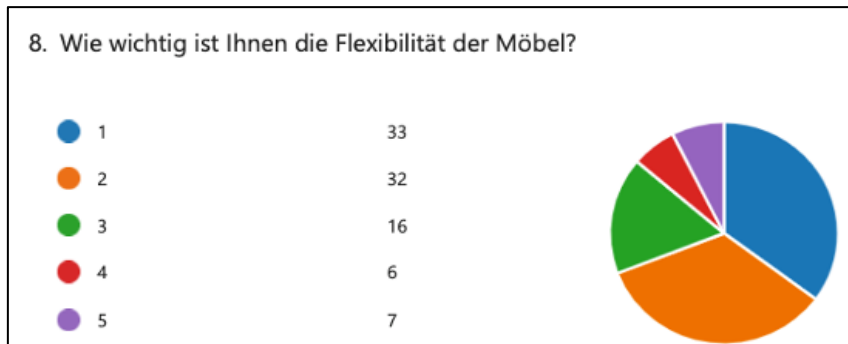


Figure 39: How important is the flexibility of the furniture to you?

Average Value: 2,17

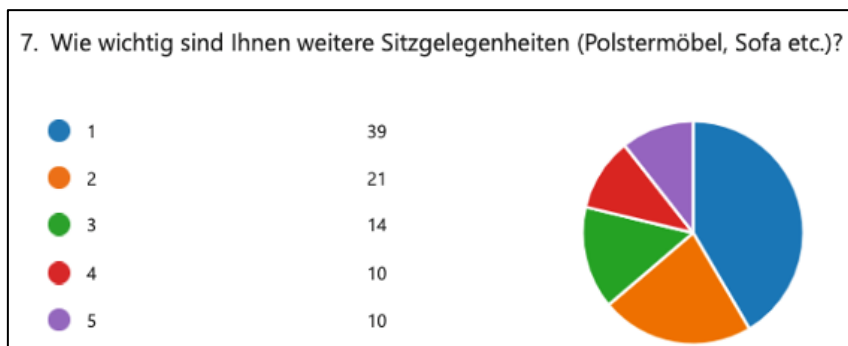


Figure 40: How important are the additional seating options (upholstered furniture, sofas) to you?

Average Value: 2,27

These ratings support the assessment that flexibility is very important for learning success and consists of several components. The "flexibility" criterion is also rated as very important in relation to the furniture.

The two questions (see figures 39 and 40) differentiate between normal tables and chairs for lessons and additional seating such as sofas for breaks, variety and group work.

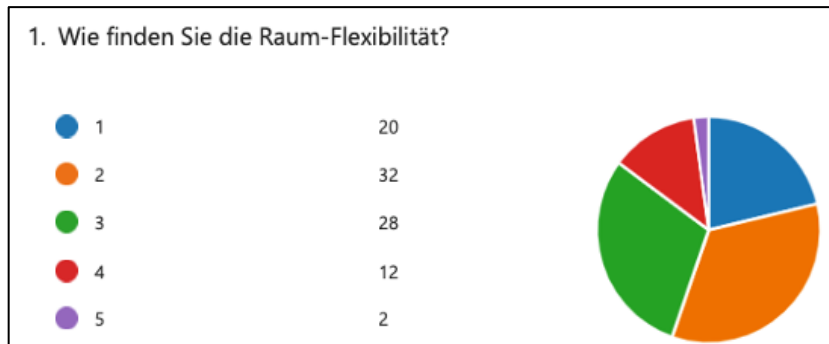


Figure 41: How do you rate the flexibility in this space?

Average Value: 2,40

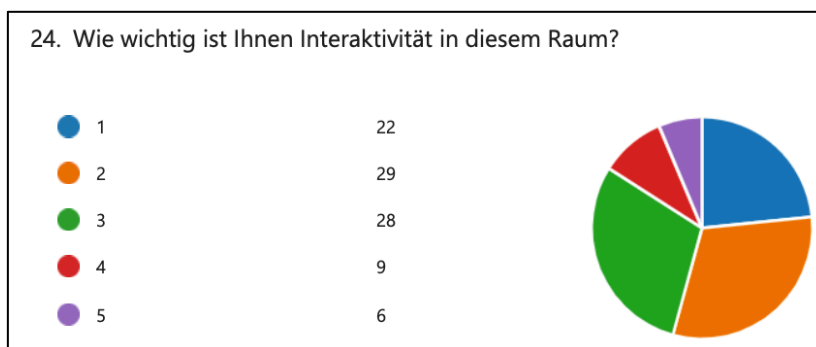


Figure 42: How important is interactivity in this room?

Average Value: 2,45

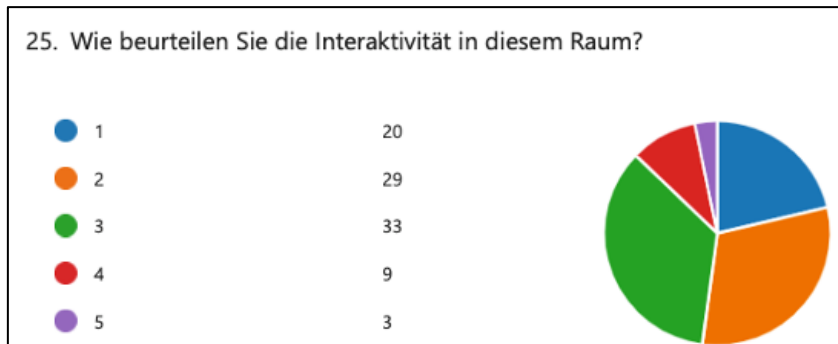


Figure 43: How do you rate the interactivity in this room?

Average Value: 2,43

The importance of the criterion "interactivity" can be confirmed (see figure 42). Due to the changes to the room and the teaching concept, the degree of "possible interactivity" appears to be "good" at 2.43 (see figure 43). Interactivity can be confirmed as a **success factor**. It seems beneficial to invest in this criterion and to stabilise the selection of methods such as group work, discussions or BarCamps.

In the rating scale used here, an odd number of levels was used (from 1 to 5). This could encourage a tendency towards the middle to avoid extreme judgments. This tendency could increase if the objects of judgment are little known or if the scales are not anchored at the end points. The survey participants should therefore be sufficiently informed about the objects to be judged (Hussy et al. 2013, 79). The participants in this survey were informed in detail about the topics to be surveyed. But the author of this dissertation cannot answer whether they have really understood all the questions. This would be speculative.

"With an even number of levels (for a bipolar scale), a judgment in the direction of one or the other pole of the scale is virtually forced. With an odd number of levels, on the other hand, a neutral judgment option is also available. However, such a neutral judgment is problematic if this judgment option is chosen too often. Neutral judgments are also problematic in that they cannot be interpreted unambiguously: A neutral judgment can be an expression of an indifferent as well as an ambivalent or ambivalent attitude regarding the object in question

(ambivalence-indifference problem)" (Hussy et al. 2013, 78). Given the evaluation problem of this unipolar rating scale, a score of 3 could be considered neither good nor bad.

But: if the grade "3 = satisfactory" is subsumed as acceptable or useful and included in the positive evaluation of the survey, the picture changes. Nearly all changes, except for the new floor and the additional seating, received positive feedback. Over 80% rated them as very good, good, or satisfactory.

The floor received the worst rating: 18 = sufficient; 22 = inadequate. Around 43% do not like the used look of the floor. On the other hand, the functional design is effective, and no additional expenses were incurred for carpeting or hardwood flooring. The magnetic wall received the second worst rating. Around 22% did not think it was useful: 7 = sufficient; 13 = inadequate. On the other hand, the majority consider it as useful.

These answers demonstrate the existence of complementarity between innovative learning spaces and future-oriented learning (see figure 15 "How well does this space support you in your learning success?": very good = 17; good = 32).

The study demonstrates that a flexible environment, including writable whiteboard walls and flexible, mobile furniture promotes interactivity and collaboration (see figure 43 "How do you rate the interactivity in this room?": very good = 20; good = 29).

The use of a design concept that coordinates colour and furniture designs, incorporates various plants, and utilizes indirect warm lighting supports learners' sense of aesthetic and emotional well-being, facilitating their learning process. This could support the development of future-oriented skills at a low cost.

The research shows that an Innolab can provide useful test results. The outcomes of a qualitative experiment, through inductive discovery, help to understand possible causes for learners' behaviour.

3.4.4.2. *Part 2 of the Experiment: Changing the way of Teaching and Learning*

The second part of the experiment deals with the way of teaching and learning. The aim is to find out whether the implementation of a GBL approach combined with design thinking and OKR-methods (Objectives and Key Results) supports interactivity, Co-Creation (Coustillac et al. 2022, 854 ff.; Leoste et al. 2020), collaboration and thus product and marketing (product) innovation (Sethi et al. 2001, 82 f.).

And whether the coordinated use of GBL can increase the emotional, social, and physical well-being, enjoyment and learning ability of learners while promoting future-oriented skills such as creativity, analytical thinking and problem solving. The evaluation goals are to gain knowledge, exercise control, document as legitimization and create transparency (Stockmann 2002, 3).

A presumed relationship between two characteristics does not automatically have to be a cause-and-effect relationship. If two characteristics behave synchronously with each other, this is initially referred to as a correlation.

"Correlations provide information about the direction and closeness of a relationship, but not about its causes. The testing of causal relationship hypotheses can - with the application of various additional techniques - only ever be approximate" (Bortz et al. 2016, 696). In empirical research, correlations can generally only be determined quantitatively using statistical analysis methods. However, the experiment conducted is qualitative in nature: the sample is not randomised and there is no control group for comparison (Bortz et al. 2016, 1024 ff.).

"In view of the initial questions and the data situation, evaluation studies should always critically consider whether inferential statistical methods are indicated at all. This is only the case if a priori theory-based hypotheses have been formulated, whereas descriptive findings are sufficient to answer many evaluation questions. Similarly, significance tests are unnecessary if, on the one hand, all participants in a measure were examined (full survey) or if only very few participants could be recruited and therefore the statistical requirements for corresponding analyses are not met" (Bortz et al. 2016, 1027).

This is the case with this evaluation of the measures (changes): no hypotheses were formed in the dissertation, as it is exploratory in nature and contains iteratively developed propositions that lead to recommendations for action. Almost all participants in the seminar weeks took part in the survey. Descriptive findings seem to be sufficient.

The results-oriented approach is therefore used to analyse the data. "The results-oriented evaluation approach concentrates on a few results-related characteristics of the evaluation object. The focus is therefore on a specific criterion-related question (e.g., the acceptance of a measure, the usability of a technical device). In the results-oriented approach, this is answered with individual specific data collection methods (e.g., evaluation on a school grading scale, usability test)" (Bortz et al. 2016, 997).

Results:

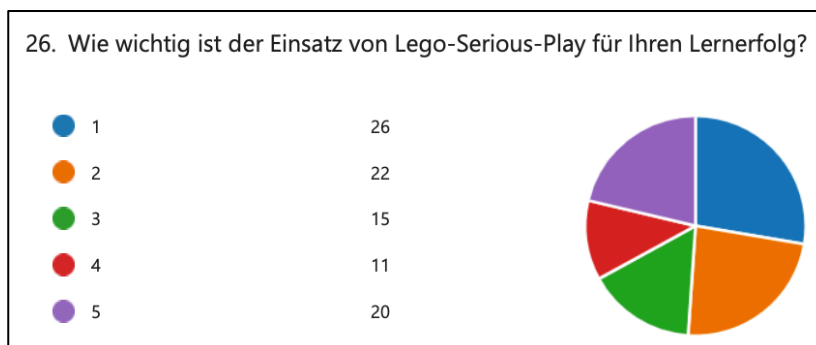


Figure 44: How important is Lego Serious Play for your learning success?

Average Value: 2,76

The importance of Lego Serious Play for learning success is rated as "good" with an average of 2.76 (see figure 44). However, it is clear that 11 participants rated the success as 4 for "sufficient" and 20 as 5. This means that 33 out of 94 participants rated the "outcome" for learning success as negative. This result has to be discussed.

One possible explanation could lie in how learning success is defined and what the participants think about it. Is it about the success achieved within a seminar week or is it about the long-term learning success, which was not asked here and could not be answered (the participants completed the survey on the last day of each seminar week).

The poor ratings could therefore be due to the fact that the participants were unable or unwilling to assess this.

Or that the method was so new to them that they did not trust its effectiveness or did not want to assess it as supporting learning.

Or simply: they do not like Lego Serious Play or consider learning through play to be "childish".

The assessment of learning success is problematic. This is because the assessment is largely subjective: "Instead, the subjective satisfaction of the students with the course and, in some cases, the subjective learning success are recorded for the summative assessment. As these subjective measures are subject to distortions, they only provide an approximation of the objective learning success. The main reason why operating with subjective measures is so popular in practice is that recording objective learning success is very time-consuming: it requires, for example, before and after measurements of knowledge, attitudes, and skills. In practical research terms, it is even more time-consuming to record later career success, which in alumni studies can at best be linked to the quality of the degree programme, but hardly to the quality of individual courses" (Döring 2005, 13).

For future research, the author recommends that the long-term learning success should be assessed via 360-degree evaluations by other researchers who analyse this survey or by mutual evaluation of the participants. This would make it possible to analyse whether the participants' own self-image matches the external image as assessed by other people. The result would be a higher grade of validity (Sedelmaier et al. 2016, 16).

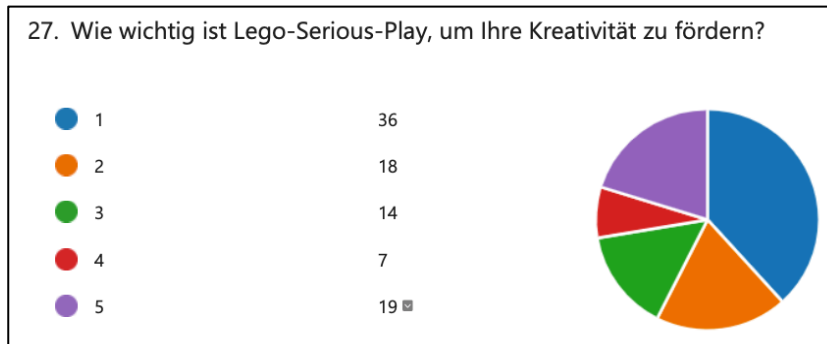


Figure 45: How important is Lego Serious Play to encourage your creativity?

Average Value: 2,52

Compared to the question about learning success, the effect of LSP on creativity is rated better (see figure 45). Nevertheless, 19 of the participants rated the effect as poor.

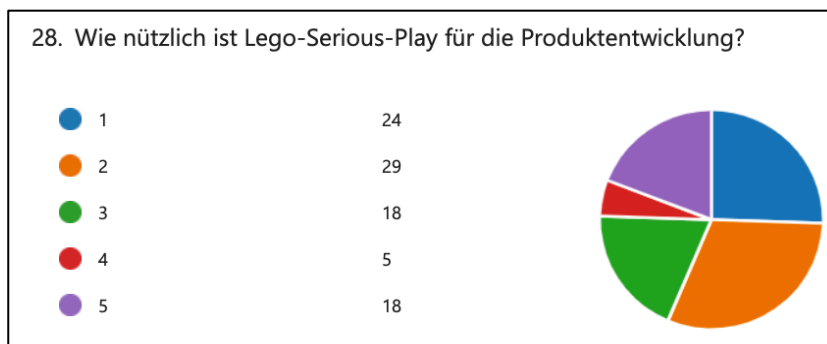


Figure 46: How useful is Lego Serious Play for product development?

Average Value: 2,62

On the other hand, LSP is rated slightly lower for the development of new products (see figure 46). One explanation could be that the participants built prototypes during the design thinking process, which in their view does not yet represent product development. Overall, however, LSP is useful for product development, even though 18 participants gave it a score of 5.

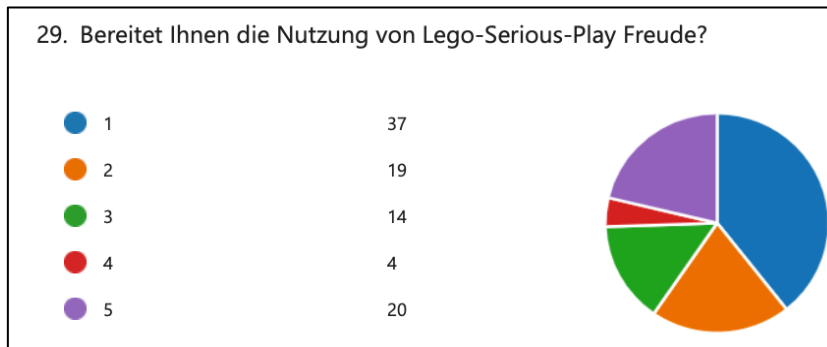


Figure 47: Do you enjoy using Lego Serious Play?

Average Value: 2,48

The question about the perceived pleasure during the use of LSP is rated best on average in the questions about LSP (see figure 47). „A successful user experience innovation makes the user feel happy, satisfied, confident, comfortable, or positively surprised, and it may even give the user a wow experience with your product. Ideally, you want your users to love your product and the experience it gives. To trigger positive feelings with the user, your design needs to be inviting, simple, and focused. Negative feelings should always be avoided, and the causes of these feelings (usually pain points) should be eliminated” (Kraft 2012, 15).

However, the outliers must also be addressed here. If 20 out of 94 participants really did not enjoy using LSP, the author of this dissertation sees no room for manoeuvre at this point. After all, if people do not feel pleasure while playing, then this must be accepted. Alternatively, other games could be tested.

This represents a need for further research.

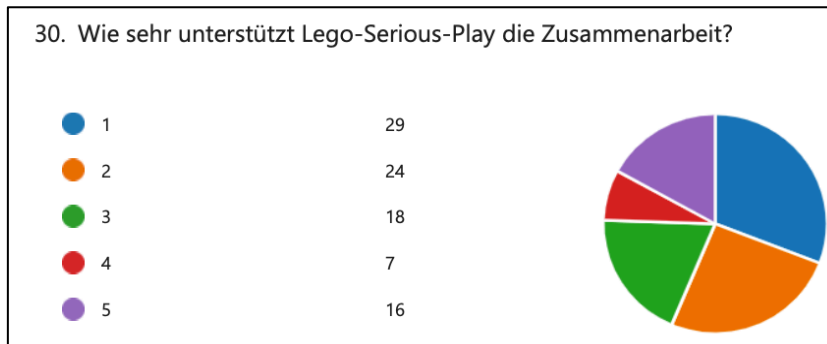


Figure 48: How much does Lego Serious Play support collaboration?

Average Value: 2,54

The evaluation of the collaboration support provided by LSP supports the criterion of interactivity as a relevant and beneficial parameter (see figure 48).

To summarise, it can be concluded that LSP appears to be useful for the majority of respondents. The average score is between 2 and 3.

The **effectiveness-oriented evaluation model** is used as a variant of the results-oriented approach, as the practical effect on the participants in the workshops or seminars is at the centre of the objective of this dissertation: "Effectiveness or efficacy refers to whether and to what extent an intervention achieves the desired objectives or effects. A distinction is made between the immediate performance or productivity of a measure (output), the effectiveness for the members of the target group (outcome) and the long-term consequences at a supra-individual level (impact)" (Bortz et al. 2016, 998).

The theoretical findings in combination with the findings from the Expert Interviews, the statements from the Group Opinion Poll and the data from the third study should clarify below whether the changes could actually be effective and efficient. This refers to the practical effectiveness that is demonstrated under real conditions in the field, in this case in the Education Innolab (Bortz et al. 2016, 998). Other external factors are dealt with in the limitations.

"However, evaluation will be particularly informative if it succeeds in recording the different - subjective - assessments of various participants and arriving at an assessment by comparing and contrasting them" (Flick 2009b, 13). This evaluation can conclude a didactic reflection process.

Application of the Pattern Run

The mean values calculated according to school grades can also be used in qualitative evaluation to discover and analyse patterns or trends in the responses. "It should also be borne in mind that in many evaluation studies it is probably only possible to detect weak effects that cannot become statistically significant due to a lack of test strength in small sample sizes.

In order to arrive at reliable findings here, it is advisable to consider, for example, the pattern consistency of the results instead of statistical significance (Bortz et al. 2016, 1027). The mean value of the survey results actually ranged between grades 2 and 3, i.e., "good" or "important" to "satisfactory" or "neither good nor bad" and could be considered statistically insignificant in this respect. The pattern run is thus the descriptive and comparative investigation of value characteristics.

The pattern of results of the post-experiment survey allows the following conclusions to be drawn: descriptively, there is significant agreement between the selection and the importance of the criteria for 35 out of 36 criteria and assessments of these criteria. The selection of criteria or change parameters and interventions in the room and in the way of teaching are "good" and "useful" - all have mean values between 2.03 and 2.76. The concrete floor is graded as an outlier with a mean value of 3.09.

The criteria surveyed are ranked according to their importance or relevance. The criterion with the best score is given first place and the criterion with the "worst" score is given last place, while the others are listed according to their rank. This makes it possible to visualise which criteria are the most and least important, at least for the subjective measure of the participants.

It should be noted that not all parameters or criteria were surveyed, which were then followed by interventions. This would have lengthened the survey too much and could have encouraged participants to complete the survey superficially.

It should also be noted at this point that the average processing time of the survey participants for each of the 36 questions was only 6 minutes anyway. This means that the participants took an average of 10 seconds per question. The mean values are shown on the right-hand side of the following lists:

Listing of the criteria according to their importance or relevance according to the mean values of the school grades awarded from 1 to 5

How important is the ergonomics of the chairs?	2.03
How important is the flexibility of the furniture?	2.17
How important are other seating options such as sofas?	2.27
How important is the flexibility of the room?	2.24
How important are plants for well-being?	2.40
How important is interactivity in the room?	2.45
How important is the use of LSP to encourage creativity?	2.52
How important is the use of LSP for learning success?	2.76

Listing of the effectiveness of the interventions surveyed according to the mean values of the school grades awarded from 1 to 5

How useful is the close-distance projector?	2,13
How useful are the laptops?	2,15
How useful is the writable whiteboard wall?	2,16
Are the acoustics of the test room comfortable for you?	2,24
How well does this space support you in socializing?	2,28
How useful are the additional speakers?	2,35
How comfortable do you feel in this space?	2,37
How do you find indirect lighting (warm colour temperature)?	2,40
How do you rate the interactivity in this room?	2,43
How do you rate the flexibility in this room?	2,43
How do you rate the flexibility in this space? (Control-Question)	2,40
How do you rate the colour concept of the test room?	2,44
Do you enjoy using Lego Serious Play?	2,48
How do you rate the room design?	2,49
How do you assess the technical equipment for learning success?	2,50
How well does this space support you in your learning success?	2,51
How do you rate the lighting design?	2,52
How much does Lego Serious Play support collaboration?	2,54
How well does this space support you in creative thinking?	2,55
How useful is magnetic plaster on the wall?	2,56
How useful is Lego Serious Play for product development?	2,62
How well does this space support in analytical thinking & innovation?	2,64
How do you find the ceiling lighting (cold colour temperature)?	2,70
How well does this space support you in critical thinking?	2,71
How useful is the document camera?	2,73

How well does this space support you in solving complex tasks?	2,74
How useful is free Wi-Fi for you?	2,76
How do you like the floor (used look)?	3,09

The evaluation allows some conclusions and assessments to be drawn:

The technical equipment and connectivity of electronic devices is very important for participants to be able to work or learn, including digitally with regard to Education 4.0, without this having been specifically queried. The question about Wi-Fi and the evaluation has already been discussed above. However, the question also serves to find out in the future how natural the target group considers the use of electronic and digital devices to be and what the tendency towards a willingness for purely digital collaboration looks like.

The data shows that laptops and WiFi are very important to important. This leads to the conclusion that the readiness for digital learning per se cannot be ruled out. It seems that the participants consider this basic equipment to be a "conditio sine qua non" or "must haves". The advantage of the close-range projector is a clear and sharp image for displaying content. The acoustic equipment is used to transport comprehensible audio and video content. These technical or technological features confirm the relevance of catering for different types of learners, as recommended by theory.

The collaboration equipment (mobile furniture, writable whiteboard wall, magnetic plaster) seems to be very useful. It offers the opportunity for interactive and flexible co-learning.

Other elements such as the plants, the variable and pleasant lighting design, the coordinated colour concept and the flexibility of the entire room support the feel-good atmosphere of the learning environment according to the theory and the statements of the expert interviews.

Based on the list, it can be recognised that LSP is enjoyable. A mean value of 2.48 was calculated. Based on the recommendations of the theory on Game Based Learning and Lego Serious Play, it can be concluded that LSP is very useful for the participants, as it conveys positive feelings that support the learning process.

Effectiveness of interventions in the Educational Infrastructure

The interventions in the educational infrastructure are effective.

As the change parameters and the criteria were developed based on the theory, the findings from the Expert Interviews and the Group Opinion Poll and were assessed as positive or useful, it can be concluded that the quantitative indicators (the survey results) largely correspond with the findings and insights from the expert interviews and the theory. Based on the results of the Group Opinion Poll, it is possible to speak of an improvement in the parameters proposed by them, without being able to be empirically proven here. To do this, the participants in the Group Opinion Poll would have to be able to experience the Innolab during comparable seminar weeks and they would then have to take part in a "before and after survey". This was not feasible due to the random sample and anonymisation. However, there is a high probability that the assessment of the participants in the Group Opinion Poll could be more positive after the changes:

Because the responses of the poll participants allowed clear conclusions to be drawn about the learning-promoting appearance of a learning environment: appealing design, a modern, pleasant infrastructure with ergonomic equipment and digital options for interactivity and collaboration can create a feel-good atmosphere that promotes learning. The desire for digital equipment and digital connectivity as "learning material" in combination with the design suggests that innovations can be created more effectively and efficiently in a future Education Innolab. These proposed interventions were carried out in the real-life experiment and were positively rated by the users of the new Innolab.

Regarding the participants in the real-life experiment and after analysing the survey, it can be concluded that the interventions are effective and useful. As the pattern shows, the interventions are rated on average as "good" or "useful". The ranking serves to distinguish which criteria or parameters are more important or more urgent than others. They could now be used in a cost-benefit analysis to initiate further changes.

Effectiveness of GBL in the form of LSP in combination with Design Thinking

The intervention is effective.

The didactic context of the training programme, in this case the newly designed seminar week with LSP in combination with OKR and Design Thinking, was examined (Reischmann 2003, 34 ff.). The participants in the study confirmed a positive and useful connection between the methods and the parameters surveyed. The majority welcomed this concept in terms of promoting creativity, co-creation, collaboration, the joy of learning and the promotion of professional expertise in terms of interdisciplinary product development and product innovation.

When it comes to the question of learning success, the result is not clear. It is true that 48 out of 94 respondents rated the use of LSP as very important to important for their learning success. However, this only represents 51% of respondents. The reasons for this can only be surmised, especially as the other parameters surveyed achieved higher scores of 1 and 2: However, the parameters creativity (57%), collaboration (56%), enjoyment of learning (60%) are success parameters for learning success according to theory. Only the term "joy" was queried. This feeling can be subsumed under emotional, social, and physical well-being. Product development (56%) can be defined as a result of learning success, as one of the aims of the seminar week was to develop a new product by the end of the seminar week.

The term "learning success" may have been chosen as too abstract in the survey, as discussed above. LSP might have seemed "childish" or not intellectually challenging to the respondents. Perhaps the respondents did not trust the construct of GBL because it was new and unfamiliar to them in the classroom. Or they do not subsume the success of product development under GBL as a learning method.

There is a need for further research into this question. Nevertheless, the use of GBL in the form of LSP can at least be assessed as useful after analysing the other, significantly more positive responses. "Evaluation gets involved because it wants/should have consequences." (Reischmann 2003, 27). This assessment can only apply to LSP as a form of GBL. Other teaching and learning games must be tested separately. This would be a further research approach.

Like in the chapter “**Part 1 of the Experiment: Changes in the Educational Infrastructure**” and given the evaluation problem of the used unipolar rating scale, the score of 3 could be considered neither good nor bad. But: if the grade “3 = satisfactory” is subsumed as “acceptable or useful” and included in the “positive evaluation” of the survey, the picture changes again significantly:

- ⇒ In response to the question "How important is Lego Serious Play for your learning success?", 63 out of 94 participants would give a positive assessment.
- ⇒ In response to the question "How important is Lego Serious Play to encourage your creativity?", 68 out of 94 participants would give a positive assessment.
- ⇒ In response to the question "How useful is Lego Serious Play for product development?", 71 out of 94 participants would give a positive assessment.
- ⇒ In response to the question "Do you enjoy using Lego Serious Play?", 70 out of 94 participants would give a positive assessment.
- ⇒ In response to the question "How much does Lego Serious Play support collaboration?", 71 out of 94 participants would give a positive assessment.

It should be noted that the long-term consequences at a supra-individual level (impact) cannot be assessed. This would require further research.

3.4.5. Conclusion of Qualitative Study Nr. 3

The author of this dissertation tends to include only the grades "1 = very good" and "2 = good" in the evaluation as a success factor in order to achieve greater validity. Nevertheless, it seems legitimate to also include the score "3 = satisfactory" in the potentially positive range of the evaluation. Especially as it was used by participants who regularly deal with this grading system in their school system and are used to it. In the next evaluation, grade 3 could be specified as a need for research. In the sense of: "If you were to give a grade of 3, would that be a positive, neutral or negative assessment for you?". Evaluation also means assessment. The evaluation can take place through subsequent discussion with regard to these results and is open-ended.

The evaluation surveyed and analysed several parameters within education (Balzer et al. 2015, 72 ff.):

- ⇒ The changes to the educational infrastructure were rated as "useful" or "good" in varying degrees of the mean values. These changes can serve as possible parameters for the development and operation of an Innolab.
- ⇒ The learning objectives and content also appear to be useful for the target group to varying degrees, and for the most part they appear to be needs-based. The methods are conducive to learning for the majority of participants, as they significantly support the acquisition and further development of professional (creativity, product development, innovation and change management, marketing, sales and project management) and social (interactive and goal-orientated cooperation) skills. LSP and Design Thinking appear to be "good" and "useful" respectively.
- ⇒ The transfer success of the training programme into professional practice cannot be evaluated, as it is a week-long seminar in a training centre and not a real work project in the professional environment. The author of this

dissertation is not (yet) able to answer whether this type of education helps to promote a climate conducive to learning in the organisation of the training centre in which the experiment took place. This would be a further research approach.

The last question of the survey consisted of an open question to the participants:

"Do you have any suggestions for improving this space?"

This concludes the survey with an open innovation approach (Chesbrough et al. 2007, 7). The application of open innovation techniques can be promising and useful for companies (Poguntke 2019, 74; Chiang et al. 2010; Reichwald et al. 2009). 45 participants out of 94 answered this question. Participants suggested further improvements in the following areas: Floor, plants, Wi-Fi, air conditioning, height-adjustable desks, ergonomic chairs and sofas. Also, different or fewer colours. The acoustics and lighting could also be improved.

Excerpts from the answers to the open question:

- ⇒ "New floor, nicer large plants, the blue on the wall clashes with the colourful cupboards (perhaps a pastel colour that goes better with the cupboards)."
- ⇒ "Put more plants in the room. And you could use several bright colours for the wall paint."
- ⇒ "Hang a creative picture above the pallet sofa to match the colour scheme."
- ⇒ "No angular tables; monotonous colours; newer laptops."
- ⇒ "Air conditioning, soundproof windows, different ceiling lighting."
- ⇒ "Better Wi-Fi and a document camera and an extra screen for the projector is a bit stupid when there's something on the white board and you have to give a presentation."

- ⇒ "Everything was great:)))!"
- ⇒ "Better speakers, more ergonomic chairs, smart TV, minimally better lighting to stay active!"
- ⇒ "You could consider letting the groups that have a course in the room paint the floor to have a nice "picture" at some point."
- ⇒ "Will the floor stay like this? ;) / better Wi-Fi very important! Otherwise, awesome!"
- ⇒ "A coffee machine, fridge, sockets, definitely better Wi-Fi!"
- ⇒ "More plants, more colours and digitalisation. Possibly more comfort in the chairs, they are very uncomfortable and inflexible."
- ⇒ "Stickers on the windows, as birds fly against them!"

Summary: 27% of participants wanted the flooring to be changed, with this wish coming in first place. In second place (22%) was the desire for better Wi-Fi. In third place (18%) was the desire for ergonomic and flexible furniture. The other suggestions were individual requests from the participants. These suggestions for improvement and their possible feasibility were included in the further planning of the changes. However, they will be subjected to a cost-benefit analysis (Döring 2005, 16).

3.4.6. Limitations

Evaluation errors can occur in innovation processes in scientific work. Research distinguishes between different heuristics:

The availability heuristic was observed as far as possible in this study by collecting, analysing and questioning the information base used for the innovation process.

The representation heuristic was observed, the theoretical sampling is close to 100. It should be mentioned that the target group of the study survey consists of prospective businesspeople. The sample was not randomised. Other socio-demographic target groups are not part of the study. This represents a limitation.

The confirmation heuristic was observed as far as possible by supplementing the author's opinions with expert statements and theory and validating them through the Group Opinion Poll and the third study. As a limitation, it must be noted that around 70% of the respective seminar weeks were conducted by the author of this dissertation himself as a lecturer. 30 % of the teaching was carried out by his fellow lecturers. It should therefore also be investigated whether the results would be similar if other instructors, lecturers, trainers, or teachers were to implement this concept in this form.

The search for additional data outside of the individual case, such as objective data, information from third parties, meta-analyses, or comparative studies, on the other hand, can ensure the validity of individual cases (Mayring, 2016. 143). The author has endeavoured to make this possible through the study design.

The author of this dissertation also tried to avoid possible bias in the assessments, but cannot rule out bias (Hauschildt et al. 2023, 329 f.). This represents a limitation.

Lego Serious Play

As already discussed above, it is noticeable in the responses about LSP that 16 to 20 out of 94 participants are not satisfied with the use of LSP or that they have little use for it. Overall, between 17% and 21% of respondents gave the worst score of 5 to the five questions relating to LSP. "In order to generalise a correlation to a population, it is necessary that the sample under investigation was actually drawn at random and does not represent an intentional or unintentional systematic selection. For example, extreme group selection can lead to a dramatic overestimation of correlations" (Bortz et al. 2016, 682). The sample was not drawn at random.

The author of this dissertation cannot subsequently "enquire" with these participants where this assessment comes from, what the reasons are and how the use of LSP could be improved. The survey was anonymous.

It could be related to the fact that these are types of learners who are not haptically orientated. However, they could also be learners who do not like games or are unable to make the transfer from the game to the scientific or practical content or vice versa and therefore do not benefit from playing. Or it could be due to LSP as a game method. Or LSP was used too often or too long or too short during the seminar week. Perhaps the participants would prefer other games. Or there were barriers to creativity:

"These are group-internal or external blockages that inhibit creative thinking and problem-solving processes or lead to innovative ideas either not being accepted by the group or not being implemented (...). Most barriers to creativity result from learning processes. They are caused by the family background, group affiliations, influences of society, the education system or the culture of the individual (...)" (Hubounig et al. 2013, 94).

Other "sources of error" could be time pressure on the part of the participants during the survey. Or a superficial "clicking through" of the questions and answers. In extreme cases, the participants could have mistakenly given a score of 5 for "very good" and a score of 1 for "poor".

The "not invented here syndrome" is also possible, as the participants did not choose or invent the game themselves, they had to play it (Moring et al. 2018, 33; Sehested et al. 2011, 178; Doppler et al. 2014a, 105 ff.).

Finally, the rejection could also have been due to the fact that the participants' habits were disrupted, and this appeared unpleasant to them (Wood et al. 2002). For future research, it is advisable to carry out data cleaning if the study is to be analysed quantitatively (Ziegler et al. 2021, 5 ff.).

As part of a Grounded Theory, the author of this dissertation and his fellow lecturers tried to take feedback from the participants into account during the seminar week. People were therefore asked regularly, almost daily, whether LSP was useful and whether its use should be extended or shortened. Or if someone doesn't want to learn with LSP at all. In this regard, none of the participants gave feedback that he or she did not want to learn with LSP.

Further reasons for the rejection can only be of a speculative nature and will not be discussed in more detail at this point.

Due to the closed questions directly after the respective seminar week, the design of the study did not allow any possibility of evaluation in this regard. The anonymisation did not allow us to follow up with those participants who refused. Questioning and analysing these results could represent a need for further research.

Qualitative Experiment: Individual Case

This was a qualitative experiment, i.e., an individual case. The comments on the infrastructure, changes and effects relate to existing seminar rooms in a specific training centre. They can therefore only be generalised in part, as each educational organisation has its own specific circumstances, traditions and corporate cultures and works differently.

On the other hand, according to the research, it makes sense to involve real users more in the brainstorming process for new products or services, including with the help of an experiment, as was done here (Schirr 2012, 484 f.).

Further research could be needed to make the changes in other training centres in a similar or identical way and to analyse and compare the effects. This could make the experiment replicable.

Specific specialised teaching and specific target group

This limitation also applies to the second part of the experiment conducted here, namely the change in the way of teaching and its effects. They were carried out as part of a new seminar week for marketing, sales and project management, i.e. for lessons in a specific subject. It should be investigated whether this concept would also be suitable for other subjects and for other target groups. Trainee office management assistants took part in this experiment. They have different school-leaving qualifications with different levels of education, motivations, and experience, but have not (yet) studied at a university. This could represent a need for further research. The experiment was unable to measure other subjects or other target groups.

Duration of the lessons

A further limitation is that the experiment only took place within one week of lessons. The dramaturgy of the teaching method ends after five days of full-time teaching. This means that the experiment cannot measure whether the teaching method is just as promising for learning success over a longer period of time, such as a semester at a university. Or over a shorter period of time.

Data Collection

It should be noted that the experiment consists of two parts that can influence each other. Firstly, the educational infrastructure was changed in the direction of the Education Innolab. This represents the first intervention. Next, a new weekly seminar concept was designed according to Education 4.0 principles and then carried out 12 times. The participants in these seminar weeks thus experienced two

innovations at the same time, which affect all dimensions of an innovation. They were all familiar with the seminar room and the way of teaching before the interventions.

As described above the following innovation dimensions can be distinguished (Hauschildt et al. 2011, 4):

1) In terms of content:	What is new?
2) Processual:	Where does the innovation begin, where does it end?
3) Subjective:	New for whom?
4) Intensity:	How new?
5) Normative:	Is new also successful?

For the participants, both interventions can be subsumed as innovation in all dimensions. The learning space and the way of teaching are new. From a process perspective, many of the teaching methods are new. The interventions are new for the target group, who previously attended classes in the old seminar rooms. The intensity of the innovations has changed, but it is not disruptive, but evolutionary in nature. The innovations appear to be successful. To summarise, the interventions represent significant innovations as defined in the literature and research. These dimensions of innovation and the combined use of these innovations may have influenced the participants and their evaluations.

Therefore, the mutual influence of the innovations represents a limitation. It could be possible that the pure intervention in the educational infrastructure could be evaluated differently without a new seminar concept. Or that the implementation of the new seminar concept in conventional old seminar rooms could show different results in the evaluation. This represents a further need for research.

IV – OVERALL DISCUSSION

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"The implementation of an innovation is a sequence of decisions not to discontinue" (Hauschildt et al. 2023, 339).

In order to evaluate the success and benefits of innovation, Hauschildt et al. propose the linking of multidimensional measurement values and the concept of in-process innovation evaluation. Partial innovation achievements should be considered before moving on to the next milestone in the innovation process. There are many possible measurement subjects and evaluation bodies: technology experts, scientists, market researchers and marketing managers who survey customers and analyse the benefits, experts from production and logistics, controllers and industry experts (Hauschildt et al. 2023, 340 f.).

In this dissertation, after several partial innovation achievements in the real-life experiment, the 3rd qualitative study was conducted to evaluate the success and benefits of the innovations. Above all, the customers, i.e., the real participants in the lessons, were interviewed to analyse and evaluate the benefits and pave the way for further development. "To innovate properly, you have to focus strictly and uncompromisingly on the market. The only correct definition of innovation is success in the market. Only this starting point and this definition open up the opportunity to find the right strategies. Only when something new starts to have an impact on the market can you allow yourself and your employees to talk about innovation. From there, everything must be seen, planned and assessed" (Malik 2013, 262).

In this overall discussion, the propositions developed through the theory, the analysis of the Expert Interviews and the Group Opinion Poll are first compared with the findings of the evaluation from the real-life experiment and iteratively refined. The status of the iteratively developed propositions **AFTER** the Group Opinion Poll is shown below in *italics*. The further developed additions from the analysis of the survey results of the 3rd study are presented in normal font for better comprehensibility:

Proposition 1:

Strategic Support and Tactical Innovation Management are necessary.

Furnishings, equipment, maintenance, resource allocation and activities must be decided strategically and provided on a long-term basis.

Derivations from Qualitative Evaluation after the Real-Life Experiment:

The results of the 3rd study confirm this proposition. The author points out that large financial resources are not the main deciding factor for the benefits. Ergonomic chairs and tables and technical equipment are certainly a cost factor, but additional seating that can be purchased relatively cheaply, such as upholstered furniture and sofas or colour, need not be expensive. Beneficial changes can be implemented cost-effectively. The application of innovation management requires competences, i.e., the ability, as well as the willingness and permission.

Proposition 2:

Values and Failure Culture must be clear.

Derivations from Qualitative Evaluation after the Real-Life Experiment:

The results of the 3rd study can only provide indirect information on this proposition. The values and a culture of error were not asked directly in the survey, but they did influence the questions. GBL consists of trial and error. Mistakes can and should be made in order to learn and further develop the products. GBL is not possible without mistakes. Collaborative work, flexibility, variety, cognitive and emotional empathy, and interactivity are promoted as values.

Openness, fairness, integrity, and human "eye level" between lecturers and participants have an influence on learning success. According to the 3rd study, this can only be empirically confirmed indirectly. At least the relevance of the values of

flexibility, interactivity, enjoyment, and social interaction can be confirmed. They are important to the participants and could be verified by the experiment.

Proposition 3:

Infrastructure and design are relevant.

The equipment and design of an Innolab are the main deciding factors for success. The main parameters are permanent material, financial and appropriate technical equipment, as well as flexibility, mobility, interactivity, and a feel-good or well-being atmosphere for heterogeneous groups that is as targeted as possible and can promote creativity, collaboration, and interactivity.

Derivations from Qualitative Evaluation after the Real-Life Experiment:

As Proposition 2 shows, the propositions overlap. An error culture is based on adequate social interaction, joy, exchange, and cooperation. The results of the 3rd study confirm this proposition.

On average, the participants in the survey confirmed the criteria as "important" or "useful". And they confirm the changes in favour of these criteria through the interventions in the space and in the way of teaching as "good" and therefore useful.

Proposition 4:

Design Thinking, Game Based Learning and other methods are relevant and useful.

Derivations from Qualitative Evaluation after the Real-Life Experiment:

The results of the 3rd study confirm this proposition. The participants in the survey confirmed the criteria as "important" on average. And they confirm the changes in favour of these criteria through the interventions in the way of teaching, in the dramaturgy of the seminar week and the use of LSP on average as "good" and therefore useful.

The use of as many teaching methods as possible is useful. This is not about the use and evaluation of individual methods, but about the variety and the target group-appropriate and situation-related use of the methods.

Proposition 5:

Key Success Factors

Strategic commitment, strategic alignment, long-term provision of resources, adequate design for a feel-good atmosphere, beneficial infrastructure, modern and contemporary way of operating according to scientific aspects, application of target group-flexible and situation-related methods.

Derivations from Qualitative Survey AFTER the Real-Life Experiment:

The fifth proposition condenses the first four propositions into key success factors. "The higher the priority and performance fulfilment was rated by the respondents, the greater the success" (Ortmanns et al. 2023, 119). The results of the 3rd study confirm these summarisations and thus this proposition.

- ⇒ They can be supplemented by the relevance of the technical and technological equipment and the provision of functional connectivity between the devices.
- ⇒ Collaboration and visualisation tools such as writable whiteboard walls or magnetic plaster also support learning success.
- ⇒ GBL using LSP with a design thinking process and the use of Lego to build prototypes can be recommended as a possible key success factor. There is a likelihood that both GBL and Design Thinking are useful when applied separately. In the experiment, both were used in combination.

These success factors support the development of the infrastructure and the way of teaching towards Education 4.0 and interdisciplinary project work (Dirsch-Weigand et al. 2018, 17 ff.).

As a starting point for the final answers to the leading research questions of this dissertation, the iteratively developed answers to the research questions are first summarised to the status **BEFORE** the real-life experiment. These answers are then further refined and presented with the findings and analyses **AFTER** the experiment and the third study (survey). Finally, they are combined with the iteratively developed propositions and summarised.

Status of the answers to the leading research questions BEFORE the experiment:

Based on the group opinion poll, it can be concluded that the existing spaces are not or hardly conducive to innovation. The theoretical foundations and the experts' recommendations are actually relevant for real users of such spaces. Conclusions were drawn from the general to the specific. The leading research questions can be answered even more decisively by the answers to the group opinion poll.

Research Question 1:

The performance of Innolabs. How do they manage to improve their ability to innovate? Which success factors can be measured?

The seminar room, analyzed in the poll, is not an Innolab, but the preliminary stage to an Education Innolab. Therefore, the answers cannot be used directly to answer the research question in full. However, in addition to the basic theory and the expert interview data, they show a high correlation with the parameters Equipment, adequate design for a feel-good atmosphere, beneficial infrastructure, modern and contemporary way of operating according to scientific aspects, application of target group-flexible and situation-related methods.

However, the parameters strategic commitment, strategic alignment, long-term provision of resources can be inferred indirectly from the answers. If changes actually take place, then these parameters must be taken into account. Without commitment, strategic alignment and provision of resources, change cannot take place.

Research Question 2:

What should a learning environment (spaces) look like to optimize learning success? What is the relationship between the design of the learning environment and the selection of learning materials and the ability to create innovations?

The responses of the poll participants allow clear conclusions to be drawn about the learning-promoting appearance of a learning environment: appealing design, a modern, pleasant infrastructure with ergonomic equipment and digital options for interactivity and collaboration can create a feel-good atmosphere that promotes learning. The desire for digital equipment and digital connectivity as "learning material" in combination with the design suggests that innovations can be created more effectively and efficiently in a future Education Innolab. This question will be finally answered after the real-life experiment in the next chapters of this dissertation.

Research Question 3:

What is the relationship between innovation techniques (activities), e.g., agile techniques such as creativity methods or design thinking and game-based learning via Lego Serious Play, and the ability to create innovations? Which success factors can be measured?

This question has already been answered by theory. The experts' data also indicate that the clever, flexible and target group-oriented selection and application of these methods can promote the creation of innovations. So far, these methods have not been used in the classroom. The statements of the opinion poll participants allow only an indirect conclusion that these methods can be useful. They would like to see a change in teaching. Teaching could be changed by using these methods. It should be emphasized at this point, that it was a real classroom that was surveyed. Innovation could therefore be compared with learning success. However, the seminar room can be defined as a preliminary stage of an Education Innolab.

V – CONCLUSION

V - CONCLUSION

The leading research questions will now finally be answered, after the operation of the new Education Innolab discussed in the chapter before and the 3rd Qualitative Study on the Real-Life Experiment. In this experiment, some techniques such as GBL, LSP and Design Thinking are used in the real operation of the Education Innolab and then evaluated in the final study.

5.1. FINAL ANSWERS TO THE LEADING RESEARCH QUESTIONS

Final Answer to Research Question # 1:

“The performance of Innolabs. How do they manage to improve their ability to innovate? Which success factors can be measured?”

Several success factors were discovered, analysed, refined, tested, measured and evaluated in this dissertation. The seminar room, analyzed in the group opinion poll, was not an Innolab.

In addition to the basic theory and the expert interview data, the data show a high correlation with the parameters (technical) Equipment, adequate design for a feel-good atmosphere, beneficial infrastructure, modern and contemporary way of operating according to scientific aspects, application of target group-flexible and situation-related methods. The parameters strategic commitment, strategic alignment, long-term provision of resources can be inferred indirectly from the answers. These parameters were considered to change one seminar room into an Education Innolab. Without commitment, strategic alignment and provision of resources, change cannot take place.

The evaluation of the survey results of the 3rd study after the real-life experiment shows that, in addition to the basic resources such as rooms, personnel, organisation, time and sufficient financial resources, there are some possible

success factors for an Innolab. It should be noted that the data from this study cannot be used to draw statistical conclusions about the population as a whole, as they are of an exploratory and qualitative nature and relate to an individual case.

Provided that the planned Innolab has been adapted to the objectives, target groups and strategic environment of the implementing organisation or company, the following **success factors** can be named. These could improve the ability to innovate:

1. The establishment of an Innolab using the success factors as part of the corporate strategy and innovative corporate culture with long-term provision of resources and commitment from shareholders and stakeholders as a basic prerequisite. Without wanting, being able and being allowed, the development of innovations seems to be fraught with complicated obstacles. Motivated colleagues who are intrinsically motivated to support these innovations and act as change agents within the organisation to overcome resistance.
2. Adequate technical and technological equipment
3. Digital connectivity
4. Adequate design with colour concepts and plants for well-being
5. Ergonomic, mobile and flexible furniture
6. Collaboration tools: analogue and/or digital
7. Flexible, interactive, target group-orientated and varied approach through a diverse selection of methods and appropriate application. Not every method suits every person.

-
8. Continuous skills development of the staff carrying out the programme through training and further education
 9. The application of research on emotional intelligence
 10. The application of research on innovation management, change management and change communication
 11. The application of research on Education 4.0
 12. Approach according to agile project management methods, trial and error including the establishment of an error culture
 13. Subjective experiences of the author: The author used a Maturity Grid Model of the Education Innovation Lab and agile project management methods for the planning, conceptualisation, as-is analysis, construction and operation of the Innolab. This approach was extremely useful for the implementation and can be recommended for practical use.

Final Answer to Research Question # 2:

“What should a learning environment (spaces) look like in order to optimise learning success? What is the relationship between the design of the learning environment and the selection of learning materials and the ability to create innovations?”

Research Question # 2 asks more specifically than Research Question # 1 about the effect of the educational infrastructure and the selection and use of learning materials. As a result of the studies, it can be stated that the user-centred, target group-specific and aesthetically appealing design of the learning environment is very useful for the success of (learning) innovation.

The equipment should provide as many benefits as possible and necessary on a functional, social, emotional and life-changing level (Almquist et al. 2016). From a business perspective, they should have a cost-benefit ratio (Döring 2005, 16). The learning environment should offer a feel-good atmosphere.

The electronic devices, technologies and collaboration tools used should be intuitive and easy to use and ideally self-explanatory. Technical support must be organised to be able to provide quick and competent support in the event of problems.

Towards Education 4.0, it is relevant to consider and promote digital networking. "Connectivity supports collaboration, and the space should not be limited only to its physical perimeter" (Delgado et al. 2020, 135). Seamless and efficient access to the internet and social media and the wireless connection of electronic devices used are essential.

As an emotional dimension, it can be seen as a success factor that participants should enjoy working and learning in an Innolab "creatively". After all, innovation cannot be commanded. The feel-good atmosphere is a success factor.

Flexibility, interactivity, opportunities for collaboration or individual work through mobility and additional work and seating options can be success factors (Classen et al. 2024, 30 ff.). The success factors identified by the evaluation confirm the findings from theory, Expert Interviews, and the Group Opinion Poll.

Final Answer to Research Question # 3:

“What is the relationship between innovation techniques (activities), e.g., agile techniques such as creativity methods or design thinking and game-based learning via Lego Serious Play, and the ability to create innovations? Which success factors can be measured?”

The varied, diverse and target group-orientated selection and flexible, needs-based use of teaching and learning resources are closely linked to (learning) innovation success and the ability to create innovations. The probability of success increases. GBL in the form of LSP combined with design thinking increases the probability of successfully creating innovations. Other methods were not specifically analysed empirically, but the indirect positive influence of design thinking could be proven by argument. The techniques and methods used in the new seminar weeks are positively related to the ability to create innovations. They increase the probability of innovation and are success factors.

1. The use of GBL by means of LSP can be confirmed as a potential success factor for innovation management in education. Other types of games were not used and not evaluated. This opens up further research opportunities.
2. The use of Design Thinking as a process combined with OKR and clear objectives can be confirmed as a potential success factor for innovation management.
3. Other techniques and methods were used alternately, planned or spontaneously, extended or shortened, more intensively or more superficially during the seminar weeks. The statement "The more methods, the better" seems to be confirmed, as they were used as part of the Design Thinking and GBL process, which was rated positively by the majority. None of the individual innovation or learning methods used were actively rejected by the participants or rejected on request during the seminar weeks. It should be mentioned, however, that this is not empirically proven in this dissertation. However, the flexible, target group-orientated, varied and situation-related use of innovation techniques and methods can be confirmed as a potential success factor for innovation management.

5.2. RECOMMENDATIONS FOR PRACTICAL ACTION

The study results show probable, potential and practical success factors for the design, construction and operation of an Innolab in the form of an Education Innolab. The example of the real-life experiment shows the direct positive effects of the interventions.

In this case, one of the results is that the remodelled seminar room was not only used once for test purposes during the experiment but was permanently converted into an Education Innovation Laboratory. However, it is also used as a normal seminar room in conventional teaching operations to utilise the resources efficiently and the innovations developed. In future, the equipment and purpose of the Education Innolab will be used to create, test, and refine further innovations in the education sector.

The interventions in the teaching methods (GBL and Design Thinking, combined with other teaching and innovation methods) and the positive evaluation by the study participants ensure that the findings will be applied to the same seminar weeks in the future, but also to other subjects and target groups. And further educational innovations will also be created, tested, refined and, if successful, applied.

1. Based on the pattern evaluation in the 3rd study and from a resource allocation perspective, it is advisable for the shareholders and stakeholders to develop an innovation strategy, a tactical Eisenhower matrix and agile project management for the specific situation, the organisation and its strategy, the objectives of the Innolab and for the target group.

This allows the importance and urgency of individual criteria, infrastructure components and methods to be analysed, priorities to be set and innovation management to be designed effectively and efficiently (Steiger et al. 2013, 157 ff.). Maturity models can visualise, categorise and communicate progress transparently (Winter et al. 2016, 170 ff.).

2. These measures should be combined with a cost-benefit analysis in comparison with the controlling of the organisation (Döring 2005, 16). Since the experiment is also about teaching and learning innovations and their evaluations, it is recommended to optimise teaching evaluation at the micro level, to add teaching evaluation at the macro level and to conduct meta-evaluation (Döring 2005, 20). The evaluations can serve as a basis for argumentation to convince shareholders and stakeholders.

3. "Tell me, and I will forget; show me, and I may remember; involve me, and I will understand" (Kotler et al. 2010, 102).

Successful innovation management will be difficult to achieve without the principles, findings, and application of change management (Kotter 2011, 18 ff.) and change communication (Deutinger 2013, 99 ff.). It is recommended to combine innovation management and change management. For practitioners with different goals, smaller or larger opportunities than those of the author in the real-life experiment, the implementation of a change process is also recommended to achieve smaller steps and quick successes or to find and test disruptive innovations.

The real-life experiment conducted here included two innovations that were significant for the author's organisation: changing the educational infrastructure in a seminar room used in real life into an Education Innovation Lab and changing the way teaching is done in the direction of Education 4.0.

4. "If you want to innovate successfully, you should realise what you are asking of those affected" (Hauschildt et al. 2011, 114).

The results of the evaluation show that "you can't please everyone all the time". Not every criterion asked about is equally important to all survey participants and not every intervention in the "objects" and not every change to the structure is rated as "very good" or "good" or "very useful". One example of this is the comparatively high level of rejection of Lego Serious Play.

Innovation management always involves changes and new dimensions that should have as positive an impact as possible on people and their environment.

However, innovations can also generate resistance that scares people or vice versa. Resistance has different causes. In an entrepreneurial context, they are fuelled by the barriers of "not knowing" and "not wanting". This can have ideological, factual, power-political or personal reasons (Meschkat 2012, 88 f.; Hauschildt et al. 2011, 100 f.).

"Resistance can always be said to exist when planned decisions or measures that appear to be sensible, logical or even urgently necessary, even after careful consideration, are met with diffuse rejection by individuals, individual groups or the entire workforce for reasons that are not initially apparent, generate concerns that are not immediately comprehensible or are undermined by passive behaviour" (Doppler et al. 2014 a, 293).

Innovation and change managers should be able to recognise and analyse resistance, accept it, and have the emotional intelligence to recognise other people's feelings and deal with them appropriately. This is because "only through a shared awareness of the problem and by conveying the meaning of change can old mental blocks be broken down and new energy for change be mobilised" (Frey et al. 2006, 53).

Innovation and change managers should be open to suggestions, even if they seem crazy or unusual. Even if they do not fit into the innovation and change manager's Eisenhower matrix. This openness and flexibility change the values and corporate culture in the direction of open innovation and a culture of error.

"Corporate values are the standards that employees use when they have to prioritise their decisions. They are evaluation criteria that, for example, make an alternative attractive or unattractive, a customer more or less important and a new product idea exciting or uninteresting" (Christensen et al. 2011, 186). On the other hand, innovations should always be subject to a cost-benefit ratio and fit in with the strategic objectives of the implementing organisation, the target groups and the markets.

5. If you want to innovate, you should also realise what you are asking of yourself.

This is a subjective opinion of the author of this dissertation. Initiating changes such as innovations, conceptualizing them, and obtaining the commitment and resources to carry them out can be strenuous, tiring or frustrating. But it can also be very satisfying if it succeeds. It's about wanting, being allowed or having to. The author recommends that further research is needed here.

VI – LIMITATIONS AND FUTURE WORK

VI - LIMITATIONS AND FUTURE WORK

6.1. LIMITATIONS OF THE RESEARCH

- ⇒ The research design of this dissertation is explorative and qualitative in nature.
- ⇒ Four expert interviews were conducted.
- ⇒ The participants in the Group Opinion Poll were not the same participants as in the survey after the Real-Life Experiment.
- ⇒ The Real-Life Experiment and its Evaluation is an individual case in one specific educational centre.
- ⇒ The sample was not randomised.
- ⇒ The author of this dissertation was the main lecturer during the Experiment.

What did the study measure?

The study measured success factors for the design, equipment and operation of an Education Innovation Lab in order to improve innovation capabilities. What could not be measured was evaluated.

What did the study not measure?

The study did not measure or evaluate the success factors for a "pure" innovation lab, but for the special case of an educational innovation lab.

The two parts of the experiment were carried out in combination, not individually. The study did not measure or evaluate only the change in the educational infrastructure or only the change in the way of teaching.

The study measured and evaluated the benefits of Lego Serious Play in combination with Design Thinking as methods, not other game-based learning methods.

The sample of the third study was taken from a specific target group who were required by law to attend classes in a specific combination of subjects; other target groups were not surveyed.

How was measured? Selection of methods:

A qualitative research design was chosen, as the investigation of subjective patterns of interpretation, views and theories took place at individual case level. This dissertation follows an explorative nature, as the objects (educational infrastructure; way of teaching) and their changes should be understood and interpreted through the experiment.

What the study could not measure:

The results relate to the evaluation of the data at the time of the survey. They cannot measure whether the participants in the lessons have internalised and can apply the learning content in the medium to long term. "Nor can examination results measure deep learning and life- long learning, which must now be accepted as ultimate learning goals" (Lechner 2001, 2). The long-term success of innovation could not be measured or evaluated.

The studies cannot measure or explain why the participants subjectively assessed the individual parameters of the changes in this way. The 3rd study involved closed questions. Questioning and analysing the reasons for the individual parameters could represent a need for further research.

What the study was not supposed to measure:

The study was not intended to measure or evaluate the usefulness of other individual innovation and teaching methods, but only GBL using LSP in combination with Design Thinking and several other methods.

Towards Education 4.0

The tests in this Innolab are carried out carefully and step-by-step, with the involvement of real users to provide scientific insights and practical effects. From an internal company perspective, this experiment and the study results mean that the author has received approval to make further planning, investments and accelerate transformations towards Education 3.0 and 4.0.

The study results and the analysed benefits for the participants supported the arguments for the management in the negotiation situations. This approach to steadily convincing stakeholders and shareholders can also be seen as a practical recommendation for action.

A concept for a fully digitalized learning space to test was already created by the author after the evaluation, towards a “flipped classroom” (Cheng et al. 2018) - to gradually achieve Education 4.0 step by step and in an iterative process.

6.2. FUTURE WORK

1. Qualitative and Quantitative Study Design:

The third study was not evaluated quantitatively due to the exploratory design of the experiment, the limitations of an experiment due to the difficult to generalise and non-random sample, and the lack of a control group in this study. Only the descriptive statistics with the analysis of the arithmetic mean values and the pattern consistency were carried out.

This would be possible and appropriate as further research. The value in the population could then be inferred by determining the confidence interval and further statistical tests and analyses (Ortmanns et al. 2023, 41 ff.).

In the author's view, a quantitative data analysis for exploratory studies, a descriptive-statistical and exploratory data analysis or an inferential-statistical review of research questions would be conceivable (Bortz et al. 2016, 621 ff.). Because: "Of course, it also makes sense to compare qualitative and quantitative analyses" (Mayring 2016, 148).

2. Design-Based-Research and effects of the Experiment within the organisation:

„Successful user experience innovation happens when the users feel that the innovation gives true value and is relevant for them. Hence, it comes back to the needs of the user. If the user feels that the innovation is relevant, cool, or amazing, then you may have created a successful user experience innovation“ (Kraft 2012, 13).

The research design in this dissertation can be subsumed as a preliminary stage or part of design-based research (DBR). The qualitative experiment described in this thesis will be continued as DBR in the future. The procedure is similar to the design thinking approach as described above.

DBR assumes discrepancies in educational practice: There is a problem or a goal. Interventions are intended to help overcome these discrepancies. The concept of intervention can be an educational programme, a curriculum, a teaching format, a teaching or learning method or a technical tool for learning. The design of the intervention is the design. DBR follows iterative cycles. Several activities or methods are repeated, reviewed, tested, modified and retested, and so on, until the intervention can no longer add value. Continuous improvement (kaizen) and process orientation could be used as further development methods to further increase customer benefit (Von der Gathen 2014, 154 ff.).

Possible changes: the way of teaching is changed and trialled, new curricula are constructed, or the educational infrastructure is changed and evaluated. Promising changes are then developed further, while those evaluated as less useful are not developed further. The result is recommendations, theories or teaching design principles.

DBR is based on an examination of theory: theory can justify design, provide blueprints for interventions and serves as a reference for evaluations. DBR includes empiricism: before the design, the initial situation is analysed (what is the problem?) and during the design, the trials are examined (does the solution work?). Empirical methods are selected and combined for this purpose. The design of an intervention aims to achieve practical educational benefits and theoretical findings (Reinmann 2022, 2 ff.).

The qualitative experiment in this dissertation was partly iterative. It can be seen as the start of several iterative cycles. The interventions in the objects "way of teaching" and "educational infrastructure" were each designed and carried out once as a sample for the experiment: the Education Innovation Lab was brought to a higher level of maturity with the most important parameters resulting from the theory, the qualitative Expert Interviews and the Group Opinion Poll. These were combined with the requirements in this specific and real educational centre for the target groups. The new seminar concept was developed and elaborated once and then applied, further developed and tested several times. Both interventions significantly and positively changed the "subject matter".

It is true that 124 participants went through the one-week seminars and the seminars were held 12 times in this form. However, the room remained almost the same during this time and the seminar implementation also remained largely the same. It is therefore not yet possible to speak of a DBR.

Nevertheless, further iterative changes were introduced following the completion of the study and the analyses. New cycles were started. And this is also the declared aim of the author of this dissertation.

The Education Innovation Lab must never be "finished". It should be open to further changes, be they of a technological or educational-theoretical nature. They should be implemented and tested to gain useful insights. This approach has already borne fruit through the experiment and the evaluation.

The findings have been communicated within the training centre and other trainers have been convinced by individual useful changes and have also implemented them (see figures 49 and 50 below):

- ⇒ Another IT classroom has also been given a graduated colour scheme (yellow colour spectrum) to make the room friendlier and at least improve the participants' sense of well-being.
- ⇒ The benefits of the writable whiteboard walls were recognised and two walls in this seminar room were also fitted with this technology.
- ⇒ Training supervisors in the hairdressing trade have recognised the benefits of digital teaching materials and have started to digitise their teaching materials using Power Point. They have also had some walls painted in different colours (pink and peach).
- ⇒ One of the vocational training experts has recognised the benefits of Lego Serious Play and has used the Game-Based Learning method at information events in public schools to encourage pupils' creativity and to present and post various vocational training courses.

- ⇒ The painting and design instructors are now independently proposing further changes. For example, they have discovered a writable chalk paint to write directly on a wall with chalk. This prevents wear and tear on the whiteboard walls, as they have to be repainted at regular intervals. Despite cleaning, the pens leave colour residue on the walls. This will be tested.

The tests in the Innolab were carried out carefully and step-by-step, with the involvement of the learners to provide scientific insights and practical effects. From an internal company perspective, this experiment and the study results mean that the author has received approval to make further investments and accelerate transformations towards Education 3.0 and 4.0:

- ⇒ A concept for a fully digitalized learning space to test was already created by the author. The upholstered furniture, that was perceived as useful, was already replaced by new lounge sofas in a colourful American Diner style to facilitate group work and recreation (see pictures below). This corresponds to a higher level in terms of the maturity level of mobile and additional seating.
- ⇒ Another wall in the Education Innovation Lab has already been painted with whiteboard paint.
- ⇒ Rollable 5-corner tables in different colours for each learner have been purchased to improve flexibility and interactivity. This also corresponds to a higher level in terms of maturity and starts a new design cycle.
- ⇒ The installation of a new floor, improved Wi-Fi, and air conditioning is currently being calculated. That means, that a new iterative cycle due to these parameters has been started.
- ⇒ After communicating the results of this study, the author of this dissertation received approval from management to participate in a public tender to receive funding from the German Federal Ministry of Education and Research. This

funding could be used to convert and equip three additional seminar rooms in different analog, hybrid, and digital maturity levels. The study results serve as the justification for the official funding application. A main part of the funding applied for, is the design and teaching transformation and the technical equipment towards “Co-Creation” (Michalik et al. 2022, 77 ff.) and a “flipped classroom” (Cheng et al. 2018) - to gradually achieve Education 4.0.

- ⇒ These technical and educational developments will be utilized in the next stage of development for digital educational infrastructure based on maturity levels, which will require additional iterative testing and research. In terms of DBR, the real-life Experiment and the following study were the start of several iterative cycles.
- ⇒ A feasibility study for the expansion to further seminar rooms in this education centre should help to assess the opportunities and risks and then initiate further changes (Schaufeld 2015, 62 ff.).

3. Game Based Learning:

GBL was used and evaluated during the Experiment in the newly designed seminar week in marketing, sales and project management. It seems possible to use it in other theoretical subjects, in different training centres, with different demographic target groups, with different intensities and durations. This could be planned and implemented and could therefore represent a need for further research.

There could also be a need for research into applying, testing and evaluating this method in practical training programmes such as electrical engineering, mechatronics, carpentry, painting, hairdressing, dental technology, heating and air conditioning technology and others. Based on the theory and the analyses in this dissertation, the practical benefits appear to be potentially positive (Plass et al. 2019, 57 ff.), and even digital GBL promotes benefits for learners (Anastasiadis et al. 2018, 141 f.). Regarding Education 4.0 research, this method could also be applied purely digitally without the participants being present in person. This could also represent a need for further research.

This thesis therefore offers not only practical relevance, but also approaches for further research. Learning to play and playing to learn.

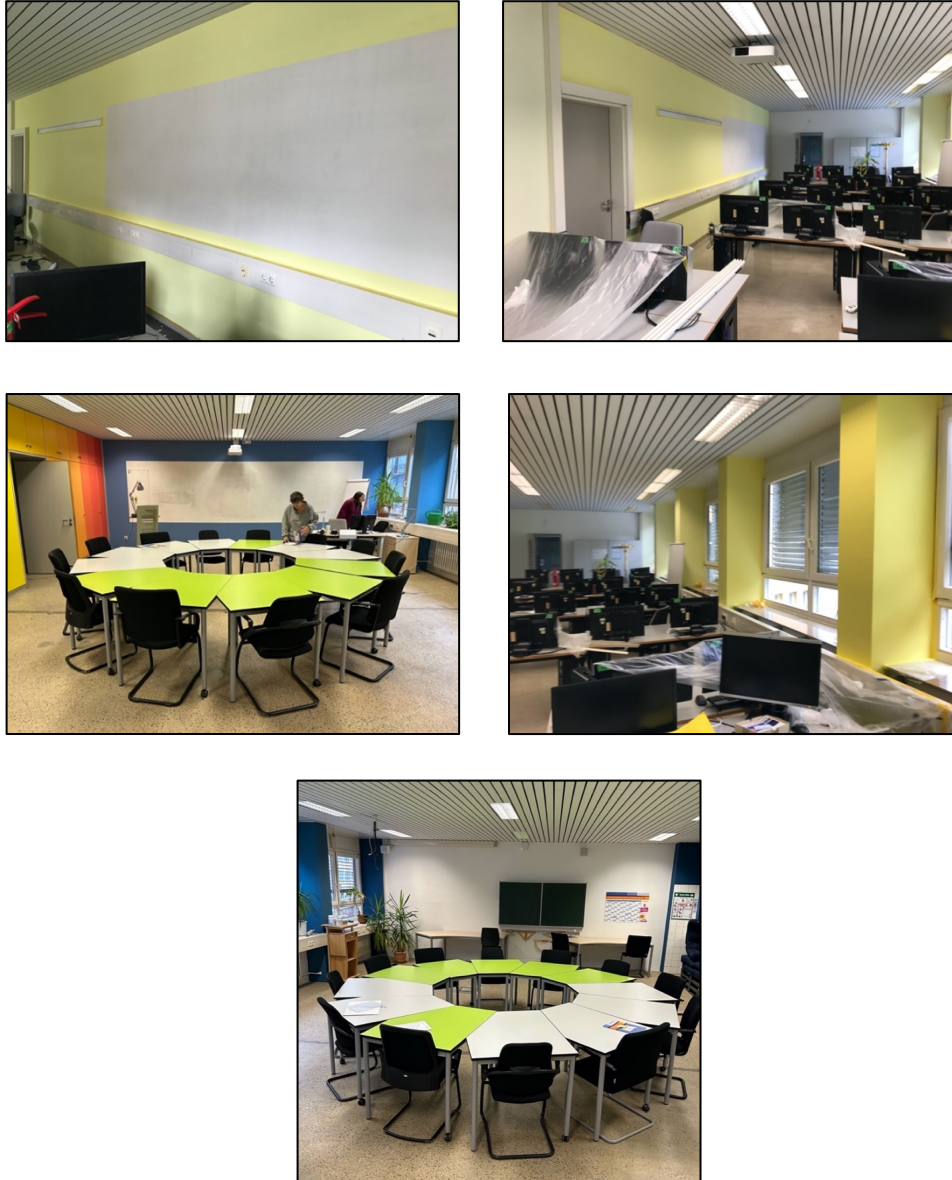


Figure 49: Further developments in the Education Innolab and other rooms after the experiment

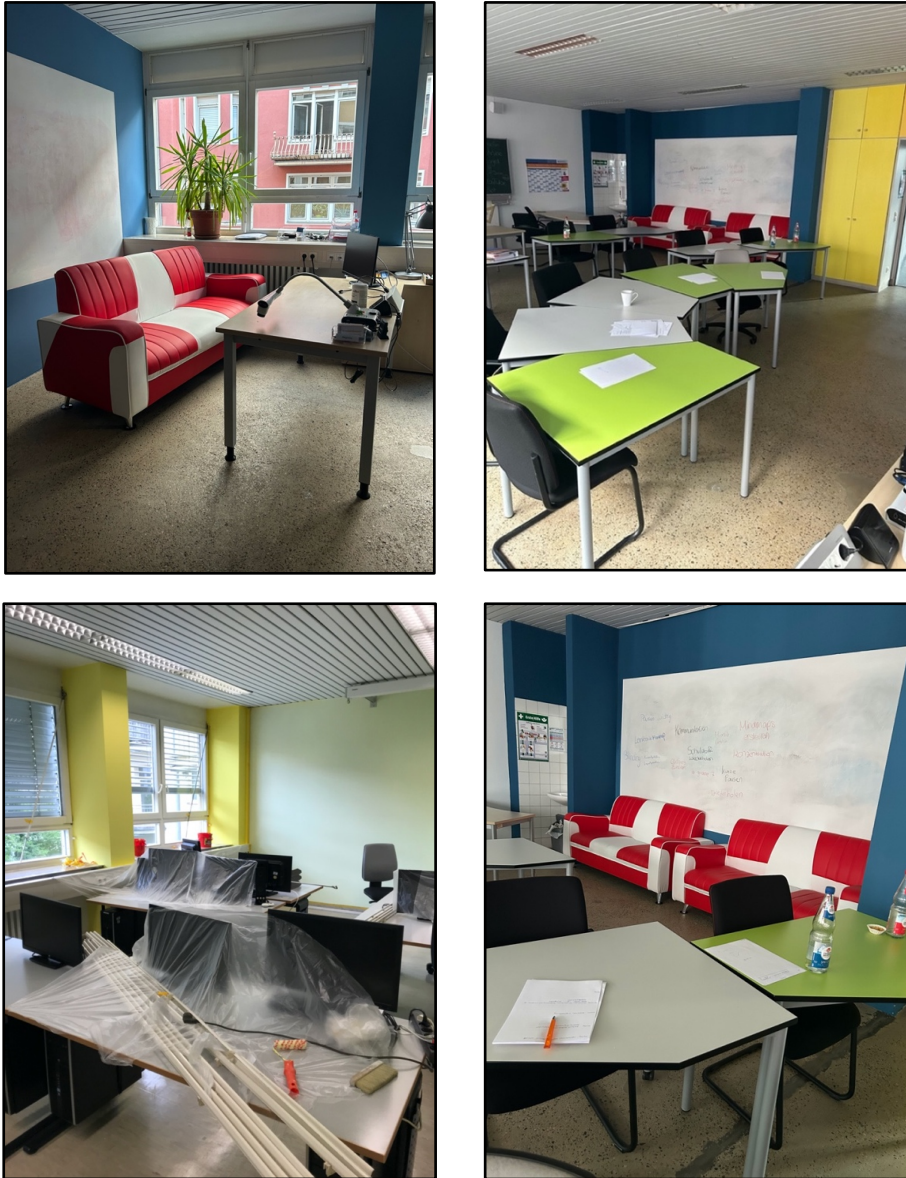


Figure 50: Further developments in the Education Innolab and other rooms after the experiment

VII – BIBLIOGRAPHICAL REFERENCES

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VIII – APPENDIXES

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Appendix 1:**Transcriptions of the Expert Interviews
“Qualitative Study Nr. 1”****INTERVIEW TRANSCRIPT EXPERT # 1****Interviewer: Oliver Meschkat****Date: April 2021**

P1: So as a first question. (...), do you agree that I record this interview and use it for my dissertation? #00:00:13-1#

P2: Yes, I am. #00:00:15-4#

P1: As a warmup. Just a short introduction. Who are you? What do you do? And what have you done so far? #00:00:21-8#

P2: Oh yes, my name is (...) I'm 53 years old, I used to study social sciences. And I've actually been working in the innovation environment since 1997.

P2: First day at work, my first personnel consultant. And then I went from a start-up to (...) and in 2001 to (...). Product management at first. But actually, it was always about developing new things, driving change and then later, after 14 years, I moved from the company (...) to (...). There I was a specialist for business model innovation and now I'm at (...) as Head of Business Development. And there, too, it's about developing innovations and looking for new business areas outside the financial sector or in the neighbouring financial sector environment. Yes, that's what I do and where I come from.

P1: Okay, the aim of this interview is to explore how in and labs and similar organisations could be successful. So I'm investigating what mechanisms of action can be found there. Do you have your own innovation department at the (...)? Can that be seen as a lab or is it just a department? Or how is it organised at your company?

P2: It's not yet an Inno Lab, but it could become one. So ultimately it is like this. The procedure. #00:01:58-4#

P1: The idea. #00:01:59-8#

P2: To do things in small steps, especially as more innovation also involves a major cultural change. And the first thing I did within the (...) was ultimately to set up an innovation team, where different people were first taught skills. So how do you actually do innovation and get more time for this topic. And the team is not a team where I now have six people for whom I am responsible in disciplinary terms, but it is actually a team that is supposed to bring processes and things into development.

There are six people in it, each of whom currently works 10% of their time in the innovation environment and will then go up to 20%. But of course, my job is also to bring the whole thing to the entire company, to bring it to the outside world, in other words to network. And as part of my role, we have also created a second team, for example, which is now really a team in its own right. It's responsible for corporate development, because it's a bit about driving digitalisation forward as a cross-divisional function. And digitalisation is ultimately also a prerequisite for innovation to a certain extent, which means that it also provides the framework. And now I'm also in the process of drawing up a two-year plan. What should come next? And then it will develop in the direction of Innolab.

P1: And what strategic goals are you pursuing with this? So with the foundation of this, let's say, department or organisation. #00:03:49-6#

P2: Or first of all, that we, as a specialised bank, have relatively few private customers. And mainly corporate clients. These are large, large institutions in the Catholic Church, in the Catholic Church environment, i.e. large parishes. Large hospitals, large nursing homes, etc.. We are simply saying that the traditional banking business, especially the private customer business, no longer has a future. That will be phased out. #00:04:21-9#

P2: We're just looking to see where we can find new areas of business. First of all, adjacent to financial topics, but above all in the problem areas of our firm. #00:04:35-6#

P1: Basically. So it's about the business model Innovation. #00:04:41-8#

P2: Exactly. We are looking for new business models and new business areas outside the financial sector. Wherever we have data or can collect data, of course. So ultimately, of course, we're also looking at how we can develop data-based business models in the future. And where might certain topics or tasks come together? So you could imagine, from a bank's point of view, we have a lot of data, for example about personnel. Or we could offer finance, accounting and payroll services, for example. #00:05:16-8#

P2: Because we have the data. And by bringing things together, it might be conceivable that at some point we could develop completely automated financial and payroll accounting for our customers. So it's also about product development, service innovation and process innovation. #00:05:33-8#

P2: Ultimately, everything comes together. So, we're looking. So we are looking. We have, of course. So I also have a (...) focus and a task that goes in that direction. In other words, we are looking for business areas with a sales potential of more than one million within a certain period of time. #00:05:55-0#

P2: Not just the small things, but innovations, but ultimately you have what is actually incremental innovation, it's always there, you just have to do it. But of course you also have to look for the somewhat larger innovations that will take us forward, because we can already see how things will develop. We will develop our revenues in the next few years and we can say exactly okay, so and so, we will be lacking. And we have to close this gap with new business areas. #00:06:23-2#

P1: Has a budget been released for this strategically or by the Executive Board? #00:06:31-9#

P2: Yes, let's put it this way. #00:06:35-1#

P1: It's the budget, of course. #00:06:39-1#

P2: Because I'm there, of course that's already clear. It's already been decided, of course. So many (...) don't afford business areas. #00:06:44-7#

P1: Developing for small (...). #00:06:46-8#

P1: If the budget has already been used up, it wouldn't be. #00:06:49-6#

P2: Otherwise, that's exactly the issue. How big will the budget be? And the current attitude of our management is that the innovation projects should be brought forward. And the budget will then be given, because we have of course also set up

a system where we say okay. We work according to the start-up principles, and we first have to find out what the actual problem is. And then we all proceed in small steps and validate the idea. Or the problem at the beginning, then the idea. And for each of these steps. #00:07:28-4#

P2: Then there are certain things that have to be done. You have to test and validate hypotheses, and the team then gets a grant for this, for this period of time, where it now finds out, for example. #00:07:39-0#

P2: What problem do people have and then what solutions do we have and then, in the end, we have a market for it. It gets a budget for these individual phases. So that means innovation, accounting, that and the budget grows. So we call it meta funding, ultimately for each area. You get, I don't know, 5,000 or more for the first phase, then comes the next phase, then it's maybe 25,000. In the next phase, it's maybe 150,000. #00:08:07-8#

P2: These processes, here we come, I can dispose of budgets relatively freely. It is. But now it's like this. I've been there for ten months now. Not that we have many projects in the pipeline yet. We're still more in the first phase, where we're doing sprints in design, for example, which cost a few €1,000. However, our colleagues in the innovation department are already qualified to carry out such projects themselves. And that's a small investment. And when it goes to the next stage, there is greater interest and most of the ideas are still in the first phase, so we haven't said X amount, but things will be released. Nevertheless, I'm currently in a phase where I'm saying okay, of course it's still the old attitude, the Board of Directors still has to be involved in the decision-making process. But although he actually says he doesn't want to be involved financially, it's still always going in this direction. And that's why it's now a bit about creating an independent budget. That will be the next step. And of course that would also mean going in a stronger direction. Well, you're allowed to do that, you know, when you talk about Lab, you might always think of a space like this and something that is demarcated. But I see it more as a process, as a culture, as a methodology that may at some point really lead to it being a separate area that only deals with the topic. But I know of only a few cases where this has worked, i.e. where the established company has somehow been leveraged. The money is then put in and they have performed according to their performance, because it is often the case that the lab is just too far away.

And I've also experienced that a bit before at the company (...) that somehow, because the bond isn't strong enough. #00:10:11-2#

P2: The old system triggers certain resistance effects. What are they doing there? #00:10:20-5#

P1: And we want to. #00:10:22-0#

P2: They also have to show how much money they earn. But I mean at the beginning of innovation you don't earn any money and you need completely different, completely different standards. (...)

Compared to where I can measure the ROI. #00:10:35-2#

P1: Or so, I then use the promoter model in the (...). It comes from innovation management. Where do you recognise that so actively with you and that there is a power promoter and a relationship promoter or simply a promoter or something? Do you realise that? Is it controlled or by chance? #00:10:52-6#

P2: Well, at the moment it's by chance, but it's also in the process that we actually say that every idea needs a promoter. #00:11:06-5#

P2: And if possible, that promoter should be a sponsor or what we call a partner and, if possible, he should come from the current management level and that should be a department head or a team leader. And in the end, he is also the one who supports the team in a certain way and also helps him to remove certain barriers. #00:11:28-3#

P2: On the other hand, as Head of Business Development, who also brings in all these new things, I am of course also a promoter to a certain extent. #00:11:37-4#

P2: Who then has to remove barriers in various places. That's very, very exciting. So a lot of ideas are still coming from the business management level. #00:11:49-3#

P1: They have too. #00:11:50-8#

P2: They're also very close and have a lot of potential. I always have discussions where I say, okay, let's draw up a matrix and let's see what the risk is and what the opportunity is. If there are currently some ideas at management level that probably have a great chance, but also a very high risk. And when we talk about risk, we often talk about regulatory issues or something like that in the banking environment. Are we allowed to do that at all or are we allowed to talk about issues that would suddenly attack a market player that could react? #00:12:21-9#

P1: So, we introduced this design sprint method and now an idea has emerged from this design sprint method. Which was suddenly there very quickly and which was also tested very quickly with customers, but the potential was perhaps not as great as it could have been. It may not have been as big as it is now, i.e. that we were already talking about the big millions. But this created a dynamic that suddenly made people realise, oh, they're already out there with customers and testing the product. And then the Management Board was a bit shocked, even though it actually wanted this rapid development. And now you realise that with some ideas we can make faster progress, we can work faster with the customer. And that's where dynamics arise and that's where it's important, of course, I realise that now. #00:13:10-2#

P1: As someone who is familiar with such things, then also tries to capture these things, to moderate them. #00:13:19-6# (...)

P2: So when you change something, processes arise and they have to be moderated. That's why it's important to have the right promoters. But the fact is, of course, that if you come into a bank like this, even if it is already very innovative in its thinking. But perhaps only in small areas. Then you always need people. Then you always have processes and dynamics that you have to moderate. #00:13:49-8#

P2: And it's always two steps forward, one step back. So that's just the way it is. And that's just a process. #00:13:56-0#

P1: Okay. You've gained quite a lot of experience, including with Innolabs or with Start Hackathons, as a lecturer or as a co-planner, organiser and lecturer. And my preliminary study is now about finding out which methods are used, in which order, why and which are most likely to have the greatest impact as a key success factor for the creation of innovations. And that is a focal point. And that's why I'm just going to put it bluntly: What methods have you used so far? #00:14:36-2#

P2: Well, what we're doing at (...) has definitely changed compared to what I did and assumed before. I've also been to hackathons before, which are always things where I think you can get things moving. So if you want to try out this culture of innovation or something. #00:15:03-8# Then a hackathon is definitely a useful tool at a certain stage. But we now do it completely differently.

What I've learnt is that many of these innovation initiatives often operate in a vacuum. You simply organise an event and perhaps have a topic. But then there

are ideas and these ideas are simply far too far removed from everyday life to be realisable or similar things. And we are now trying to take a more scientific approach with the (...). Because we actually say okay, first of all, who is our customer and what problems does this customer actually have? And that's where we try to apply this jobs to be done methodology, which was actually developed by Christensen, but then also by two others, almost as a scientific method, and they actually say that people have basic needs and jobs to do in their lives, and in doing these jobs they want to achieve certain outcome scales. And actually, all of these needs or jobs that exist can actually be worked out, they don't change much if you look. Sure, the environment changes, but people's needs haven't always stayed the same or anything like that. #00:16:34-4#

P1: The economy pyramid and why. And we're actually going here now and trying to define all our industries and the people in these industries. So we're trying to define who are actually ours? #00:16:45-0#

P1: Who are the cool ones? They're often hospitals or something like that. What roles are there in a hospital? There's the controller or there's the HR manager and there's the carer. And then we try to describe the day-to-day jobs of each individual role and then look at them, look at the frictions, i.e. where, where is there potential for innovation and try to work this out for all sectors and then innovate on the basis of the framework that is there and we don't do a hackathon and see what comes out of it, but we try to orientate ourselves very strongly on these customer problems. And at some point, that's my wish, I'll have a list, I don't know.

P2: An Excel table or whatever where I have actually described all the problems and needs that are there and can then just look at where I can innovate and we all try to scientifically analyse this. We also work with an innovation thesis that frames the whole thing because we say at the beginning of the year, how is our market developing, what will happen in the next ten years? What do we want to do in the next twelve months? In which direction do we want to renovate? Because we often have the problem that these labs somehow innovate, but there is no framework? So we can see that now, in our industry, how are things developing? What is the biggest challenge that hospitals have and the care challenge is now becoming even greater? #00:18:20-3#

P2: Then we can say okay, let's go in this direction and then work with the jobs to be done method to work out and analyse the problems and then of course try to get in touch with the customers quickly and test them and therefore work with the Google Design Sprint in the first phase. #00:18:41-3#

P2: But we have the philosophy that we want to be much faster, that we actually want to realise value as quickly as possible. That we can perhaps see or develop, test with a customer, so that we actually get into a situation like this. We want to be able to test an idea that is already there in two days and then, of course, we want to network much more closely with our customers. We want to involve them, so the keyword is ecosystem and exciting after the design.

We then build with normal lean startup processes, where we have certain phases in which the teams test certain hypotheses and after a certain time. Say okay, now we know this is one. Now we've found a business model and then we'll scale up. And that's where we are now. We've founded a property company, but of course that's actually now. It's not rocket science, everyone knows that (...). The first thing you can do as an extension is to set up a property company or something like that. #00:19:55-7#

P1: Okay. So I've heard a few methods (...) the start-up method, design, sprints, Google Design, sprints, design, sprint methods. But from your experience so far, there are other methods that you have used. Because of me also in the hackathons or in the last one you worked on that you can think of. Then spontaneously. Yes, so. #00:20:21-1#

P2: Well, in the hackathons. These lean startup stories in particular always have individual elements. #00:20:26-5#

P1: So there are overarching frameworks and then there are, there are the individual methods that come out of this context, the little wall canvas or something like that. So all the stories from this Osterwalder. #00:20:38-7#

P1: Well, Osterwalder has just published a new book called "the invincible company" and there's quite a lot in there that we use a bit to now, because it's not just about the methods, it's also a bit about what I do as a team, but also: What do I do around it so that an idea can develop further? How do I act now? For example, a committee that evaluates ideas. For example, we have created a future board at our company that is linked to this, to this, to the company, i.e. to this innovation

area, and this board is made up of managers from the (...) and also employees from the (...), but also from external parties. And this future project, which is of course a bit of a hackathon, is a kind of pitch committee. #00:21:36-5

In other words. The team has now. It now has an initial idea. They also have to be very. They also have to be described, the ideas. So we have also developed a document for this. And then the evaluation committee, where we say, okay, we now have five strategic topics here. If none of the strategic topics fit the ideas, then we won't deal with them.

And then they are evaluated and as soon as they are approved, the teams are given resources. And now the future board ensures that I say okay, the team will now receive a resource for the next phase. And then it's a question of how do you evaluate that? And there is now, for example, the topic of innovation accounting, i.e. has it delivered certain data and are we now investing in the team on the basis of this data? In this respect, these are accompanying methods, because in my time, of course, it has often been the case that you might have to develop ideas and also, to a certain extent, develop them. Developing ideas and testing them to a certain extent is often not the biggest problem.

But the fact that they then continue because they are also supported or understood by management, that depends, that is also important, so the methods and competences of decision-makers in a company are extremely important. That means you also have to build that up. And as I said, we now have sport in the future and we are working with innovation accounting at the end of the day. There are so many methods. I would even go so far as to say that we actually tell the teams. #00:23:11-7#

P2: So we go there, for example, and map the innovation process on an open microport. So we actually say okay, people, you have to answer questions, but you can use this tool there. It's similar to the innovation kickboxing that the Decade Game had. You can use this microboard. It helps you answer the questions. And the tools are included in this process that we map there. So, for example, I would first like to find out what the problem actually is. And then I can say okay, your value proposition can use this or you can use data, jobs, you know what. And that's where we are.

Actually, we would also give people a choice. At the end of the day, they can also find out about it another way. It's just important that they somehow have a structured process and that they collect data from the customer. That's not the most important thing, that they collect facts and don't somehow stand there six weeks later and say: Yes, but I think the idea was good or something. But in the end, it's the methods. There are lots of possible methods. There is no, there is no method bottleneck. #00:24:28-6#

P1: Is there a certain order in which the techniques or methods should be applied? So what is this sequence based on? #00:24:36-3#

P2: Yes, the order is of course based on the stage of the innovation project. So the starting point is always the customer problem. #00:24:45-6#

P2: And I have different options and methods for this context, so I'm a method context or something? It's an innovation context that's currently developing, which I find very exciting because it also has a lot to do with a new phase of agility.

These are all things that come from Hidden Journey and Golding, these are the so-called flow concepts. And that also goes a bit smaller. What I find exciting is that the person who says this reduction in the size of innovation steps is saying, okay, a company that has a lot of data can try things out very, very early on. You don't need to wait three or four months, you can actually do it in just one or two days. I think that's really exciting.

But we're doing them now, we're not working on them yet. I first have to find a context where we can apply it, because the methods are based on what I'm currently doing, what my task is, do I want to find out whether the problem is there? Do I want to test my solution? Do I want to test my market or am I in a scaling phase or dependent on these phases? Are there different methods or tools that can be used? And in the first phase, of course, when I somehow get from the problem to the idea, all these tools are actually already established. So let's take a business model canvas or a lean canvas that comes out at the end. Then I have the fields and then I have to draw up hypotheses for the individual fields and have to say okay, what do I have to test first? So how does my idea stand or fall? But that means that in the phases, in the next phases, it's all about testing the hypotheses and looking for more facts. In other words, I actually have the tools at the beginning and then I might have a few additional tools afterwards, but ultimately the phase

is simply about Define the experiment hypothesis, go out, test, see if my experiment was successful and if it wasn't, change something. To my idea, to my business model. Or perhaps say okay. Works, don't stop. And in the best case, continue. #00:27:12-9#

P2: So in that respect, you only really have the experimentation and testing phase, which sounds quite simple at first glance. But there's just no culture for it in the company. So experimentation and testing is everywhere where I have complex environments and more and more. And our environment is complex, is actually the one where I can actually implement this as internal genetics. Which actually has to be implemented as internal genetics. But it's just, it's extremely difficult because people aren't used to it and people in the bank aren't used to it either. But we just have to look out at the world as it is right now. There's no experimenting and testing. #00:27:56-7#

P1: So the choice is formally your concept? Is it an innovation process? That sounds like design thinking to me. Roughly. #00:28:05-1#

P2: Yes, exactly. That instinct plays a role. But we have. Ultimately, we have a. Innovation ecosystem ultimately built up. And that actually exists. We didn't invent it either. There is one. #00:28:16-9#

P1: There are also many. #00:28:19-0#

P2: In the end. I can't even remember the name of the book that inspired me. There's a lot of literature on it and. Innovation ecosystem means that we first said we need innovation, we need vision, then we need a strategy. For the strategy, we need an innovation thesis. So everyone, every venture capital company has one. So this thinking of a venture capital company is also a bit of a framework, of course. What ideas do we invest in? We have to say how ambitiously we want to get involved, so do we only do incremental things, or do we also build things that are radical? Then, of course, there is disruptive innovation, where I believe we will not. So I don't think we're going to bring anything out now.

So I think that if you somehow say, I'm not going to develop a new Facebook, we're not the technological pioneers who could develop or utilise any new technology ourselves. So we'll probably never do anything ourselves. So we'll actually be more in the area of radical innovation, I think that's where we could

have opportunities in terms of ecosystems and things like that. But we also have the advantage of being active nationwide. #00:29:30-5#

P2: And not just regionally, so I don't believe in regional ecosystems or anything like that. And that's ultimately. Then there's also the fact that I need tools or people need methods that they can work with. And then I need an innovation accounting system where I can measure progress and I can then allocate appropriate things based on the progress. And then, of course, it's also an important factor in this whole ecosystem. #00:30:03-7#

P1: How do people develop? #00:30:07-1#

P2: Or how do people develop together. #00:30:09-0#

P2: And of course, also. #00:30:11-5#

P2: How do I communicate into the house? Because everything we experience, because we're a bit on the front line, the other people should be able to understand it, but they should also be able to do it themselves. So the idea in the (...) is definitely that we say that everyone in the company is called upon to produce innovation and not one area or one department. #00:30:33-1#

P2: Now in this first phase, it's clearly also about enablement. But you also have to say that it takes time. So you have to say Now here. Someone is coming now. We have innovation methods and tomorrow it starts. And then all the great new ideas will come. That's not the case. Of course, there will be a few.

But you have to get people on board first. And that's why it's so important that I'm now in a phase where I'm very much involved. Networking with external people. Um, also to see where the competences are that we don't have?

For example, we don't have our own developers now, so perhaps we need the data centres on the one hand, but I had a conversation with one just before we spoke to each other. And companies that are very active in the IoT sector. And they are currently building a smart data hub that will give me a device like this in care homes, for example. And I can connect it to a digital nappy, for example. Things like this already exist or digital care nappies. And they then supply data to this one hub. And as a carer, for example, I can see okay, room 321, I have to go there now and the carer saves a whole lot of work. So, if we build up networks here with other companies, Microsoft or whatever, that make care easier and offer solutions in this context, then we can build innovations together. And I am actually firmly

convinced that in future it will no longer be possible for you as a company to create innovation on your own. You need that for the partners.

And that brings us to the topic of ecosystems, where you have to work together. And this is no longer a co-operation in the sense of: I sign a contract and do something with them, but then you also have to see that things develop in an evolutionary way. So the ecosystem is about everyone benefiting from it and not just one unilaterally extracting value. Because platforms extract value unilaterally, but in the ecosystem, it develops in a different direction. And that's where I see our greatest opportunities. We are, because we have many, many players in our environment and many questions. The healthcare sector in Germany is just starting out with digitalisation. A lot has been set in motion there. #00:32:59-8#

P1: That also fits in with a study on the three Innolabs. We can briefly consult the study. It confirms that the more heterogeneous the collaboration, the better the result of an Innolab. I think you would agree with that. #00:33:14-7#

P2: Yes, 100 per cent. Now we need to have a look. So, what kind of people? If you meet people in a bank, you meet people who have actually pursued a career in banking and never did. So you don't go there either. You don't join a bank because you somehow want to reinvent the world, but there are very clear job descriptions defined and when you go into a bank like that, you might find a few people who have this gene, but who haven't been able to live it out because it wasn't necessary. And as a bank in particular, you are extremely dependent on bringing in other people with different skills, but also with different attitudes, ways of thinking, etc... #00:33:59-5#

P2: Of course you can take different people with you on the journey, but ultimately you're also in a bit of a dilemma. You can't get the people that you might need, with your expertise, who are data scientists or something like that. Or with a certain attitude, you can't get them. They don't come to a bank because they're either too expensive or because they say: "That's too hierarchical a construct for me. #00:34:24-7#

P2: And the few that you have, you have to train them, you have to educate them. But of course they also have a daily routine. And as a bank you would be alone. I don't know what it's like internationally now. There are certainly a few innovative banks, but you wouldn't be able to do it alone in your own network context. You

only have to look around in the geno world. Where are the big innovations that you might need? #00:34:49-8#

P1: And the study also says that the more innovation methods are used, the better the result. What do you say to that? #00:34:58-4#

P2: I can. Yes, I think so. Well, I think you have to be open. So what you. That's also a bit of a flow approach. It's not about that in the end. A method or a process is about putting people there. Of course, you need a process so that things can develop. Innovation is not something. We're all creative now, because then nothing comes out, but you have to somehow find a process to get from an idea to a business model. To a business model.

P2: But people should choose the methods or develop the processes that help them as a team in a specific situation. It can't be that. Of course, I experience this time and again. But you also experience that in the agile world. Our motto here is now this agile process and this process, you have to stick to it. But that's actually bullshit, what I mean. Take a look at Mathematics, if you will. There are also different accounting methods to arrive at solutions. And I think that what you need is people who can deal confidently with a methodological dispute and a set of processes and who actually choose the tool that helps them in the situation. And I think that's the bottom line. It's also okay to a certain extent.

P1: The third output is: the more information flow between those involved, the better the result. #00:36:23-9#

P2: Yes, yes, definitely. So that is in fact the case that you. Yes. (...) In every company we also have silos, which also depends on that. How much information do I give out as a person? Especially when we come into companies that have a long history before digitalisation, you have a lot of people who still think that knowledge is power or hierarchy, it has to be respected. First they are informed, so that they are informed, then they are informed. And these are all things that have to do with innovation and maximum transparency, maximum innovation flow. And that's also partly the case when you see all these great digital tools, for example. Many things disappear into computers or social networks. Sometimes it makes sense to actually bring back the old and: do it, do it.

For example, you can take a wall in a building and collect all the information about the customer there. And that's what's really exciting about this concept of

hey look without you and and. And if Google is there to visualise work, things like Miro and and and Conceptboard or whatever they're all called are brilliant tools because they allow you to visualise work and the sooner you can present it so that everyone can understand and see everything, the better the innovation will work. And that goes so far that you just have to say, people, hang up the pictures. So if you look at some buildings where there are lots of great pictures hanging on the wall. And use the walls to work there. And there is still, even brain research says so. The best way to communicate is to stand in a small group in front of a wall where you can exchange ideas. And you can colour things in, etc. #00:38:23-3#

P1: Pictures are quick keys to the brain. That brings us straight to obstacles in the innovation process. What other weakness did you just mention? What else can you think of? What hinders such an innovation process? What else? #00:38:39-5#

P2: Yes, I think I have most of them. I've mentioned most of them. So structures, hierarchical structures that are people, people. But at the end of the day, only people can change. People shape the whole year. And people have to change. And if you yourself are not prepared to change, then there will be change. Then the change won't happen. Because, of course, the normal employees look to managers. So it's simple. #00:39:15-3# (...)

P1: As soon as people come together, a context and framing is created. And as soon as a manager is there, people behave in a certain way. And you don't change culture by saying you have to have different values, but you change culture by behaving and modelling different things. And first and foremost, managers have to behave and exemplify new things. And managers also have the most to lose from their point of view. So it's just me. #00:39:46-3#

P2: I'm no longer a team leader, I'm one of many. That's true for many, because it's just that you've made your career over 20 - 30 years with different principles of success than before and now you have to change that. And that's why one of the biggest obstacles is that we humans are not prepared in many areas. Yes, to learn new things and, above all, to unlearn the old. We use other methods and practices. Which no longer work in the new world. And the fatal thing is the smarter we are. And the more of an expert you are, the less willing you are to engage with others and learn from others. This has now been scientifically proven.

This expertise. But this knowledge that I am simply very much subject to

some kind of cognitive bias is often not present at management level. And a culture of innovation must therefore be extremely well supported by leadership training and behavioural training. How do I deal with emotions? It simply has to be. To a certain extent, it has to be accompanied by psychology or the latest findings in psychology, neurology and sociology. It simply has a lot to do with How do we humans deal with each other? What do we have to do? We have learnt a lot of things in our profession, at school, that are simply wrong today. They don't help us. We can see that. Discussion all round. (...)

I am the expert and what I say as an expert is correct. But science doesn't mean there is one, there is a right one. In physics perhaps, but everything is always only provisionally correct. And there are different research directions. And that's also extremely important in innovation, always looking to see what I can learn from the other, what I might have to unlearn? And where do I perhaps need to be persuasive? On the other hand, you also need a framework, guidelines within which people can move. And I have to be flexible. Of course, I have to keep an eye on things. The changes are fast. And they're getting faster and faster. And that's why I have to be able to adapt flexibly. So perhaps one example that I found a bit of a shame.

Kurt, has been here for two years now, almost a little over a year. There's a lot of potential there. All for innovation. And there are companies that have been able to utilise this incredibly quickly, i.e. software companies, Microsoft etc., but also other companies that have simply said, in a specific situation, what problem does my customer have and how can I solve it now? And we weren't able to use this, for example, because we perhaps didn't have the thinking, but we also didn't have the tools. So now all of a sudden with a customer. And to go into a Teams conference or a sub-conference and any conference that they want. Could you? You and banks can't do that because you have certain structures that don't allow you to. Then you just have to use Go2Meeting or whatever. And seize these opportunities.
#00:43:09-1#

P2: These short-term innovations were perhaps only incremental. Yes, but I would have liked to have used them. And that's the point anyway, innovation will always go faster. A company that has data, Amazon, you name it. You can see that right now. Amazon was, I think, within 2019 crisis in India together with an Indian company founded the company. And this pace of innovation. How do you achieve

that? And you have to. Of course, we have a lot of catching up to do. And this flexibility. Lack of data, lack of systems, lack of courage, but also, of course, regulatory restrictions. These are of course also an obstacle. Depending on the industry.

From your experience of working with a lab or similar organisations in recent years, do you have a worst case scenario, i.e. what didn't work at all, and a best case scenario? Can you think of anything and I will always ask why? What went wrong and why did it work so well? #00:44:22-2#

P2: Maybe sometimes I even have more worst cases, because of course I've been with (...) since 2001. And the situation is also very good. I've been with (...) for five or ten years, but I was wrong. So it still exists, although now the pressure has of course increased. So when I look at the worst-case scenarios, the first hackathon was good, but five, six or seven hackathons were actually organised. Always under the premise. We've now learnt a bit and... What comes out next? #00:45:11-6#

P1: So my worst case scenario is that you can't get out of this playfulness. A hackathon. I think the hackathons, which were the first one, two or three, were okay because you kind of triggered this spirit. But then there was no further development. Then there just wasn't the courage. Then maybe there was. Internal constellation, because maybe it was responsible for that or something similar. And if you then make a fourth, fifth, sixth or seventh, then it's actually a worst-case scenario, because with every future hackathon, people ask themselves: Yes, but what's the result? #00:45:50-1#

P1: So you didn't get out of the loser rotation phase or where were you exactly? #00:45:56-9#

P2: Well, we couldn't take the people with us. We didn't get out of the ideal phase. And the one or two things where it came to. Tagging. That's when the point came at some point. #00:46:09-7#

P1: Well. #00:46:10-3#

P2: Start a company now, the people who had the ideas. What do you do with them? Then, of course, maybe people weren't prepared to say okay, I'll do it now. You were an employee of a bank. #00:46:21-4#

P2: And didn't want to take the risk. So it's actually a worst-case scenario. Basically, in the innovation environment, you don't see people as entrepreneurs. So you actually have to promote entrepreneurship and not innovation as an internal aspect. Because I actually need the entrepreneur who is still ready when the idea really proves to be viable. The entrepreneur who then drives the company forward. And we often had a story like this. Okay, then he took a back seat and someone else took over or half-heartedly or not at all.

But you need entrepreneurship. I have to be honest, I've always been an innovation expert in my own right. #00:47:07-7#

P2: And it's quite practical. At certain points they just say okay, I'm not going to take it, then I'll just carry on as before. But actually you have to say. If my... If I've found something out there on the market and my idea isn't getting anywhere. I should actually be an entrepreneurial person. Okay, then I'll just stop and drive the company forward. So we actually have to lead entrepreneurship.

And that's actually a worst-case scenario, that you don't promote entrepreneurship and tell people right from the start, okay, you can have a corporate career here and you have the best case, what pops up, what has worked really well, but an innovation process in a regulator or something similar. Yes. You could almost say that we're a bit of a threat now. #00:47:52-1#

P2: What are the best cases?

Well, for example, I've experienced best cases where I or we have somehow come a long way in the idea phase, where an employee actually had an idea that was initially a surprise because it came from the whole, they didn't come from the education process environment, but from the catering environment, where the person was also very driven because they also had a special core competence. And up to the point where you could say, okay, but now the company has to invest more in this idea. Things went well until then, but then the decision had to be made. Now we're going to give them the money and let them get on with it. And then it just fizzled out. #00:48:47-8#

P1: But the best cases are actually always there when a team. My idea. That and the team drives the idea forward. They experience that they can develop things themselves. Of course, there are always negative setbacks and. So of course that

was also a bit of a result of the hackathon was also an idea that was then pushed relatively far.

It was about the digital estate and during this phase, the team did an incredibly good job of organising itself. It worked in an organised way. So these are actually always processes that work well. And when it comes to these decisive phases, I've actually always experienced that. When it comes to scaling. Once I've found something, it becomes more difficult because then I have to provide resources, then I can no longer do it in such a small team of two or three people, but have to give the company resources that may be missing elsewhere or that weren't planned for.

Then it becomes difficult. Otherwise, of course, I have my innovation activities in my first phase, where I now have no one where the role is not innovation. And when I had the title of business area developer or something like that. Of course, I also experienced some very positive aspects. For example, we once developed a crowdfunding portal. #00:50:06-0#

P1: Which was one today. #00:50:11-0#

P2: Many are creating more, which is very successful in (...) That's great, a project that has gone really well or also partly the cooperation with start-ups, where something has somehow been developed by start-ups that has solved a lot of customer problems. But there are of course my I would be coming now. Most of my innovation experiences have always come from the banking environment. #00:50:38-9#

P1: So what? Erm. #00:50:41-2#

P2: Of course, there were also things that were always a barrier in the way. So the banks often make things difficult for themselves. #00:50:48-4#

P2: In the phase where I worked in a start-up, it was of course totally easy. You did everything yourself, tried it out yourself, tested it yourself and there were no barriers, except maybe money, that stood in your way. #00:51:04-5#

P1: So commitment is also a success factor. Well, then you need it, otherwise it won't work. #00:51:11-3#

P2: Yes, of course. I mean, all companies say: I need innovation. Nobody says that we don't need it. And then it's always obvious at the beginning to get someone who

somehow drives the topic of innovation forward. Whereby you have to say, okay, one person is just me now, it's not an engine, but with one person the thing is of course also.

So I might not be able to go here now, but I could say that we have to do this and that, because that's where the clever ideas are. If I were that clever, then I would, if I were Jeff Bezos or something, I don't know. So you always need a lot of people, you always need a team and you can take on a role yourself to drive certain things forward. But that's about it. Commitment has to go beyond saying I'll just have one person do it. Commitment means that I have to see all these processes that are coming my way, all these developments, and I have to allow them. And then, of course, some of them are also failures. That's part of it. 99% of all ideas fail. So failure must be possible. It has to. And I have to learn from it. So it's not about celebrating failure, it's about celebrating learning and then I have to be able to grow. #00:52:30-7#

P2: And of course I have to see. I give support. Me. There is no safe innovation. I will burn money. (...) But if I bring in a person, then they also have to assume that investments will be made afterwards and that investors will invest. Many fail. And if I don't see that as a company, then it will always fail. So commitment over a period of time. In good times and bad. You also have to look at that. If innovation doesn't work. Then you have to make adjustments. #00:53:04-4#

P2: Because that's the job of a company manager. To say that it works and makes progress, but also to have a completely different attitude. And then I have to think completely differently. I need completely different assessment values. And I can't say after a year in the innovation team, "Yes, here, where is the return on investment?

I need completely different data, completely different figures. And I have to be the person who, if I'm a company now, if I'm a board member. Or if I am now a managing director. As a person, I need to know for myself. I take a certain amount of risk and I have to be prepared to take it. If I do. If I don't take a risk, then I don't need to do it. So if I only ever think about it. Okay. What happens if I fail? What happens if I fail? And you have to be honest. There are quite a few. Most established companies are doing well. The older they are, the more likely they are to have had a history before digitalisation. Before digital digitalisation. The more difficult it is for them to deal with me, with change, with innovation. #00:54:14-6#

P1: There, if that's also your. Your recommendations for companies. Let's assume. Or someone comes up to you and says Hey, I want to set up an innovation lab. That sounds like a lot of recommendations that we would make. Do you have any more? #00:54:32-9#

P2: Do you have to? Do you have to? Yes. You just have to understand the connection between digitalisation and innovation. So ultimately, what's happening is a kind of dual transformation. On the one hand, I have to reinvent my core business with existing customers. Transfer my products to the digital world, so to speak. But I also have to look at what the extended products are here. #00:55:04-9#

P1: Extended solution? #00:55:05-9#

P2: And the second aspect is to invent the business of tomorrow. And that's kind of the topic of innovation. #00:55:13-3#

P1: As a provider, exactly that. #00:55:15-8#

P2: That's exactly the issue. And it is. It's not a new invention. But then I also have to realise that I will change my company through this process and that a lot of dynamic processes will be set in motion. #00:55:27-9#

P1: To which I then have to find answers at the appropriate time. I can't predict it, but some things can be predicted. But it has a complex environment and I can only ever experiment and test in small steps. #00:55:41-0#

P1: And before I learn what a problem is, what a lab is. That always sounds so big. We have a tendency to create these new topics as big projects. And these big projects overwhelm people. So it's like I'm going to build an InnoLab and it has to achieve this and that and then I'll take these and these steps. And then I have a huge issue that paralyses what people and the company are learning. #00:56:09-2#

P2: If I define the lab as a vision, as an attitude, as a what, what do I want to achieve with it? Well, the fact is that these, these, these American or these start-ups are quite good at saying okay, we want to now, Tesla is not an automobile company, we ultimately want to solve the energy transition, the energy problem or something like that. If I associate a vision with the Lab that I can work towards. That is tangible for people, where they can also realise their own attitude, their own vision. Then a laptop theme is something I can live with.

But if I say I'm going to set up a lab on a greenfield site, where five or six people come in, or I set up a lab in my established structure, then it's always difficult. Then the probability of failure is high.

P1: I saw an exciting video about that last year. I think they're very innovative and, above all, they started with a lab like this, but they've learned and they've said at various points, okay, I now have to bring the lab together with blockchain, with our blockchain initiative, so I have to maintain this flexibility to react to change and then also throw things together that I might not have recognised as coherent at the beginning. #00:57:47-7#

P1: And. Okay. Last question back to the methods. There are hundreds of methods and techniques that you can use. Design thinking, scrum business, model canvas, love partners, Lego, serious play, scenario techniques, brainstorming. From your experience, why do some lead to success and some don't?

P2: (...) The music and the methods are just tools. I've also seen or witnessed many design thinking projects that have sometimes failed because of dogmatism, because the method was prioritised over the goal. Um, well, I have experienced a few things where design thinking was somehow more associated with, I'll say (...).

Then half the staff came along. They didn't actually behave towards adults the way you should behave towards adults. For example, I criticise or find that the problem with this one is often that it's very superficial, that phases of depth, where people exchange ideas with each other who have a certain level of experience, are ignored. So I, I, we used a method ourselves that I found very exciting.

And that is Innovation of Mining. So I don't think there is any great innovation that has come about through design thinking. Design thinking is more like this: I adapt processes, I make things more pleasant. Nido One of the first design institutes, they also come from the direction of human centre design, but I just make certain things easier for people, more comfortable, more experience-rich, etc., that way. Like that, right? #00:59:53-0#

P2: And dogmatism is just wrong. Criticism is part of it. When I talk to you now. And maybe we both have. You have an idea. I have an idea. And because we have different contexts, we reach higher levels together. That's this innovation of mining. So, I think that's the nest of many innovations there. #01:00:16-2#

P2: The iPod or whatever they're all called, iPad, iPhone or whatever, they don't come from design thinking. #01:00:24-1#

P2: They often come about through people coming together and now reaching a higher level together. #01:00:28-7#

P1: Well, I think dogmatism is a problem. #01:00:30-7#

P2: (...) A lot of things fail because methods are at the end... They're just tools and I have to be able to change them. #01:00:39-9#

P2: And then of course there are also methods that are too complex, that people don't understand. #01:00:46-2#

P2: And then there's always the problem that you often try to apply one method to many different use cases. You always have to look. I believe that every situation, every context can be special. Even the team can be special and therefore may not be able to work with a method. And that is certainly another problem that can cause things to fail. Of course, it can also use the wrong methods.

Because if you are now in complex environments, of course. Then you need different methods than if you're complicated. So that's also often a risk. Then we just do what we're doing now. We say okay, we've now introduced the design sprint and then you start, design, sprint, everything isn't perfect now, it couldn't be. Applying the design sprint to things where I already know a lot of things. #01:01:45-2#

P1: So I don't have to check anything if I already know things. #01:01:48-1#

P1: Yes. #01:01:48-8#

P2: And that's another problem, that all of a sudden design thinking is being done everywhere. #01:01:54-9#

P1: And that's definitely wrong. #01:01:58-7#

P2: And it also often depends, I think, on the people who. So I think some things become so. Cult-like. #01:02:08-3#

P2: We're in a sect or something now. #01:02:13-1#

P1: Yes, so it also has something to do with fashions. It has something to do with the people who use these methods, as coaches or trainers or lecturers, as scientists, who practically make the pre-selection, i.e. the success factors of the methods.

If I were to summarise this, you need an innovation process that can be based on design thinking, for example. And then you must try to understand the vision of the company and have the commitment and then allow a selection of methods per step and situation that also suit the people, so that those who understand, internalise and also actually like a wine in the supermarket, that they say, hey, I have three or four methods to choose from, I understand them. And there's one that I like best, and I want to use it now because it's better for them. So it's practically like a hammer. I don't get on with the hammer with the plastic handle, but I get on very well with one with a wooden handle. #01:03:14-3#

P2: Exactly, the thesis is just to deliver results. So they actually just have to say okay. #01:03:19-4#

P1: Is that what you want now? #01:03:23-4#

P2: It's our solution. Can we even produce the solution? It's a question, of course. Can we. Can we earn money with the solution? Is our solution also customisable? So what is it? I could develop something today that might be on the market in a year's time because the technology has evolved. #01:03:41-8#

P1: Yes. #01:03:44-7#

P2: And it's just survival. It's survival viability or yes, just that. Four criteria that you always call up. #01:03:50-0#

P1: Must and those Teams have to answer questions. They need methods for this. And they have to collect facts out in the world. And they have to present these facts. And when they have collected these facts, then you can give them money for the next phase. At some point, you reach the point where you can say. #01:04:16-5#

P1: Okay. #01:04:17-4#

P2: We've actually proven a business model with low scaling, so to speak. #01:04:24-6#

P2: Then it's really just about scaling in the next phase and seeing if we can actually make the whole thing even more efficient now? Can we win more customers and earn more money with an increasingly efficient and automated structure? #01:04:46-1#

P1: Yes, great, (...). Wow, we're done. Yes, thank you very much. Then I'll end the recording now.

INTERVIEW TRANSCRIPT EXPERT # 2

Interviewer: Oliver Meschkat

Date: April 2021

Note: Expert # 2 calls the company's internal Innolab by name. For reasons of anonymity, the author has replaced the Innolab name with the word "Innolab".

P1: (...) Do you agree that I should record this interview? #00:00:19-5#

P2: I'd love to, no problem. #00:00:21-1#

P1: Thank you very much. Okay, a little warm-up. Who are you? What are you doing, please? #00:00:26-4#

P2: My name is (...), I'm 42, and I'm a trained banker. So over 20 years ago I did a classic bank apprenticeship. But after my training, I quickly made the leap to the HR department. I was head of training there for 15 years. I also trained as a trainer during this time and actually returned to my original career aspirations. I actually wanted to become a teacher at some point and through my work as a trainer and lecturer, I actually ended up there a bit and docked in and was then also responsible for personnel development. And over the years, the topic of innovation and corporate development was added because we were thinking about how we could become a very traditional Volksbank in the future with the world that currently surrounds us and tried out various things. I can probably go into this in more depth later. And as a result, the (...) Innolab has emerged over the years, where I will take over the management in the future. And the aim is also to set up a medium-term (...) Innolab as a limited company. Corona got in the way a bit. I can say thank God we didn't do it or haven't done it yet. If we had, I would have had to close up here again. #00:01:59-1# P1: The aim of this interview as part of my dissertation for a study is

to investigate how InnoLabs and similar organisations can be successful. So, what mechanisms of action can be found? Can you briefly explain when this is set up and roughly what it looks like? #00:02:18-0#

P2: This is the result of a longer journey. This journey started in 2016. We came out of a failed merger and had to realign ourselves, and that's where we started. We worked together with 180 employees over three days in a future workshop. And they then created the bank's vision for the future, thought about new business areas and were very, very free to pursue innovative ideas. And small analyses and business areas emerged from this. And as a result, the topic of omni, channel, bank and customer focus was also implemented in our organisation and the Management Board no longer wanted to implement this in traditional project structures, but to become more agile. And then we travelled to Berlin for a week, to an agile workspace at the Lounge Labs, where we spent a sprint week with 25 people and broke down the overall topic, which we would probably otherwise have worked on for over six months, into action areas within a week. And the people who were there thought it was so cool and awesome that they said we really only want to work together like this and we need premises like this ourselves. We no longer want to work at a traditional seminar table or in a meeting room, we want to work more freely. And then the board members looked each other in the eye again. And then it was a bit of a coincidence that some space became available in one of the bank's existing properties, a whopping 300 square metres. And then the board members said okay, we'll put our money where our mouth is and we'll have to renovate it anyway, but we'll put a bit more money where our mouth is and build the (...) Innolab there.

Und im Gegensatz zu vielen anderen (...) Innovations Labs haben wir von Anfang an gesagt, wir wollen uns auch nach außen öffnen. Das heißt, wir wollen nicht nur interner Dienstleister sein für Bankthemen, sondern auch für Unternehmen hier in der Region oder sogar überregional dann da sein und haben daraus dann auch dieses Geschäftsfeld entwickelt, was wir jetzt eben dann seit 2019 in die Welt gebracht haben. #00:04:40-8#

P1: To stay in the banking language, how many more casts are working there or are in there? What is that? #00:04:47-5#

P2: That is. That's the point that always hurts. We've already been through all the valleys in the world, because there's no real brand as yet, but we've already

sketched it out on paper (...) But the colleagues who are in charge of this as a core team are doing it all because they're highly motivated and keen on the subject and really want to free up their line work. Hopefully things will be a bit better in the future. It's really this party, these 1 to 9, who really have the freedom. In addition, we have now trained 17 agile coaches in the bank, who at least have the expertise to be able to support topics and projects. #00:05:42-9#

P1: I can do that. #00:05:43-9#

P2: I always see it as an add-on. So they all do it parallel to their normal line work. #00:05:49-5#

P1: How can I imagine that? Are they always two or three-day seminars or do they work on a topic for several weeks or how is it structured? #00:05:58-2#

P2: Um, you're now training the coaches or the topics we're working on. #00:06:03-7#

P1: On the topics in retail? #00:06:05-0#

P2: Um, so for internal I'll switch between internal and external. For internal topics, the current situation is that we have defined, um, fields of action that are currently being managed by drivers and solution teams have been formed around them. And these in turn network with each other because there are always interfaces and they meet at their own intervals. At the moment, unfortunately, it's only virtual because it's not really possible here in person, but otherwise it will take place here in person and that could be for a day. It could be several days in a row, depending on the subject area. It can also be an entire sprint week or, in the case of external assignments, anything from a small workshop to several days. We are currently preparing and coordinating what to do for the (...). They now want to do a design sprint over a week. We will then accompany them for a whole week. #00:07:14-7#

P1: Okay. Why was this (...) (InnoLab) founded? #00:07:18-5#

P2: Erm. Yes, I've already touched on it a bit, to get out of this classic waterfall project work, which was always a thorn in the side of our Executive Board, who left the company on the 31st of March and retired, with classic structures and project steering committees and things are first delegated upwards. In other words, classic Taylorism in the project structure. And that wasn't fast enough for him and he also wanted to hand over responsibility. And you could already see that in the future workshop. It really (...) took a lot of courage to simply hand over responsibility to

the employees. Take a look at how you want to develop this bank, you have all the freedom you need and that was really the case and even now, even in the areas of activity, there is of course networking with the Executive Board, but more in an informative way. The decisions are then really also made in the teams and he just didn't want to waste any time. And this room concept and the energy that is freed up by this room concept is simply conducive to really working together as equals, working together cross-functionally, breaking up the classic hierarchy, so there is always a culture of dialogue here in the rooms and really working together from the trainee to the Management Board. So that has also had a huge cultural impact, even if we haven't yet reached where we want to be. But cultural development takes time. But they were valuable steps that are now being supported again and again by the rooms. #00:09:09-7#

P1: Are the reasons then also, let's say, the banks' attackers, i.e. low interest rates since the financial crisis, lower turnover, declining profits, the business model is outdated, there are digital attackers. This is also one of the reasons for this. #00:09:27-5#

P2: Well, of course, the famous vocal world is one reason. But also the megatrends and the fintechs that are attacking us and the competitors and, above all, the topic of digitalisation, because these are also the core topics that we were the first to work on in an agile way, namely customer focus or now omni-channel banking, to see how we can transfer the classic functions of the bank into the digital world without losing customer contact or personal contact, which is actually the main focus of the cooperative banks. That's the balancing act that Landeier wants to achieve. #00:10:08-6#

P1: So open innovation also takes place, not only with banks and employees, but also with other target groups. #00:10:14-6#

P2: Um, yes, so what we've always liked to do is to involve customers in the processes, through interviews or active participation. And what was always a bit of a dilemma was that when we picked up speed, the next merger came in between, um, merger negotiations with the (...), so of course a lot of energy was channelled into that again, so we had to put some things on hold again, otherwise I think we would have made some progress. Also through the digital member network, which we had actually wanted to establish a long time ago, where such aspects would be easy to handle. #00:11:00-8#

P1: Okay. And what strategic goals are you pursuing now? Is it about the business model, innovation, product development or new services? Or what are the financial ones? #00:11:13-4#

P2: Erm, yes, me. I had to smile a bit earlier. Well, I don't think we're really an innovation lab from a traditional teaching perspective, but I would almost see us more as a culture lab. Um, precisely in order to break up a lot within the bank, to break new ground and to rethink and establish new ways of working together. That almost carries more weight than it does now. Developing innovation, because of course we're always in the short grass when it comes to many things. Of course there are ideas to bring some kind of app to the market or to develop things for customers. But that's usually far too expensive for a bank of our size, so (...) it quickly comes to an end. And, of course, we're always involved in the network and in Fiducia and the data centre, so I think that makes it difficult to drive real innovation here. That's why I'm more interested in the topic of cultural development when it comes to internal stories. #00:12:35-8#

P1: Okay, and that can also be an innovation, namely renewing the way we work together with innovation, added value. It's also about being new. It doesn't just have to be a product, but the collaboration is also the new year. For whom? How new is the whole thing then? It could even be a disruptive innovation if collaboration in the bank is now completely revamped and this ultimately changes the corporate culture. Then that is. It's a profit centre in its own right. Does that have to happen at some point? So if it now becomes a limited company, it must be able to make a profit. Is that also the reason? Maybe to open up the lab to external partners or customers and say hey, you can book this thing? #00:13:17-2#P2:

Yes, so there is no sum that we have to generate. It would be nice if we left here with a black zero, because of course we could have rented the space in a medical centre to two medical practices. The idea is always that this should of course also be earned. We will never earn back the entire investment sum that went into this. So that, um, that's utopian. But that's never what the Executive Board was about. But it should be handled as a small business area, so that something flows back into it and that's why, above all, this opening up to the outside world, so that we are now developing our own training programmes, which we then also take to the outside world. #00:14:07-1#

P1: Okay. Do I have to imagine the craft itself in terms of format? How big is it and why did you organise it this way? #00:14:15-5#

P2: Well, it's about 300 square metres. We have two large work areas. One area is the plenary, which is also outlined by a large grandstand, where teams can always network very, very well, exchange ideas, where things can be patched up, presented. And then there is the other large area. This is the sprint area, which is equipped with team workspaces where up to 30 people can work in parallel. It is primarily equipped for design thinking, as there is also a lot of prototyping material on shelves. But it can also be organised very flexibly. The space because the furniture, which we also bought from a Berlin designer, is on castors. It's all movable, so you can always create the setting you need for the process.

And we also have an area for breaks or for the evening with a large kitchen. The board has realised a bit more as a hobby chef, so that team events or cooking evenings would also be possible there, so that this can also be promoted again.
#00:15:31-8#

P1: This equipment and the design, is that crucial for success? #00:15:36-9#

P2: Erm. It supports the process. I don't want to say whether it's really decisive, but you notice that it creates a different working atmosphere, that people interact differently here. The best example: even if it has nothing to do with innovation at all. A works council meeting was held here today with the Management Board and it took place differently than if they had sat together in the meeting room at the bank. I always find that quite amazing, because somehow a different energy flows. And in projects it's completely different again because everything is mobile. You switch back and forth between the rooms, there are no doors here, everything is interconnected and that emphasises this cross-functionality once again or promotes this eye-to-eye contact. #00:16:37-6#

P1: Do you have any adjectives other than different? So what do you notice that you have noticed in your dealings with each other, when people are there in that sense and so other adjectives than different? Is it more open or more closed or more creative? #00:16:54-1#

P2: Or it's more open, it encourages creativity. It is. (...) more open, more creative. Erm. At eye level. More familiar, even. Even the biggest sceptics, which of course we also have in the bank, who can't imagine anything about the way of working or the concept beforehand, we have found that they simply have to experience it. We have also organised a lot of so-called taster workshops, because the product (...) Innolab also requires some explanation as to what we want to do and offer here.

And once they've jumped over their shadows and simply got a bit active, you really notice how even a traditional, dusty bank suddenly blossoms and can open up and simply be who they are as a person and not as a banker with a tie. #00:18:02-5#

P1: Okay, so more informal. #00:18:04-9#

P2: Exactly. #00:18:05-7#

P1: You mentioned design thinking earlier. So my dissertation is very much about researching which methods are used in such labs, what is behind them and why they were chosen. Perhaps also in what order. I'd like to talk to you a bit about that now. Which methods do you use? Just whatever you can think of? #00:18:28-3#

P2: Exactly. We have worked out three core topics for us in advance. That has different aspects. But over the years we've realised that they fit together very well and complement each other very well. The first is mindfulness, which of course promotes resilience, which you need in this crazy vocal world in order to get through it in good health. But also to get through it well as an entire organisation, so that's the basis for us. But not just from a health perspective, but also really from this aspect that you mentioned earlier, to say, "Man, now I have to focus on one topic again. In many agile methods, I have also incorporated the opening and closing of this Double Diamond, which also promotes this mindfulness training.

I have exactly these aspects, I have an open awareness, the opening and again, the focussed attention and I can cultivate this in a different way. And it also promotes a different way of working together, especially at management level, which is very much in line with the agile values, which are very well supported and underpinned, so we are very happy to incorporate this. It doesn't always have to be under the guise of mindfulness, but simply methods that we then use to do this and are now also currently training our managers more and more on the topic of mindfulness. That's why I'm studying in the background, because we want to establish this more and more, just like many other companies such as SAP and Bosch. And the other topic has also come in through (...). It is the topic of complexity and systemic thinking also ties in very, very well with the VUCA world, where the topic of complexity is already included. And (...) it was always about simply making this complexity more comprehensible, more manageable. And of course, as a systemic coach, to play this systemic perspective more strongly into the companies and also into our organisation, which is why he developed his focus system. I don't know if he ever introduced it to you. #00:20:59-0#

P1: Mentioned very briefly, but if you like. That's exactly what's interesting. #00:21:03-4#

P2: Exactly, it's now a patented model of the focus system or focus model, which works with different levels, i.e. works more three-dimensionally in order to make complex relationships visible, where resistance can be anticipated very early on, where connections can be visualised. And we also work very haptically, as in many agile methods. So it's a haptic model on which we then work together as a group. It also draws a lot from constellation work, so that it connects different things with each other and is therefore often a real eye-opener in many areas. When you stand in front of it and say, "Oh yes, from this point of view, or if I put myself in the person's shoes, then I perceive the situation in a completely different way. So it can also be used for very different topics. #00:22:08-4#

P1: Can you name a few of the methods? So. Design thinking. #00:22:13-5#

P2: That would be the third aspect, the topic of agility, which is our third core topic, as it is primarily used by us or brought into the world through the topic of design thinking. Because this is a great method for us, especially in the external market, to introduce people to the topic of agility. They are very easy to transport. The second method that we like to combine with this and that we also combined during our Berlin week is Design Thinking with Scrum. We also like to use this to create backlogs and simply break down topics to make it clear what is actually behind the topic. We now also combine this here because we have the kitchen with the topic of cooking, so we organise Scrum as a method, as a cooking evening, to get to know the method. Another completely different approach. Erm, yes. And then the classic Google Sprint Design Sprint, which is also close to the topic of design thinking. We've already used it internally and also offered it externally. #00:23:40-6#

P1: Brainstorming methods? #00:23:42-1#

P2: Brainstorming methods, yes, are also often used in Design Thinking in Idea, there is also a colourful mix. Here, too, we always look at the methods in general to see what is helpful and that's why we like to mix things up from time to time, depending on the workshop or the field of action that is currently on the agenda. Yes. #00:24:06-7#

P1: Why did you decide in favour of these techniques or methods again? Hmmm. There are hundreds of methods. Why this one? #00:24:18-8#

P2: Um. (...) Because we had very, very good experiences with them ourselves, I think, and they helped us when we were getting to grips with the topic of agility. Then I'll take this Berlin week again. The Management Board approached me and said: "We have nine topics here from the customer focus on private customers. We would like to work on them in one week or have them broken down for us. What do we derive from this for the todos and what do we want to do? He threw that on the table and (...) then said: Yes, we don't need external support, we can manage that on our own. The second time I swallowed was the first time I had just been to a Scrum seminar, and we had already got to know Design Thinking and then we made this mix out of it and then in Berlin we brought in a bit of expertise through the Launches Labs, where Design Thinking and Customer Journey, i.e. customer focus, customer orientation, were also brought in again. And I think that convinced us so much that we said, okay, these are the methods that can be applied very broadly to many subject areas because they can be used so flexibly and I wouldn't say that we are implementing Scrum here in pure culture, but always, always look to see which aspect of this method helps us now? And next time, that could perhaps be a method that we haven't even considered yet. #00:26:10-6#

P1: Okay. In other words, the methods that you choose are because you have experienced them yourself somewhere or because someone trustworthy has told you about them. Trusted coach. So these methods are practical. The reason for using them is also based on experience and trust. In normal marketing speak, like a seminar. You don't know beforehand how this seminar will turn out, but if you realise that this method can be used well and is flexible, and that's the decisive factor here, otherwise other methods could also work, then it's more likely to be these and it's important and it has proven to be good, just as it fits together to some extent.

Do you use these methods in a certain order? (...) That's why I'm asking: What would you recommend? Where do I start then? Or is it enough to take a design thinking process and then break it down? #00:27:10-9#

P2: Um, that's where you have to look, of course, where am I? At the very beginning of the process with my idea, I have a pain point or a field of action, which I then simply pour into the design thinking process in order to develop a prototype, an idea at the end. Or is it about really breaking down a specific topic, then I'll take customer focus, then I'm more likely to use Scrum to create a backlog and define the individual work packages and then simply work through them in the solution

team. So we look at where we are in the process, we've also been doing CIP for a long time or four, many years in the bank, a continuous improvement process, where it was more about successively tackling or improving existing issues or processes. #00:28:10-5#

P1: Okay, are they limited in time, the methods or shall we say help? Design Thinking sits for three days and Scrum learning takes half a day or makes it flexible. Or how do you plan something like that in the dramaturgy? Hm. #00:28:29-5#

P2: Again, it depends a bit on the topic or the brief. Namely Berlin again. The clear brief was one week. So see what you make of it. So of course we considered that we wouldn't be able to do that in one week on site. So there was a phase before that where we had a team (...), a team (...), so to speak, which then worked in different ways to prepare things. Um, we often worked with so-called pilot teams that then designed workshops for testing before they went into the rollout. That's also how the future workshop came about back then. But from my point of view, there is no. There is no pattern, no rule. I would always make that very, very strongly dependent on the topic that comes up. #00:29:37-0#

P1: I'll ask about best and worst cases later. For example, I have a few studies, there are scientific studies on success factors, and I have found three statements. The first is that the more methods are used, the better the result. What would you say to that? (...) Or is one method like design enough? (...) And not anymore. It depends.

P1: No, it's simple. #00:30:12-5#

P2: (...) I'm more in that direction. It has to be the right method for the topic for me to be successful. So I'm not a friend of that now. I'm not a fan of opening up my method suitcase, which can certainly contain a lot of things, and launching a firework display of methods. But it's not at all useful. Um, and in a design thinking process, I can also pack a lot of different methods into it. So that's the question, what is a method anyway? Do we now see design thinking as a method or do we also see each phase as a method, where I have sub-topics in it, in an iteration or again, if I then go back one step in the process and then perhaps go into back testing again, so these are actually also methods or individual methods. You also mentioned brainstorming earlier. That would also be another individual aspect. #00:31:17-6#

P1: Okay, the second output from the study is: the more heterogeneous collaboration, the better the result. The more heterogeneous collaboration, i.e. cooperation, the better the result. #00:31:32-7#

P2: I would subscribe to that immediately. #00:31:36-3#

P1: Yes. Why? #00:31:37-5#

P2: Um. (...) Yes, the classic swarm intelligence that comes together. #00:31:46-0#

P1: And I can't lose focus of any aspect so quickly. We've also had that experience. Things come to light that you wouldn't otherwise have considered or taken into account, because through the. Collaboration is really cross-divisional, cross-departmental. You are simply made aware of points and things more quickly and can take them into account straight away before you fall flat on your face later and have to row back again. #00:32:25-9#

P1: That means different experiences for these changes of perspective. #00:32:30-0#

P2: Exactly, changes of perspective and experiences, also in terms of age. A lot of things come together. We also try to bring young and old together and get them to work together. So male, female, diversity. There are many aspects that come together, which in turn encourage creativity and lateral thinking. Yes. #00:32:55-5#

P1: Okay. Third output. Almost unpleasant to say. The more information flow between the participants, the better the result. Yes, of course, it's something. #00:33:11-2#

P2: It's immensely important to ensure this networking so that nothing falls by the wayside, especially when you're working on topics or things in parallel. #00:33:20-3#

P1: Yes, also. Always good for this study. Just wanted to ask you. Briefly the input into the meta level. How did your management consultant become known? (...) Innolab was anchored in the hierarchy, so I told you that someone who was head of the company one year ago has now retired. He practically initiated it.

Now there is the so-called promoter model in innovation management, which means that it has to be approved from the top down, resources have to be made available. (...) Do you actively use the promoter model at management level or is it more of a coincidence what they wanted? Or does it at least shape you? #00:34:06-3#

P2: Well, I think it was more of a coincidence that the board member who has now left wanted it, but we were actually a team of three, the board (...) and me. We then came up with the idea of taking something like this out into the world ourselves. And it was certainly beneficial, and it continues to be beneficial, that the Board of Directors stood behind it and provided the financial resources and was fully behind it right up to the last minute that it was here. And the whole thing has not yet been anchored organisationally in the sense that we are now catching up on this, but it was then supervised by Corporate Development. And as a core team, we then had the second advocate, so to speak, namely (...), who has a modern understanding of leadership anyway and let us run as managers. And we were able to organise it ourselves and plan our time as best we could. And that was very different from other agile coaches at the bank, who sometimes had to fight battles with their superiors.

When they said, “Man, I have the opportunity to work in the (...) Innolab for a day or will be happy to accompany a topic there. So far, they have tended to be thwarted because we always wanted to include innovation times in the job description so that it would be legitimised to be able to work with them. But we haven’t managed to do that yet. And now we are completely restructuring the bank according to the archetypal concepts of (...) so that we will also have a so-called change cluster in future, where the topic of innovation will really be incorporated. And now, through two division heads, we will also have a mouthpiece in the bank and this (...) will now be seen as a subsidiary, so to speak. Already seen as a subsidiary, so to speak, even if it has not yet been spun off. But there will still be a strong cross-connection to this change cluster. So we will never be able to separate it completely. Because we also fertilise each other or need each other. #00:36:40-2#

P1: How important is this commitment from the board or the executive floor?
#00:36:45-8#

P2: (...) Yes, on the scale that we’re doing it now, I don’t think it’s possible as a grassroots organisation, so you really need power from the top. And this change cluster has now also been deliberately given two division heads, who will probably even be given a chief representative, so that they can, unfortunately, in this old way of thinking, which we don’t really want any more, but still have this power to push things through in the area of innovation, even against other division heads.
#00:37:25-8#

P1: This kind of authorised signatory. Okay, let's move on to the output. What kind of products or services or what? What has come out of it so far and how do you measure the success? There are various key figures, as mentioned earlier: Patents, property rights, key performance indicators, the price or simply turnover and profit. How is success measured? #00:37:54-5#

P2: Um, well, as far as the topics here are concerned, we haven't defined any key figures. At the time, the aim was to develop two new business areas in 2016 before the (...) Innolab, which would position us a little more broadly as a bank and also steer us into other areas and other services. Nothing came of it. Nothing extraordinary came of it. But we have now founded a property company. This means that we now also operate student residences and other properties, such as this health centre, where I am now sitting here with the (...) Innolab, and a service has been created for customers, the so-called (...) secretary, where we take on office and administrative activities for customers that go beyond banking transactions. And we are now in the process of developing the product further. And we'll be looking more closely at how many customers use the product in future. Um, because we already need key figures in order to achieve this with consultants, because it's a bit stagnant at the moment and we're currently looking at how we can achieve this as an additional service. #00:39:34-0#

P1: So there have already been, let's say, beginnings of business model innovations. Yes and approaches to service innovations. #00:39:44-2#

P2: Exactly, that's what's already happening. As I said, this (...) Innolab is currently being further developed. In the future, it will perhaps also be made available to corporate customers. So let's take the small master painter who is perhaps always struggling with his invoicing or appointment management, so that we can say, "We'll be happy to do it for you for x euros per month. And we are currently planning another business segment. Um, which is supposed to represent the topic of interim management for corporate customers or also offer succession planning and succession planning, because unfortunately it is very, very difficult for many corporate customers to find something adequate as an offer. It's actually the job of the Chamber of Crafts or the Chamber of Industry and Commerce, but that's not the case and we can imagine that this could also be interesting for corporate clients. #00:40:39-1#

P1: And there was a patent or, if I heard correctly, before the Focus System. #00:40:44-6#

P2: That's exactly where. You have to say that (...) developed it privately and is now simply making it available to the man or the bank. That's actually more his private development, his private patenting. #00:41:00-3#

P1: If you have ideas or information, what criteria do you use to judge them? Do we reach market maturity? Who decides what is put on the market? Is there a decision-making body or does it just co-operate? Or how do you do that? #00:41:16-1#

P2: Well, we now have a separate field of action for new business areas. So you would otherwise call it a project, a project team that works on these topics and can decide for itself, relatively initially, which topics are to be taken on and then developed to a certain prototype. And then the Executive Board will certainly give it the thumbs up or thumbs down. That's how it was back then in this future workshop. I think we had twelve analyses or business areas back then and all employees were able to invest a virtual €10,000 in the idea they liked best using crowdfunding, so to speak. And that's how (...) and Immobilien GmbH came about and were then continued. So even the management board took a bit of a hands-off approach back then, but then put it in the hands of the employees. #00:42:25-6#

P1: Okay. Are there any obstacles that you have noticed in such an innovation process? What hinders this process from your experience? #00:42:36-1#

P2: One issue is the resource. It's a constant battle with the line. Um, to get the appropriate resources so that colleagues can also work there. Unfortunately, you have to say that on the one hand, but on the other hand you also have to find employees who want to work there. Um, because we're also in such a tight situation in terms of staffing that many people say, "No, I just can't do it alongside my mini-job. That really is an absolute bottleneck, which we still haven't been able to resolve properly in terms of how to organise it. Other obstacles. (...) Yes, developing the much-loved mindset, working differently, um, looking at issues differently and. We're doing very, very well with this snowball effect. I already said that when I was 17, we were already briefly trained in various agile methods and are now continuing to train so-called change coaches in order to bring these topics more culturally into the bank. So that it is no longer such a parallel world, which it was for a long time. So there were future workshops or formats like that, and then they were over and then you returned to the old banking world. It was so disconnected. And what we now want to achieve through the change clusters is for this to become

the norm and for this culture mindset to change. But it takes a long time for bankers who have spent 30 years moving their credit file from right to left to be completely evil. #00:44:40-1#

P1: Yes, back to the methods again, because that's the main point. The question again is why do some innovation methods lead to success and others don't? Is that what you think? #00:44:55-8#

P2: (...) That implies that you actually have to do a topic with two different methods in order to have this comparison. #00:45:08-9#

P1: Maybe. So it's a change of perspective. You could take ten methods and try to solve the same problem with them. I'm interested in your experience that some techniques are probably used more often for very specific reasons. #00:45:28-6#

P2: Erm. Well, I think some things are often a fad. So, let's all do design thinking, then everyone runs off or now we're all agile. #00:45:46-3#

P1: Then let's all do Lego Serious Play. #00:45:48-6#

P2: Exactly like that. I think it's more of a ripple effect that happens and then everyone jumps on the bandwagon or doesn't jump or jumps too late. #00:45:57-1#

P1: I try to find out why individual methods are perhaps used more often, and that's why there is more or better output and some are not used in the same way. My There are hundreds of methods. There is this funny book with 555 innovation methods and so I think okay, what am I going to do for five minutes and I already mentioned that earlier. But I have to follow up on that. #00:46:26-0#

P2: Um. So, as I said, I think a lot of it is this, this awareness or this hype that is being generated there. Because if you look behind the methods, you'll see classic things or things that have been done quite often. Let's take brainstorming again. Um, that may now be included in design thinking, but it's something we've already done before. So things are actually just repackaged and put together again and then you write a new title over it and say you'll be even more successful with it. And that's why our approach is always to see what the topic needs. And then I make a selection and maybe it's no longer design thinking in its purest form because I only need one aspect. Or we modify Scrum or (...) have also combined very different things in the Focus System. Erm. No, we always look at the topic. And what does it need? #00:47:34-8#

P1: He also uses it until the word is known. #00:47:38-4#

P2: Yes, so the (...) Innolab has also been thought through at the (...) airport with a business model canvas and currently the (...) secretary. We're also going through it. #00:47:51-8# (...)

P2: No, so we haven't had any experience with it yet. Exciting, but we haven't focussed on it yet. #00:48:08-2#

P1: But I only ask a few scenario techniques, if something like that. #00:48:12-5#

P2: What do you mean by scenario techniques? #00:48:17-5#

P1: So again, you can take different perspectives. There is a worst case, a worst case scenario and a best case scenario. Depending on what might happen and looking a little further into the future. Brainstorming? Yes, does the morphological box say something or tell you something? Okay, that's enough. That's enough for me, but I've already figured it out. Okay, let's move on to two examples, maybe you can think of some. Off the top of my head. I need a best case and a worst case that you can think of that took place in your (...) through a process. That worked really well. Then there's an example of something that didn't work at all and the reasons why, which you start with, I'll leave that up to you. #00:49:03-2#

P2: So the best cases are much simpler. But that's a. Exactly. It's this future workshop that we did, we worked together for three days with 180 employees. (...) Because it was so intense and so emotional and released so much energy to find a new way forward, especially after a failed merger. And that was designed according to the principle of the RTC conferences and. Colleagues are still drawing on these experiences from the three days. #00:49:49-4#

P1: Do you remember what methods you used? #00:49:53-0#

P2: Well, as I said, RTC would also be a method for me. And within the conference there was classic brainstorming. There was work in small groups, there was crowd funding, even if you see it as a method. I would describe it as a performing game. So there were interviews. (...) What else was there? Yes, very different creative methods. In addition to brainstorming, the groups could choose from a potpourri, whether it was Walt Disney or three hats and, um. #00:50:45-2#

P1: (...) So he had also identified a bit of diversity. In this respect, the more methods, the better, because when heterogeneous people, very heterogeneous

groups are travelling. Not everyone may like one method. Not every method suits a person. Maybe the two things go together. I need heterogeneous groups and data. That's why I need several methods, because not every method suits a person differently. #00:51:17-4#

P2: Around and or maybe even tailored to the coach. So yes, we didn't have coaches in that sense, but these pilots then took on a bit of a coaching role in the small groups. And of course they also looked to see which method suited me as a coach. Yes, that is perhaps another important aspect. As a trainer and lecturer, you also know that. Do I do the PowerPoint battle or am I the flipchart king or picture? #00:51:45-6#

P1: Today's PowerPoint lecture is discrimination, says the coach, the prosthesis or the one chosen by the presenter. Because that's the point. Well, how do I choose it and which one is successful? Okay, and is there a worst-case scenario? Did something not work out? #00:52:04-6#

P2: The worst case, that's not the case at all. It may have been an external transaction, but that was the absolute worst case. We accepted a consulting assignment to restructure a part of an organisation. We were supposed to accompany the process. But what we sensed was that they had chosen us as the service provider. We also had endless preliminary discussions. They simply weren't ready yet. Also in terms of management. To approach this process in a completely open and agile way, because they were still very classic and very strongly characterised by the hierarchy, so that we kept coming up short and had to row back again and again. And the process unfortunately failed. We're still in the boat now, trying to get the cow off the ice. Erm. But there was absolutely no maturity and therefore no support from the top, i.e. from the divisional management, not even from the management. The choice was already behind it, but the divisional management, i.e. the middle layer, put the brakes on it. #00:53:28-3#

P1: And which methods didn't work or which worked? Or was it not the methodology at all? #00:53:33-5#

P2: Erm. So we approached the methods with them. We also worked with a cross-functional team. It worked wonderfully with the team. It was always just the irritation or a different target image with the manager, so that we kept getting into

discussions. And then this team also broke up. So they're still frustrated today and of course we have to get everything back on track. #00:54:08-2#

P1: That means it failed, not because any methods or techniques or the application of them didn't work, but because the commitment wasn't there. #00:54:15-3#

P2: Exactly. So verbally yes, but then in depth? Absolutely not. And there's also very little self-reflection and very quick blaming. Along the lines of we should have pushed harder, then they would have achieved the result that the manager wanted. Um, so it's very much the old world. #00:54:39-6#

P1: Okay, thank you. Thanks for the respect for the example. I have two more things about people. What do you think a person who works in a boarding school or takes part in such innovation processes needs to bring to the table? What should they bring to the table? Ideally. #00:54:58-2#

P2: Um, an open mind. Um, also the ability to self-reflect and change perspective so that you can also include other aspects and other people. Erm. Yes, and the ability to think outside the box. In other words, to leave the beaten track. Um, I'm thinking of the, uh, brainstorming headstand, so really turning everything inside out and thinking in a completely new way, leaving everything else out. Erm. #00:55:42-9#

P1: Headstand ability. #00:55:45-8#

P2: Exactly. #00:55:46-9#

P1: I sometimes use that in my seminars. I sometimes ask about totally weird things and then. Some participants then answer as if it were a completely normal question and I then have to say to them. Is our seminar now called "How do I mess up a presentation? It's a rhetoric seminar. Don't any of you flinch? Or what's going on now?" Your students are questioning and answering the debate well, what does he make of it now? Now you know how to mess it up and then the antipants look so squirrel-eyed. It's like turning round. Yeah, that's cool. Okay, that's enough. Please. Last question. I mean, to summarise, you now have really good experience with setting up this (...) Innolab and whatever you call it in the lab or think tank or I don't know. Let's say someone were to approach you at a company and say hey, we'd like to set up some Innolab. What recommendations would you have? On what? What are the success factors? Hm. #00:56:47-7#

P2: Erm. So success factors or prerequisites: Space is one thing. It can promote processes and things. But I think I first have to start with the people who have to be taken on the journey. Erm. And take them into the world that I want. And I'll take our journey over the last five years as an example: five years ago, there would have been no understanding at all for a cinema lab, i.e. really a space. The resistance would have been immense if the Board of Directors had said five years ago, "So, we're just going to build something here for 1 million and. It simply takes time, which many people don't want to take, to start this journey. And the steps can of course vary from organisation to organisation. But from my point of view, it stands and falls with the people. If I don't get them on board, then I can build fancy rooms, fancy labs. But that's the way it is, perhaps as a status symbol to the outside world. It used to be the Porsche in front of the door. Now I build myself an Innolab. But I doubt whether it will be useful and help me progress as an organisation if I haven't taken the people with me. #00:58:18-8#

P1: Yes, and the choice of methods or the sequence of methods? (...) What would you recommend? #00:58:27-6#

P2: (...) So when I'm just starting out and bringing people into contact with it for the first time, I find design thinking really good as an introductory method because I have this double diamond behind it as a principle. I can incorporate various creative methods. I can also use it to establish iterative working. I can establish a culture of error by allowing myself to fail and take a step backwards. So I think I get a lot of the agile principles across well, especially when I'm starting out. #00:59:19-4#

P1: Okay. Wow. Great. (...) Yes, the end of the interview. Well, I'm done. Thank you very much. Yes, with pleasure. Thank you very much. #00:59:35-5#

P2: I hope it helps. #00:59:36-6# (...)

P2: Then toi, toi, toi. #01:02:44-0#

INTERVIEW TRANSCRIPT EXPERT # 3

Interviewer: Oliver Meschkat

Date: April 2021

P2: (...) So first of all, cool. Cool that you're taking part. As you know, I'm doing a doctorate in innovation management. It's about innovation labs. And I want to find out what the mechanisms of action of Innolabs are. And that is now one of the studies. I'm doing it with four or five people. And from this study I will, let's say, hopefully be able to ask the right questions. (...) And if it goes really well, at some point I'll have results from the main study on how best to set up such an Innolab. And if it works out, then maybe I'll even try to run an Innolab like this for five days next January and test it. As field research or something, but it's a three-stage process. The first two stages are now clear and for the third stage, I'll have to see what works.

But you are now one of the interview partners who are responsible for the preliminary stage in that everything you tell me is okay and you can tell me what you like, let's say, and then I transcribe it somehow and try to get something out of it. It's just about that, you know science yourself. We have to try to collect information and see what is recommendable for other people. That's all okay, if you agree, what to put very briefly, I can do that, record that. It will be like this. Firstly, you agree that I record it and then we transcribe it. Okay. #00:07:28-5#

P1: I am. #00:07:29-4#

P2: Yes. Okay. Briefly about you. Who are you? Where are you? What is your function? #00:07:34-0#

P1: My name is (...), I'm Head of Organisational Development at (...) and therefore also responsible for innovation and transformation at (...). I have been working in the cooperative group for 21 years now and have held various positions, starting with eleven years at (...) in the same position and then four and a half years in management positions at (...). I then made a brief foray into the blue and orange

world in customer service there, over a period of ten months at a (...), but the merger didn't materialise. Then I left there too, let's say, and ended up back at (...). And yes, I've basically been trying to reorganise our company since mid-2016, to reorient our company. #00:08:37-5#

P2: To one. #00:08:39-6#

P1: Yes, in a different way, in a different kind of (...), with innovative approaches, with customer-centred approaches. And I also try to work on the culture, which is a topic close to my heart. Because I agree with Peter Drucker on that. Carl Schild stands for breakfast, for dinner for lunch. Because if we don't succeed in having a positive corporate culture, then we'll be left with nothing. And Drucker analysed this a long, long time ago and found that 30% of corporate culture also contributes to a company's success. If we don't succeed in making this 30% available, this resource, then we can work on our strategy and vision mission as much as we like. That will not lead to the goal.

So in this respect, I am also a cultural ambassador, not only a cultural ambassador in my company, but of course also a cultural ambassador when it comes to the topic of good leadership, because first and foremost I have been a manager for a good 24 years now and have also held various management positions and I have also made good leadership my motto, because I know that this also unlocks potential in employees and my two hashtags on the topic of leadership or leadership are not leadership and epaulettes or anything else, but my two hashtags are meaning maker and enabler.

So I love this digital or self-leadership approach very much. And with my team, with my development team, which I also manage directly, we entered the agile world two years ago, over two years ago, two and a half years ago now, and by entering the agile way of working, we also gave ourselves a different structure. The team is a holographic or almost holocratic team. This means that the team makes its decisions using the consensus method. I think that frees up a lot of potential because the employees work very independently, very self-determined and, in principle, the decisions are now made where they belong, namely at employee level, not at management level. It is not the manager who is the better decision-maker, but the employees. I am a partner there, a partner on an equal footing with my employees, and of course I also have a voice in the team and try to put forward my arguments when it comes to decisions. But if the team ultimately says we're going to do it the other way round and yes, I don't have any major objections, I

could of course pull the veto card, but I don't want to do that and I've never needed to because I really have a very, very wonderful team. So in that respect, things are going quite well at the moment and I'm trying to develop the employees and ultimately work in a strength-orientated way.

And these are my, yes, my challenges that I have here, because of course in (...), in the press about (...), but also in the cooperative organisation, we keep encountering a very strong old mindset and this old mindset is now more focused on epaulettes, more on superimpositions and insinuations. And the manager tends to make decisions rather than acting in an advisory capacity or at eye level as a servant leader. #00:12:23-6#

P2: That's where I come from. I don't want to say any more about the introduction. I think that was already far too much. #00:12:30-8#

P2: Fine. #00:12:31-7#

P1: But so that (...) you can categorise a bit better where we currently stand. And then. #00:12:40-0#

P2: Excuse me, are you (...) - a businessman or did you study that? #00:12:43-9#

P1: (...) I did a classic (...) - commercial apprenticeship at (...), then did a trainee programme, worked at the head office in Frankfurt for (...), also managed major projects there and then also did a degree course on the side and now I'm about to, a good two years ago, two years ago now. I also completed my studies at the (...) Digital Transformation Manager. So I was also very much involved in digital transformation and digital transformation always starts with ourselves. It doesn't necessarily have anything to do with technology. I've dealt with it and it's changed me a lot, because you know that too. Education is an attack on your own identity. A very wise person or my coach father once said that to me. And it's true.

You change a lot with every training course, every degree programme you do. And the others who don't want to change will of course stay put. And how difficult it is to then take people with you again or to move on with your thinking, that's quite a challenge. Um, in that respect, yes, I'm a classic (...). I certainly learnt it from the bottom up. Many people always say to me that you're not a typical (...) You think very differently. I don't even know what the typical (...) is today. Because the (...) as I once learnt it no longer exists. What the trainees learn today is basically a

businessman for B(...). It no longer has anything to do with the classic (...) businessman.

This ultimately holistic approach that we were given in our training, and I actually attach great importance to it, even in our company (...), that we organise the training in such a way that it is more of a holistic approach and not just reduced to sales. That would be far too little for me.

But that's the standard and I experience it myself. I've been on the examination board at the IHK for a good 25 years now and you realise how old you are when you've been there for so long. And on the other hand, you realise. But you also realise how time has simply changed. Today, many trainees only stand at the service desk or only see the customer advice from their training company. And they no longer realise the big picture of how (...) actually works. But that's not our topic today. We can certainly talk for two hours about this topic of education and further training learning 4:0 zero. It's also a very, very exciting topic for me. But that's not our topic today. #00:15:44-6#

P2: Exactly. (...) we are moving towards innovation management. How is your, let's say, innovation department organised? Is it a global one or is it a think tank? Or what do you call it and what does it look like? #00:16:02-2#

P1: Well, we call it an innovation workshop. In our company, ourselves, in (...). In principle, the innovation workshop consists mainly of my employees. The team. The process managers, the project managers and the employees for digitalisation and automation are based there. And this topic of innovation is also very much located with the project managers today. Ultimately. Today, the project managers have the task of regularly looking at the trend radar from the (...), for example. We have the (...) in use. We regularly look at the micro-trends. I think we are also well networked in the cooperative group. We always look left and right to see what's happening. We are also networked with the scientific community. We work very closely with the Institute for Digital Management at the university (...).

We read a lot, from different directions, including on the subject of innovation. We regularly follow (...) 's blog. We simply look left and right a lot. Of course, we also look at what fintechs are doing and try to incorporate this into our daily work. And that's where the crux of the matter comes in, because then we come up against this old tanker (...) and the old mindset of many managers and employees here at the company, where this topic of innovation culture and our own innovation work is

completely different. And they always think it's a bit of a crazy idea, I say. When we do something there and when we present something that can also be implemented in-house.

Our latest big business model, which we have now brought out, the (...), is about comparing (...). And this is a customer-centred comparison platform that we launched last year in March during the first lockdown and we had high hopes for it. We also worked together with the (...) in the autumn on a bit of a challenge with (...). They confirmed that we did a lot of things right and well. But we also made mistakes and that's inevitable in innovation work. You also make mistakes, because none of us are company builders by nature and we've learnt the hard way. But in the end, we came to the realisation that we are now more or less frozen in comparison with the status quo that we achieved in January. That's not what we wanted. We wanted to continue there. We also worked with the (...) to define how we could continue and organised another strategy workshop for the company.

But none of this has helped. The topic has now been frozen and that has of course put a big damper on our innovation work. Because, as I said, innovation doesn't work like this, I pull something out of the box, do a bit of magic and then it works all by itself or makes money, it's really hard work. And you can see it with many founders, they work 24/7 on their topics, they bring passion, they bring courage, they bring curiosity to develop things. And that, I believe, is what you absolutely need in innovation management.

This topic of passion, this topic of curiosity and this topic. The courage to do things. We also do things differently from time to time and look for partners who can do it and support you. As I said, we've done a lot of things quite well. But we have also not done many things well. And where we didn't do things well, we also learnt from them how we want to do things differently in the future. But that is also always a challenge, because of course it's always a case of doing your day-to-day business first, making sure that the (...) is basically running. And then, if there's still time, you can innovate. But that's not how innovation work works. Instead, I need my employees. If I want to keep such employees, such qualified employees, I must of course also give them the freedom to innovate.

And that's the big challenge, to keep cutting that out of the daily routine and to keep holding out my broad cross and saying: people, we know what we're doing,

but I also need other, different playgrounds so that I can keep such good employees.

We are now a company with 265 employees. You don't normally get the employees I have on board today at that size. I am also aware of that. (...) These are two factors, of course the way we work together as a team. That's how I can keep them.

We also live this New Work approach as a team. So we work according to the principles of Frithjof Bergmann. And this, this big topic or something that Frithjof Bergmann put at the centre, what people really, really want, is to make that the core of the work. And of course we can only do that if we give our employees the freedom to work on these innovation topics in a very focussed way. And I have to defend that again and again, it really is like a castle. You have to dig moats, you have to build cannons, even if only as a threat. But and and and. You have to build big walls first, because otherwise it naturally arouses desires.

And then, of course, there's always the question of what results have you produced? And of course I like to be measured by results. But the crucial thing is that innovation work does not follow a fixed process. There are many iteration loops that you simply have to go through in order to transfer this into everyday life.

And even if we have or have a really cool idea, I would almost have to say that we have to introduce it in-house and then transport it to the customer with a certain passion. That's where we run into the next hurdle, because then we're told, well, what else are we supposed to do, we have to sell our products.

But that's no longer the point today. I think even the dumbest person has realised by now that this business model that we have today as (...). We take in money and lend it out at a margin at a slightly higher price and do a bit of payment transactions. And we get commission for that. We do a bit of securities business, for which we also get commission. It no longer works like that. So at least taking money in for a low interest rate and lending money out for a slightly higher interest rate works. That's dead.

So we need a niche, also as a (...). And for this niche, I have to shift my focus to the customer and look at what the customer actually needs. And we haven't paid any attention to that in recent years.

In principle, the customer wasn't important because this business model has always worked. We did until 2006, before the financial crisis, or 2006 or 2007 before the financial crisis. If we did a campaign where there was still interest in the 4 or 5 % range, the buses were standing at the bottom, really unbelievable, they stood outside and waited patiently until they could come to us. Now we have zero interest or negative interest, not a single bus comes any more. Not even on good days. And it's also a bit more expensive to lend money.

But there's nothing left at sea either. If you have a negative current yield, even in the ten-year range of the current (...), where do you want to earn money if you need at least zero nine to live on? So these are all issues that will take a long time.

It's a cultural change. I think we've initiated it in the (...), but you also have to say that a cultural change like that takes time. I once learnt between five and seven years, that's nothing. What? What you do with the light switch on. And then the light goes on. But you really have to look at how you can, how you can change this mindset of the employees in the long term and make them realise again and again that this old, this old (...). Simply no longer works.

In my view, that's the biggest difficulty. And under (...), you also know him as a maker of innovation, he always reported very briefly from his (...), where he also said: I am completely stunned. What we are experiencing right now. We've been working on a culture of innovation for so long and we now want to reorganise the company, including towards a (...). And now we suddenly find ourselves in front of the labour court with many employees. It just doesn't fit together.

And I think that's exactly how many people in the cooperative groups are feeling at the moment. Those who have really understood it are now trying to make their homes fit, to remodel their homes. They are experiencing a bit of a relapse into the old days. Not just among employees, but also among many managers. And that's always a bit of a criticism of your employer, the way you go about it. When I look at everything that comes out of the (...), yes, when I take on board some of the attitudes of some of the (...), then I really have to say, where are they actually living? Are they still living in the 19th century? Or have they already arrived in the 21st century?

And do they actually know how digitalisation is also changing customer behaviour and that we can no longer act in this way? Many still believe that the customer still comes to the (...) and the customer does exactly what the advisor wants. Maybe it's

the grandma at 75, who I can then sell another savings bond to, if she still buys a savings plan at all. But the rest of the customers, they don't even come any more. And they pick and choose the cream of the crop from all the fintechs and ultimately put together the service portfolio they need. #00:27:10-3#

P1: We don't get into many living environments any more. In November, we held a workshop with our customers or with five of our customers. Afterwards, I had to listen to the sales team: These are not our typical customers, what makes them tick. So we really collected customer feedback. We asked them about how we do sales and how they perceive it and how we need to orientate our sales in the future so that we can reach them. They were certainly very digital people, but they also ranged in age from 54 to 30, which is a really good average. And they all knew us (...). And they really had a good relationship with us. Two of them were interested parties who had already looked at one of our (...).

But then you have to let the sales department tell you afterwards, yes, these are not our typical customers and we don't need to listen to them twice and all sorts of stories like that. So first of all, I find great excuses as to why everything is different and why we shouldn't believe them when we have done a digital fish bowl with them using such innovative formats. (...) When results come out that simply don't suit me. #00:28:37-9#

P2: Is this whole explanation of why the business, that the business is changing and that there is a need to change something. That was the reason for founding and setting up this innovation workshop. #00:28:52-2#

P1: No. What was that? #00:28:53-6#

P2: What was the reason for that? #00:28:55-3#

P1: The reason is actually, it's already in our, in our cooperative DNA, this decentralised entrepreneurship. And what does entrepreneurship mean? It means that I am continuously developing my own business model. And that is, of course, a very important point that has simply not happened in recent years. Yes, (...) it worked constantly for years, you took in money, you borrowed money, but you didn't develop any further. I always say that the last innovation that finally brought (...) out as such was the cash machine. To put it bluntly And the ATM is now more than 40 years old. Not much came after that. Yes, there were a few more financial products that very few people understand anyway, like ETFs and who knows what else. I wouldn't see that as innovation, not really innovation.

And that is simply no longer happening and we are moving away or have moved away from our customers. And we actually wanted to reduce this distance. We wanted to be close to our customers again. We have that as a slogan, as a claim too. Clear, in every respect, close, sincere, direct. And that's what we wanted to embody. As a cooperative, we want to be close to our customers. We also want to be a partner for them in all financial relationships. But as I said, we were no longer that. And I don't think we are today either.

If we really ask our customers about this, and we did so in this workshop in November, and our customers clearly told us that we are currently not that for them either. Of course I can also find customers for us now who talk exactly after my mouth and say yes, you are a really great (...) and what you do is really great. But these tend to be customers who might have a life expectancy of ten years.

But the ones that I need to continuously rebuild my (...) and with the focus that we also have as an advisory (...), I ultimately need a different clientele and I can't just win them over by being advertised on comparison portals with a lot of money. I'm told that they should come to us. And that actually has to happen organically.

It has to happen organically through good recommendation management. I'd say it's similar to how it works at (...) today. The (...) is really excellent, even on the road. Customers queue up there. A customer at (...) is currently waiting six weeks to open his current account. But the customer doesn't care. The customer at (...) also pays a monthly fee of €5 so that he can open an account there at all. He doesn't care either, because the (...) is playing with a very important topic. (...) topic that many people also recognise as their future topic.

In other words, they have found a niche for themselves and are playing it very consistently. How can I establish sustainability in financial products, including in the financial sector? And will customers accept that? That I as a (...) can also operate sustainably and they can do that well. Others, others (...) have bought (...) and have now specialised in estates and estate management.

You've probably heard of other co-operatives that finance (...) uh. Footballers do player recruitment there (...) and stories like that, the ones that really make a profit. I'd say they've found a niche for themselves, perhaps in the corporate client sector, in the commercial sector. But the very traditional (...) simply no longer works. And I believe that you can only survive through this niche. And we are still looking for this niche, like many others (...). #00:32:58-8#

P2: And that was the reason why this future workshop was founded. Why with you, so when was it founded in the first place? Again. Five years ago. #00:33:06-2#

P1: Um. (...) And it wasn't that long ago. We founded it 2019. Yes, well, of course we have already worked on innovations in the team, in the customer department, in the department also cross-functionally with others from other departments. But it's true that it's also institutionalised. #00:33:32-4#

P2: Oh. #00:33:34-2#

P1: But of course we don't know now. And that's what this innovation workshop will do, of course. There is still no real formal go-ahead from the Executive Board.

So we're simply travelling a bit under the radar in many innovation topics and are of course looking for allies on individual topics. We say that we would like to work on this topic now. But that's always a very, very difficult balancing act. Yes, I once imagined that we would simply bring together ten interdisciplinary people who are simply keen to work on innovation and who can also learn about many topics at the same time.

So we have a huge, huge box of tools and methods that we can pass on, where we are fit, also in these methods, also for innovation work, where others can also benefit from it. For example, in 2016 we did the topic (...) Innovation Kickbox with (...). There was (...) in our company who did it and we then developed it further into PC, innovation, kickboxing. But we ran this format twice more for the employees and then there were no more participants because the employees were supposed to invest one day, I'll say Saturday, of their time and then no one was found. Then the big request came from the works council. Why don't we organise it on Thursday or Friday? In other words, on two working days. Then we said: Sorry guys, we'll give you that much. If the employee isn't prepared to do that, then that's the way it is and yes, the pandemic also intervened now, in XXL with the topic and switching to a completely digital format. We didn't do that either. We had other priorities. But this is something that we urgently want to revive as soon as the pandemic is over. This (...) kickboxing innovation, based on the kickboxing generation, to fill this format with life again. #00:36:02-2#

P2: Okay, let me ask you a few things very briefly. I need a few more dates from you. So this workshop was founded in 2019. It's internal to your company. It's not external? #00:36:14-1#

P1: It's internal. #00:36:15-2#

P2: Yes, okay. (...) Are they employees who always work in this workshop or elsewhere? #00:36:20-9#

P1: They also work somewhere else. #00:36:22-9#

P2: And what percentage? So let's say, how much, what do you call it full-time labour or staff capacity? #00:36:31-8#

P1: Yes, well. #00:36:32-5#

P2: How many are there in there? #00:36:34-0#

P1: Well, if you take Max's capacities and break them down to just the innovation workshop, I'd say 0.5. #00:36:45-7#

P2: 0.5 okay. #00:36:46-6#

P1: 0.5 for the whole building. And of course that's pretty damn low. So I would have imagined an Open Innovation Friday, which was also in the concept for those who work in the innovation workshop, where we say, always on Friday, so 20% of the working time is ultimately used for innovation work and the employee knows: No, I only work Monday to Thursday and on Friday I'm always out and about in the innovation workshop. And it's not as if I don't do anything there, it's hard work too. But I work differently there, I don't do any projects, I really work on the innovations of the (...). #00:37:35-0#

P2: Ah, okay. I just need data. First of all, it's a room in your company. How big, what does it look like? To summarise briefly.

You can go to our website and then to the recruitment page. There you have a 360 degree tour. #00:37:54-9#

P2: Okay, so this is a room with different labels for tools or something like that or a flipchart. #00:38:01-2#

P1: Is that the innovation room? What will you see? Will you see when you look at it? Unfortunately, I can't share via mobile phone right now. #00:38:11-0#

P2: We'll make this short. #00:38:12-4#

P1: But just have a look at it. As I said, I was mocked for it at the beginning. Then it was said that we had already remodelled the room at the beginning of 2017, that it was going to be a playroom, that's what it was called for a long time, until you understood what we were actually doing there and why the room looks the way it does now.

For example, we've put in tables from the 180 degrees design thinking programme, these hexagonal tables. There are no more seats, we just have standing aids in there. We have the magnetic board, we have a large television, we work a lot with Meta Plan, with flipcharts, we have a glass board inside, so it looks completely different. We have a lot of freedom of movement because we wanted to do things differently. And very few people understood that at the beginning. And then we invited them into the room and introduced a bit of methodology. It was something that could do some good in this room, at least until before the pandemic. It's very deserted at the moment, but before that it was very well booked because everyone said, well, if I'm going to work with methods, I'd rather go into the room because then I know that all the tools are there. I can find everything I need there. Those are good prerequisites for working like that. #00:39:37-8#

P2: And he works with open innovation. So you bring in customers to interview them. That's enough for me. A simple yes or no is enough for me. The strategic goal. It is one. Is it the search for business models, innovations, product developments or service innovations? Or what is the actual goal? Erm. #00:39:59-1#

P1: I would call it product and service innovation on the one hand and process innovation on the other. In other words, we pursue business model innovation. We did the same with Vergleich. But we took a slightly different approach. But that's not the primary core of the innovation workshop, it's really service and product innovation and service innovation. And on the other hand, of course, the (...) is quite clear. We work on process innovation from the process. #00:40:29-5#

P2: Okay, do you have a budget for this workshop? #00:40:32-0#

P1: Er, I finance it from my budget and I now have around 6 million, so there's always something left over for them. I have a few budget leftovers, so I finance a large part of it. Sometimes, too, when we. When we collaborate with science. Working together, if we simply. We have now worked with. We have conducted a study on recommendation management with the IDM Institute for Digital

Management at the University of Eichstätt. These are things that I'm not going to have approved, I'm going to do them out of my budget. Ultimately. #00:41:05-5#

P2: Okay. Then you have. Before I get to the methods that he uses, so methods, it's the most important thing at some point. I'd be interested in this whole study, how he measures success. So resources are put in. Whether consciously or unconsciously. How is this success measured? You can measure it using patents or you have registered property rights. Or are there KPIs? Or is it simply turnover and profit? Or how do you measure it? #00:41:39-0#

P1: Of course, we have two criteria that we measure on the one hand: how quickly do we introduce an innovation? That is always the question of how innovation is differentiated. What we call an innovation may not be an innovation for someone else and vice versa. So in this respect, how quickly do we really put it into productive use in the (...)?

And on the other hand, what, what benefit? In other words, what contribution does it ultimately make to profits (...)? These are two factors that we look at. Now, of course, you find it difficult to judge such things.

For example, we have an Alexa, don't we? That's being built together with the Hornet, with (...). From my point of view, it's an innovation. (...) But the thing is free. The usage figures are in the mid three-digit range. We have a total of 140,000 customers. The whole thing says well, it's not worth it. But I would say that even the middle three figures are perhaps still with us today because they think it's cool. The fact that they also offer an Alexa boat and voice spot, which makes the whole thing even more difficult. But of course we also have other topics where we are very keen to ensure that this ultimately at least increases customer satisfaction or that the customer ultimately generates added value from it, which we then also ask about in customer surveys. #00:43:21-2#

P2: Okay, I'm purely interested in turnover, profit or any patents, number of patents or anything else. That's not the point at all. #00:43:31-5#

P1: Is that right? No, we haven't managed that yet. To apply for a patent for what we do.

According to which criteria do these innovations, let's say, reach market maturity? So when are they launched and who approves them and according to what

process? And simply thrown onto the market and tested to see what works and what doesn't work. #00:43:53-5#

P1: So, for example, we work a lot with the Mom Test, you might know it there, very intensively, that we really ask the potential customers, the users in the end, that we test things. #00:44:08-6#

P1: We could also call and ask how do you like the solution? And these are always topics that we do very systematically. Yes, in principle. If the customer says it's useful, then it's ready for the market. And then we ultimately try to develop it further.

Yes, that's a big topic that we're currently working on. As part of the digitalisation offensive, the big topic is also change in the customer interface, new online (...), new (...) app, new authentication procedure. People will now also say that this is not an innovation. Yes, that's true. But for us, of course, this is the biggest change to the customer interface in 13 years. And that's not something you do in passing. So we're already trying to incorporate a lot of iteration loops. #00:45:04-5#

P2: And to incorporate customer opinions and customer voices and then pass them on to the development team (...) so that we can simply improve continuously. #00:45:15-1#

P2: Okay, let's move on to the methods, the innovations, let's say, that you develop. There are hundreds of methods or techniques. Which ones do you use? #00:45:29-4#

P1: Well, I'd say we use the process that we've learnt, of course, a little bit from the stars. And we use the kickboxing (...) a lot. Of course, we use elements from design thinking, some of which are also included in the Innovation Click Box. We do (...) a lot of Lego Serious Play, where we repeatedly use what I consider to be one of the strongest methods in organisational development, which you can also use for prototyping or for other topics, for building target images, for strategic goals, for building images. We work a lot with that. We work a lot with the Marvel app. When we build prototypes. We work a lot with Canvas. That's actually a common tool in our company. #00:46:33-0# (...)

P1: There are always various other methods that we use from time to time. But essentially, we work very, very hard on the Adobe process. #00:46:51-9#

P2: Kickboxer Adobe Checkbox. Okay. #00:46:55-6#

P1: So that's basically the basic format, which the (...) then developed into Gene Innovation, the box or we then developed into the (...) kickboxing model. #00:47:04-2#

P2: What criteria were used to select these methods? But there are 500 or something. Or hundreds. In any case. #00:47:11-8#

P1: For sure. #00:47:12-8#

P2: Yes. What criteria were used to select them? Did it come from recommendations or from a seminar? A workshop and you thought it made sense or which ones you wanted? #00:47:24-3#

P1: I would say from many methods or from many experiences. The ones that we also made in the (...) of course. Through my training as a Digital Transformation Manager at the (...) I have learnt many methods of design thinking, superior display and so on. That's why we also use that and, of course, the methods that we ourselves are so well versed in. #00:47:54-5#

P2: Yes. #00:47:54-9#

P1: Of course, I'd rather use that than a method that I'm not so confident with and that I find difficult to apply in the end. Nevertheless, we always try out something new from time to time because we hear something new at a conference, because we hear something new in the Innovation Lab. In that sense, we've heard it because we've perhaps been recommended something, because we've read newsletters. So it's very, very different. We really experiment a lot and always try to make it very, very lively, these internal formats. #00:48:34-4#

P2: (...) Is there a sequence that you have established, or do you start with one method and then move on to the next? Or do you lump them all together and then choose one? Or do you somehow have a recommendation for a sequence? #00:48:50-2#

P1: Well, we already have a plan. For example, when we tackle a new topic, we sit down together as a team beforehand and discuss which method will help us achieve our goal. Because method is ultimately just a tool, it's not an end in itself. #00:49:08-7#

P2: Yes. #00:49:09-2#

P1: And we might also seek external advice from time to time, where we say: Wow, what does that look like? So we also talk quite a lot with Innovation Management. We've also spoken to the team from (...), with (...) you know them, and sometimes with other (...), where we say, yes, come with us. We're very closely networked with (...), for example. So we also exchange ideas with them every two months, the innovation managers, I can't say it in a generalised way, we always take this and that as our standard toolkit, it's definitely not that, but we try to use them first. #00:49:53-2#

P2: To those. #00:49:56-9#

P1: Execution or the problem. #00:49:58-9#

P2: Describes. #00:50:00-8#

P1: Ultimately finding a method that fits. #00:50:05-0#

P1: Where, of course, you are also firmly embedded in this method. And everyone brings a bit of a different skill set to the table. Yes, but that's, that's very broad, I would say. #00:50:16-5#

P2: Okay, there are a few studies on innovation labs. Just one as an example that says the more methods used, the better. But you would agree, wouldn't you? #00:50:30-8#

P1: I would agree in principle. Of course, if you don't know the methods and only ever use the same standard method, then this one standard method may not be as suitable as I just said for solving your challenge, your problem. And that's why we always start by looking at what the challenge is, what the problem description is and then try to find a method. And if, of course, you have a large toolbox. Then of course you find it easier to work with this large toolbox. Yes, in principle to handle. And you also use it at home, let's say not a hammer, if you want to screw a screw into the wall. That's exactly how I would describe it. #00:51:14-8#

P2: Okay. The study also says that the more heterogeneous collaboration takes place, the better the results. So the more heterogeneous collaboration, the better for the team, for the output. #00:51:29-6#

P1: And I subscribe to that immediately. And there's also a nice formula or belief in our team. We are, we are homogeneous in our values and heterogeneous in our strengths. And that is also what really characterises my team. We work very much

with the Habibi model. I don't know if you know this, these four colours. #00:51:50-4#

P2: DISG model, right? #00:51:51-2#

P1: So the team is really very diverse. So we have yellow, we have red while green, we have blue with the team and depending on the task, we then pick the employees we need for it.

So if we have a topic that we need to analyse first, an analytical project, then we pick the blue team members. And if we have more of a change issue, then we bring in the red team. It's very important that the employees know who each other are, because that's the only way they can communicate with each other properly. And that was before we started with the (...). It was a very, very big issue. The fact that the red man in my team was never able to communicate properly with the blue man was The red man was always emotional and the blue man always said Come on, tell me the facts and figures first. And the red one didn't understand him at all and said: "Man, the employee has a serious problem right now and you're coming at me with figures, data and facts, that just doesn't fit. But the fact that we really did this and worked very intensively with these (...) profiles, we simply got a much better understanding of it. (...)

Why do you think this heterogeneity (...) is so important? Why is it so useful for innovation? #00:53:20-4#

P1: Because everyone has a different view of this topic. And that is the deadliest thing about innovation work. Always thinking in the same direction or only looking at it with the same glasses. That's why I don't just have (...) in my team, I have a very different composition. Of course we also have (...) but ultimately I also have business economists in there. But I also have computer scientists in there who have nothing to do with (...), who tend to come from the tech corner and are also moving in the direction of digitalisation and automation. #00:54:06-8#

P2: Okay. Let's go back to the methods and techniques you've already mentioned. Why do some lead to success and why not? What would you say? #00:54:17-5#

P1: I don't think it's because of the method. It's more because of that. It's the right method for the right problem. That's one thing, because if I go out with a problem and maybe take yes, I'll take it, put it in play and that's not the right method for the

topic. And then it won't work either. And the other thing, of course, is whether I'm using the method correctly.

So I can fill in Canvas and I can fill in Canvas. But those are two different things. And of course there are some people who say Well, I've filled in the canvas. Yes, you've written in the canvas, I would say, but you can really fill it in so that there is added value and that you realise what your objective is. So what about the brand essence, for example? We also like to work with the Golden Circle of meaning, for example. So defining this, this vastness. Yes, and that is again this passion, this curiosity that simply characterises these reasons.

And that's what I always try to get very strongly involved in, that we really convey this passion. When we do innovation work, we really stand behind it or say that we don't stand behind it. But then it's also very clear to everyone involved that it might not work out. And I think that's a very important point that distinguishes us a little from founders, from real entrepreneurs, in that we very often lack this passion because we think to ourselves, well, I'll go home at 5 p.m. and then I'll drop the pen. But also. That's not how innovation work works.

Okay, finally on the methods, do you have a top three list that you would recommend? #00:56:25-8#

P1: Well, for me, for sure. The first method is Lego Serious Play, which of course suits me and which I also enjoy working with because I'm an organisational developer. The second method is the Business Model Canvas, which I really, really enjoy working with. For example, it has helped us a lot in comparison with the business model innovation. And the third method is ultimately Design Thinking, which I also really, really appreciate and like. Yes, those are my top three, so with the work that I certainly do the most. #00:57:05-9#

P2: In which order. #00:57:07-4#

P1: In the order I mentioned. #00:57:09-8#

P2: You would use it too. So start with Lego, then Canvas and then Design Thinking. Okay. Yes.

Wow. Back to the people. I've already heard a little bit. We've almost talked about people's competences halfway through the interview. So in that respect, I think I would tick that off. And what skills do people need to have in order to innovate,

what would you say? What do I need to bring to the table to create innovations?
#00:57:41-8#

P1: (...) Curiosity, courage and passion. I've told you that before, I think. #00:57:49-2#

P2: Good. Do you have a co-creation model? Does that mean anything to you? Yes.
#00:57:55-5#

P1: That tells me something. But we don't have one. So we don't really have one. Where I would really say now, it's really co-creation. So, what we certainly do is simply participate with the innovation community of ideas there. You know.
#00:58:08-5#

P2: What? #00:58:10-8#

P1: Yes, I would say that there is also some co-creation with others (...) there. But it's a real co-creation model. If you now take the definition from like. It comes out of the literature, otherwise I would say an okay. #00:58:29-5#

P2: Is there a reward system for innovation? So are those who were involved in the process rewarded? Are they rewarded in any way? #00:58:37-3#

P1: I would say from me, because it's sure to result in a nice meal or a nice event. But that's more, I would say. It's entirely up to me in-house. We simply don't have this culture of innovation. It's not anchored in the business strategy. The (...) and that is now, for example, a topic that I would like to tackle. We have already started to define the framework conditions together with Richmaker and our company builder. For me, this topic of innovation work also needs to be anchored in the business strategy. #00:59:15-3#

P2: It is not yet. #00:59:16-7#

P1: No, it's not yet. #00:59:18-3#

P2: Okay, ultimate question. I've already heard a few things. What obstacles do you see that could speak against an innovation process? What do you think hinders such an innovation process?

In my opinion, the biggest obstacle is, let's say, the mindset of managers and employees. From my point of view. This always tends to work against innovation

and tends to favour sticking to the old and existing structures. (...) So from my point of view, it's not the money. #01:00:03-2#

P1: Because it's also possible for us to look for partners and find partners who will work with us on the topic. We also started doing great things in 2016 that only cost us (...) our working hours. But they also represented a real innovation for us as (...). In principle, the partners co-financed this because they said: You are a reference project for us. We bring in our expertise, we bring in the money, you provide your working time, your expertise and otherwise we come together. And these are also topics that we have also marketed in the meantime. Erm. But I wouldn't see that as a rule, of course it also depends on individuals. Driving this topic forward is one such building block. I will soon be history here at the company and the other building block was a colleague from digital marketing. She left the company two months ago. And I would say that this means that the whole topic of innovation is no longer anchored at management level. So now we have to see who will take over. But first of all, I would say that the topic will come to a complete standstill for the time being. Unless I manage to anchor it in the business strategy by then. #01:01:32-9#

P2: Okay. Last question, penultimate question. Sorry, I've heard a bit out of it. I'm still looking for a best case and a worst case. Have you got anything? So something that really went wrong and the reasons for it and something that worked really well. And the reasons for it. Do you have two examples? #01:01:51-9#

P1: (...) Yes, so what worked really well. I've already touched on that. At the end of 2016 and beginning of 2017, we worked together with (...) to develop an online contract route for the Giro. Developed for the (...) with the new customer. And the project went really well. (...) was on board. We were. The framework conditions were right, the people involved were right and we basically had the greatest possible freedom. We just said we wanted to do it as (...), and the result had to be good, but nobody knew what. A good result, as you can define it. And perhaps there were also special constellations at the time. And the process really became best practice straight away.

The boss, who regularly conducts a study on behalf of the (...), also recognised this process as a best practice not only for the cooperative group, but also as a best practice principle for digital processes. In my view, this was really a highlight of the innovation work we have done. The worst case, I would say: I can't think of enough methods he used at the time about. #01:03:23-2#

P1: Well, we worked very heavily with design thinking. We also worked with the Marvel app, so we produced a lot of mockups and ultimately ran these mockups through test customer iteration loops again and again. That was the. Yes, I would say that. #01:03:43-9#

P2: The methods. #01:03:45-4#

P1: We did a bit more of a business model canvas, but I wouldn't say it was as stringent as we would do in-house today. We could have done that a bit more back then. That would certainly have helped us at one point or another. But it was very good, I have to say. The process. #01:04:06-9#

P2: Okay. I'm sorry... #01:04:11-8#

P1: The worst case, from my point of view, is also because you just started. We also worked very, very intensively with Business Model Canvas. We also worked with mockups. We also worked with Momtest. But what we didn't have was a clear commitment, a clear business case for this business model, how we wanted to start with it and how we wanted to deal with it in the medium term. I have to say that we burnt a lot of money in the first year. Really seven-figure sums, too. That wasn't just hand money, it was real dough.

And then in the second year, where we are now, we had no budget left over to continue pursuing this model. And we did a lot of things wrong. All together, as we are. I don't exclude myself from that. I should have intervened in these processes again much earlier. I should have taken corrective action. But by the time they listened to me, I'd say, it was basically already through the door. To summarise again. #01:05:25-0#

P1: And that cost us a lot of money. Or really a lot of money. #01:05:28-5#

P2: So why did it go wrong again? To summarise. #01:05:31-9#

P1: Because we basically believed or because others, I have to be fair, believed. If I set up a concentrated comparison portal like this, I can earn money in the first year. I don't know who believed that. I didn't believe it. Because a digital business model like this also takes between five and seven years, depending on how quickly you scale it up, before I can really earn money with it. But too many people believed it and that's why we haven't even been granted a development budget, let's say a small six-figure budget this year. And that's no longer something I can afford out

of my budget and my household. And that's why it has now been frozen. I've always said that if you freeze this business model (...) then you won't defrost it or do it again. It will remain frozen forever and will not continue. Okay. So #01:06:37-0#

P1: So, that means we've now destroyed a seven-figure sum, although we would have needed a much smaller amount this year just to develop this model further. This year was also clearly defined for us with entry and exit criteria, i.e. where we would have defined exactly according to hard criteria. So it makes sense to continue again, to go to the next stage, or it makes sense at this stage because we haven't reached these criteria or wouldn't have reached them, that we would then also exit, because we haven't even got that far. #01:07:11-2#

P2: It wasn't because of any methods or anything like that, but it was more because of the strategic and the strategic target to say, what, how to set up a vision for it, how to say for a business model: Hey, with 3 to 5 years, that's your mission, the must. So it wasn't strategically clarified, but it was actually OK by the Executive Board. Okay. It wasn't even the methods. No. #01:07:39-1#

P1: Good. So the methods, I'll say, also contributed to the clarity. We also worked methodically here with Bridge Maker, more or less aligned with this BCG model. Even that no longer helped us to argue things in this way. (...) To withdraw or to underpin in such a way that he could have derived a vision or mission on a strategic level. #01:08:13-4#

P2: (...) And then last question about your experiences with your innovation workshop. We assume that a company approaches you and says they want to do something like that. They would like to set up an innovation lab to pursue process, product or service, innovation or business model innovation out of inexperience. What would be your recommendations? #01:08:39-8#

P1: Definitely doing it differently now than we did. #01:08:44-9#

P2: So what to do? #01:08:48-8#

P1: Oliver You can always say that you're always smarter afterwards. So that's this typical yes, it would be bad if it were different. But I would do many, many things differently today. Today, I would first of all get a clear, clear commitment from the management on the subject of innovation and would also want to anchor this immediately in the strategy. #01:09:16-8#

P1: And ultimately, starting from the top down, that this culture of innovation should also be more strongly integrated into the cultural work in the company. I think you can do a lot of things better there. #01:09:31-7#

P2: Erm. #01:09:32-6#

P1: As things stand today, there's still a lot that can be done better. That would be first:

My most important topics and then I would really start with this small core team, just like we did. I have to say, we did that well and I would do it again. So I wouldn't do everything differently, it was a bit of fun. Acting like an influencer with this small core team can also bring these specific topics back into the organisation, just like we already do.

We have a few workshops in-house. That's clearly what we call community. So during a sprint, we always present our topics, similar to Working Coffee and Click.

We also present these topics from the innovation workshop and simply arouse curiosity among the employees and see who really wants to work on them and then gradually integrate these employees, who really bring this intrinsic motivation with them, and thus make this innovation workshop bigger and put it on a broader footing and no longer advertise it.

Or to rely on recommendations from managers, where we have seen the employees twice and then never again. Yes, that is the case. I don't have zero intrinsic motivation. If I'm intrinsically motivated, then I'm there, then I don't look at the working hours, then I'm happy to take on tasks, even if I already have a lot else on my daily business agenda. As I said, I would do things a little differently and approach things differently today.

But in my opinion, the most important thing is to have commitment from the top. And we didn't have that commitment. We always lacked it, and that always fell flat on its face with the other two managers. Even when we had the backing of the Management Board, in this specific case the other managers tended to dismiss it and say: Take care of your day-to-day business first? #01:11:41-4#

P2: And in the end, it's not necessarily about the choice of methods or the order, but rather a kind of bouquet of methods. #01:11:50-7#

P1: Yes, and of course the right mindset to apply the method, the method. So if you take Old Mindset and take the best method you have.

So for me, it's simply Lego Series Play in organisational development. That doesn't go together. Yes, because. Because. What is Lego Serious Play: Say you should think with your hands. That's the big translation.

You're supposed to build models.

You're supposed to explain the models.

You're supposed to bring together different models. And build an even bigger model again.

It can only succeed if you understand this thinking with your hands, what it's about and what it's not.

Always trying to scrutinise everything or making a mockery of it and saying now we're just going to start playing Lego. Oh how funny that is. There's a deeper meaning to why we're doing this and why we're doing it with Lego. There's also Playmobil. Although I'm not a big fan of Playmobil. I do more with Lego. When I go into systemic work - I'm also a systemic coach - I tend to use wooden figures for constellations. Yes, I don't necessarily need Lego for that either. But Lego is simply a really good method. But you need the mindset for that. And you have to create these foundations in the house first. #01:13:25-2#

P2: Okay. Wow, (...), I think we're through. #01:13:29-9#

P1: Now we've got it, we've almost spoken to each other for 1:20. #01:13:35-4#

P2: 20-30 minutes with always doing it on TV, I would have slowed you down. (...) But in so, so many topics are included. That's also something. I have to feel my way round it and stuff like that. But a lot of great information.

Thank you very much.

(...)

INTERVIEW TRANSCRIPT EXPERT # 4

Interviewer: Oliver Meschkat

Date: April 2021

P1: Okay. Welcome to an interview. I have to ask you first, (...) do you agree that I record this interview and use it for my dissertation? #00:00:17-0#

P2: I am. I agree with that. #00:00:19-5#

P1: Very good. Okay, let's talk about you. Who are you? What do you do? And how are you? #00:00:24-7#

P2: Yes, I'm 43 years old, I'm an employee of (...), I deal with the topic of digitalisation and innovation and accompany some (...) companies on their way to innovation capability. This means that we also accompany agile teams or innovation teams and then carry out various formats, such as innovation workshops or in Innolabs or also empowerment workshops, in order to be able to maintain the know-how in the respective organisations on a permanent basis. #00:01:09-8#

P1: Okay, the aim of this interview is to explore how Innolabs and similar organisations can be successful, i.e. what mechanisms of action can be found there. What does that look like at your employer? Is there an InnoLab there?

P2: So there is no classic Innolab at (...). There are, let me say, rooms where you can work on innovations quite well. So it's all about the room setting, especially flexible room options, especially when you're involved in a process like this. There is that. #00:01:55-0#

P2: But there is no classic innovation process or innovation stream that explicitly deals with innovation. #00:02:02-8#

P1: Okay, so you go into Innolabs as a coach, as a lecturer, as a trainer. And your job is then to create innovation processes with the people in there. If I understand that correctly. #00:02:20-8#

P2: So we're kind of a companion on the way there. Of course, there has to be a thorough clarification of the mission beforehand, what the mission and the goal and the result should be afterwards. And the core objective is to support the organisation to such an extent that it can then pursue innovation independently. And of course we're a bit limited in that respect, in terms of budget and time. #00:02:53-6#

P1: Yes. #00:02:54-4#

P2: That's why you also have to see what form it takes, what is the most effective in terms of clarifying the assignment and where we might say no, sometimes you can't win a war with just a two-day workshop. So we're also quite open about that. #00:03:11-9#

P1: Okay, from your experience, why do companies do this? Why do they set up internal labs or do an Innoshow like this? People who get involved to accompany such processes? Why do we do that? For what reason? #00:03:26-9#

P2: Well, many entrepreneurs have a certain amount of pressure to act because their very own business model is under a lot of stress. So starting with the pressure, of course, through to the corona effects, which are of course there, but also the competition, which is also changing a lot. Many new players are also entering the market, some of which offer services at a lower price, some of which are highly digitalised and can therefore naturally also save costs. And many companies are realising that their traditional organisations don't have the capacity for innovation and are considering taking the step of perhaps setting up a new division that deals with precisely these issues. In other words, new products or digitalised products or additional business models to support the traditional business model. #00:04:39-2#

P1: So it's also about business models, innovations, product innovations, service innovations. #00:04:45-9#

P1: And it's also about the type of collaboration. For the companies in which some colleagues work together, is it also about new methods? #00:05:00-0#

P2: Definitely. Well, because innovation is fundamentally a team effort. And I think you also need different perspectives and skills and expertise in order to validate and try out new topics. I now have a deep insight into (...), which is very, very classically organised, very security-oriented. #00:05:28-4#

P1: And completely far away from risk. They've been brought up that way for years. And that is of course a culture that now prevails in such a (...) or where you first say, well, first of all there is the topic of innovation, yes, I'll say that now. And more difficult to implement than perhaps companies that have perhaps already been exposed to a situation for some time. #00:05:58-6# (...)

P1: For the formats that you run, how do I imagine them? From two days to ten days? Or how many days maximum? What is typical? (...)

P2: That's a good question. On the one hand, of course, I have to invest a bit of time in clarifying the order. So what does the managing director, the board of directors basically want with the company? In other words, his vision? And then the second question is: Which target groups within the organisation do we need to address and activate in order to achieve all of these objectives? Of course, managers are also a very important target group. #00:06:52-3#

P2: Then there's the issue that I would also like to set up an innovation department, so I would also like to set up an innovation department, what tasks and roles should be bundled there, how should this be organised? Do we have the resources for this? So these are all framework conditions that we have to analyse at the beginning. #00:07:17-6#

P1: Yes. #00:07:18-2#

P2: And I would say that in terms of time, I could imagine that you would have 20 to 25 project days in total over a timeline of, let's say, six months. #00:07:34-9#

P1: Depending on how big the organisation is and, as I said, it also depends on the budget. #00:07:41-7#

P2: Well, you have to say that. And it's only with internal employees now. But the topic of open innovation is also brought in, that you take external customers, for example, or bring in experts. Or it's always just the employees themselves. #00:08:03-8#

P2: Yes, that would of course be desirable. So, of course, it would also be nice to recruit external people, i.e. to really install new people in the corridor. Only a few people do that. But I think that's a very important key, because these people have already seen different sectors and ideally also have a high level of expertise. I think you should also invest the money to have a key position and someone like that. A

person like that should actually have a high level of backing from the Management Board so that they have a certain amount of freedom to try things out.

What I often see, however, is the approach that younger employees who have been with the company for years, i.e. future managers, should be encouraged to do a bit of innovation. Is that a bit provocative, to do a bit of innovation? Well, you very often see that a lot of the framework conditions have not yet been clarified, that many things are simply supposed to happen on the side in the hope that something will come of it anyway. And that's usually not crowned with success. #00:09:25-0#

P1: Okay. Well, let's get to the things, let's get into the process. What's important to me in my study is the methods, the selection of methods and techniques during this process and perhaps also sequences and success factors. What methods do you typically use? #00:09:45-5#

P2: On the one hand, you should always have a good grasp of the topic of research first, i.e. first sound out the market. That's not a traditional method, it's simply an activity.

Then, of course, you should also be able to apply things from the field of design thinking. So where you say, okay, I now have a specific task or a certain question that I would like to explore more intensively.

So first of all you have to understand things like customer problems and customer needs. That's what I think.

I think this way of thinking, this mindset, is very important. I think it's important to ask a lot of questions and to work with hypotheses. And if you then gradually get into the solution options, you also work very intensively with the respective potential target groups, i.e. in the form of customer interviews, problem interviews or solution interviews. These are two classic elements where you interact with the potential target group, where you can validate the first prototypes that you have come up with and then incorporate the findings into the product.

Or perhaps you realise that you are perhaps on the wrong track completely. That can also happen. And I'm going to say with a minimum of effort, so try to do these things in a way that conserves resources and not write down grandiose project plans, but rather on a small scale - validating things in small steps and then reflecting on them again. What was the result? #00:11:58-0#

P1: So a classic design thinking process, so to speak, or what method do you use? #00:12:03-4#

P2: So it's things from design thinking, where you first, as I said, research the problem. Problem, go through research and then say okay, I have now learnt about many, many, many topics, including what drives the customer. And from that I then go into a solution level and generate initial ideas and then pick out the most (...) promising ideas and check how I can best work on them now. #00:12:42-7#

P1: Yes. #00:12:43-3#

P2: Of course, I can also consult experts. But I should also think about what the business model could look like afterwards. For example, building a business model canvas, what are the sources of income, but what is the power, the expenditure, so that you look at what a business model could look like? #00:13:09-4#

P1: Okay. #00:13:10-4#

P2: And then I have as a start and business model canvas and interviews as methods. #00:13:17-0#

P1: There's more, isn't there? Can you think of anything else? Market analysis is also a method. #00:13:23-0#

P2: Market analysis. Exactly. Then hypothesis-based work. #00:13:30-4#

P1: (...) Or brainstorming methods. Which ones do we use? #00:13:36-5#

P2: (...) Well, for example, you can put yourself in the shoes of different, different people. Yes. So what would Ikea do? What would Amazon do? Putting yourself in other people's shoes to perhaps gain new ways of thinking? Yes, I think that's important. #00:14:02-6#

P2: You should also ask your network sometimes. So I think the topic of networking is extremely important again. #00:14:15-0#

P1: Yes. Okay, we'll come back to the methods. Then later on. The question is, why do you use these methods? From where? And that's the reason. (...) Why these methods? #00:14:31-3#

P2: Well, I think that various frameworks have already become quite established in the field of innovation. On the one hand, as I said, there is the topic of design

thinking as so-called lean startup methods, i.e. everything that has something to do with validation, everything that has to do with customer-centred leadership. So the approach is to say that you try to familiarise yourself with as much as possible with a small budget and the limited time you have available so that you don't waste too much time and resources on one topic. Everything has to be kept lean. #00:15:16-3#

P2: And also Scrum, for example, where I say I have an agile team. I divide up the tasks among myself every day and work in small loops. As so-called sprints and also try to collect feedback internally with a lot of feedback, with a lot of feedback culture. Yes, I also like to present my partial results of a project internally in reviews and then get feedback from the employees. So I'd say these three big frameworks have already become pretty well established. #00:16:05-6#

P1: Okay. Is there a particular order in which you proceed? With the methods, with the selection of methods? #00:16:12-1#

P2: Yes, well, the origin is design thinking. So starting with the problem and moving on to ideation, prototyping, validation and then, at the end of the day, project management, which, as I said, I would tend to organise in an agile way, is small-scale. You might say that you will then release the first partial solutions as an MVP (minimum viable product) when you see how the market reacts to them. And if the market says: Hey, I think that's good, then you can add further partial aspects if necessary. And not now somehow in a quiet little room. First you build up a huge service portfolio, then you go to the market and realise: I've completely missed the mark. #00:17:07-2#

P1: Okay, so the rough design thinking process, what do you call it, should be at the meta level and then individual techniques are applied at each point, depending on logic or need. Who selected these methods or who generally selects them and why? From experience? Or because it is efficient? Again, it will also come partly from experience. And also...

P2: Well, design thinking is a bit of a challenge. How much time do I have? And I always take on the role of an external coach or consultant, if I only have three days to carry out a design thinking process, then of course I'm restricted. I could of course conduct 50 customer interviews instead of ten. It just automatically takes more time. Of course, I then have a completely different database to work with. So you have to cut back in some cases. #00:18:15-9#

P1: Okay, there are scientific studies on methods, selection and just labs. And finally, let's have a quick look at three topics. Let's see what you have to say. One study says that the more methods are used, the better the result. What do you think about that? (...) #00:18:41-5#

P2: I'm a bit torn. The more methods. (...) I think that always has something to do with the degree of uncertainty. So if I still have a relatively high degree of uncertainty in it, so I have formed certain hypotheses where I say, oh, so they are, they are not yet validated enough for me. (...) If this hypothesis doesn't become reality. You could also say that my business model is also collapsing. Then, of course, I'm a big fan of using other methods as well. If I say that I already have a validated basis. Then I don't think it's necessary anymore. #00:19:26-2#

P1: Okay. #00:19:27-1#

P2: (...) the answer is a bit too global for me (...). #00:19:31-6#

P1: Okay, good. The second statement of the study is: The more heterogeneous collaboration, the better the output. The more heterogeneous collaboration, the better the output in such international future workshops, she says. (...) There is always talk of diverse teams. (...)

P2: I think that's very valuable, because you also have different perspectives on the matter. One person might have more of a technical view, i.e. a technology view, another might have more of a sales view, another might have some kind of legal issues. So I think the more diverse, the more heterogeneous, the better. #00:20:45-5#

P1: Okay, and the third (...): But it's almost clear to me too, the more information flow between the participants, the better the result. #00:20:52-9#

P2: That's just the way it is. #00:20:55-3#

P1: But there is transparency in the work results and high transparency in the exchange. #00:21:04-1#

P1: Oh, okay, I'll come back to the methods in a moment. (...) In innovation management, there is the so-called promoter model. (...) The promoter model means that innovation happens without the top down, without the leadership being at the top of the company. The other day I was told: Hey, we're doing this and then there's a small team and that's what should be formed out of science. That

means you need a power promoter, a relationship promoter and a network promoter and a skills promoter. So what, for example, have you noticed? And that like this, let's say the initial spark for these InnoLabs, in the companies you are in. That's a promoter model, or why? Where does this decision to do this come from? So who makes this decision and how is it put into practice? #00:22:11-9#

P2: Well, I wasn't aware of this model, but, um. When I hear that from you now. What's behind it, it makes total sense that there are certain people in the company who should stand for the topic of innovation and who are also equipped with a certain ability to act. Okay, for me, connectivity also means either the ability to act strategically or the availability of resources or budget responsibility. So that's a very important criterion. #00:22:58-9#

P1: Okay. From your experience at the company, if they perhaps already have existing InnoLabs or something like important risks, because the equipment is off. So purely from the architecture. What are your experiences? Is there already something there? Or are they just seminar rooms? #00:23:17-1#

P2: Well, basically they should be spaces where you can work together permanently, where work results are very transparent for everyone to see and are also permanently available. Where you can change the working environment relatively quickly because you say okay, now we're working on a topic as a team of three or I'm working on a topic alone.

I have to somehow pull myself out completely and have to focus somehow, I need a bit of silence. So flexibility is very important.

I also think a high level of transparency is very important, even for employees who don't work directly in this team. Because the innovation department in particular is also very much scrutinised by other traditional employees: what are they actually doing there? And perhaps they also indirectly realise a little about the topics they are working on. So detached from any communication issues. Yes, which I think is also very, very important, but that you can also indirectly see what they're actually doing there? #00:24:34-8#

P1: Yes, there are also studies on this. In other words, if you want to set up an InnoLab, it's highly recommended to set it up outside the existing structures, i.e. outside the building, the original company itself, in order to get away from it. #00:24:51-7#

P2: (...) It has advantages and disadvantages. So the advantage is of course. Suppose you were to establish an InnoLab as a kind of co-working space where I can also come into indirect contact with other external people. Let's say I somehow go on my lunch break and suddenly meet a patent attorney or something like that. That's also quite helpful, isn't it? There you go. And that's really important for networking alone. The other issue is, of course, that you've left your mother ship a bit. And I think it's also important that you have this expertise and this ability to dock with the mother ship again afterwards. Yes, well. I always find simultaneous or two-sided very exciting, but it's always difficult to show that. #00:26:01-1#

P1: Yes. #00:26:01-9#

P2: Okay, if you say you have a hybrid model, where you say okay, maybe I'm somehow always in a co-working area on Mondays because I'm simply looking for basic networking with the outside world, where I also indirectly attend events that are organised there and then maybe I'm at the company the rest of the week. It could also be a model. #00:26:27-5#

P1: Okay, thank you. The last point is based on your experience, from all the coaching you've done in recent years about supporting innovation processes. How is success measured? So how do they do it? How does it work? Hey, we've applied for a patent. We have registered property rights. About the performance indicators, turnover, profit. And from your point of view, how do they measure success? #00:26:53-4#

P2: (...) So I think it's very important to define these success criteria in advance. There are also soft factors that can be measured. #00:27:04-2#

P1: Yes. I say, with the people I've had contact with. They are, as I said, very, very often (...). Yes, the board members are very much in tune with figures, data and facts, especially in terms of turnover and earnings. The profit mindset is always very high. That is of course a criterion. On the other hand, I also think it's a criterion to say: How many ideas have we validated? In other words, how many ideas have we generated? How many ideas have we validated?

Because if we had something, we wouldn't do that. That would not be good for the company's ability to innovate. So I think that's what you have to measure yourself against. #00:27:58-7#

P1: Okay. In these processes that you have accompanied, have you also noticed any obstacles? So that could have hindered the creation of innovations?

The first thing that is a major obstacle is the availability of resources. Especially when you say, okay, we want to set up an innovation area now, so that employees are really sent there to work mainly on this topic, but then there is also the issue of resource availability, especially if you already want to work together via. The issue of the availability of resources, especially if you already want to work together via the force, is that the respective managers then also send the employees to these projects with enough resources. So that's always a big point of contention.

I believe that the clarity of roles and tasks in this project team must be clarified in advance. Who has which task?

Of course, there are also obstacles if there is no success. In other words, projects are set up that are then not crowned with success because perhaps you only ever looked at revenue opportunities but didn't actually look at what the customer might actually expect and then missed the mark a little. So I'm convinced of that:

If you bring a good customer solution to the market that solves a customer problem, then a customer will also be prepared to pay something for this solution.

But it can't be the case that I say I'll provide a service and just see how I can price it. But the service is simply interchangeable, and can I perhaps get it cheaper elsewhere? Or I don't even have the problem as a customer. (...)

P2: And also Coop. And also expertise. So that. That the internal expertise in the (...) or at the customer is not there. In other words, the really genuine questioning of problems. That it wasn't somehow profound enough. #00:30:40-5#

I don't know exactly how to put it. But perhaps the approach was too superficial. And yes, it will work somehow and there. #00:30:52-1#

P1: Okay, well, thanks again. As a presentation on the topic of methods, the focus was on that. There are hundreds of innovation methods. I'll just name a few: Design Thinking, Scrum, Business Model Canvas, Lego Serious Play, scenario techniques, brainstorming, morphological box, Osborne method. Whatever. Why do you think some of them lead to success and some don't? (...) Um. #00:31:29-8#

P2: So on the one hand, methods help to stimulate ways of thinking again. Depending on how you apply them. So either in the group through discussion, for

example, new points, new ways of thinking, new insights on the topic of methods that are used, simply for transparency, so for example with Business Model Canvas it is actually only transparent. Outlining a business model at a glance, where you simply discuss it again. If I change it, what happens on the other side? So it's actually more of a communication medium, I would even say: the visualisation of a visualisation component. Lego Serious Play. That could perhaps work quite well for prototyping. Also to visualise things. Erm, maybe also to show others a prototype like this and then get feedback. So there's a lot to do with visualisation, communication, exchange and discussion. #00:32:52-1#

P1: That's nice. And is it also related to the coaches themselves or to the trainers themselves, depending on their level of experience or preferences? #00:33:02-4#

P2: Also totally. So some might swear by Lego Serious Play, others say no. #00:33:10-9#

P2: I haven't bothered with that. I do it somehow with pen and paper or maybe build a digital version or make a video. So of course it also depends very much on what kind of coach you have and what methodological expertise you have. And it's also always a question of which tools(...) you use at which point in time. #00:33:35-9#

P1: Okay. And penultimate question from your experience, do you have a worst case and a best case? So that something went really wrong or that something went really well? Can you think of anything? #00:33:52-4#

P2: (...) So worst case. #00:33:56-9#

P2: Actually, the factors I listed. If you don't clarify them in advance, then you lose a lot in the course of the innovation work. So it starts with the issue of mandate. #00:34:17-3#

P1: There are people with enough resources and expertise. They have the right search focus. So tell me, where should they look strategically first? Should they first look inwards or should they, should they look outwards? And research learning processes that should be improved? Or should they look for completely new business models? So if all of this isn't clear, all of these framework conditions, we're going to have a lot of problems relatively quickly. Okay. Best case. #00:34:54-5#

P2: (...) And yes, best case is actually exactly the opposite, so that you say. #00:35:04-8#

P2: Yes, that you really think about it. How do we actually have to set ourselves up in this team so that we can validate innovations permanently and sustainably? That doesn't mean not having the expectation that every shot is a hit. #00:35:24-5#

P1: But so this also means that the culture is prepared for it. So also other employees who are perhaps not directly involved in the innovation process, that they are prepared for the fact that what is important is innovation work. But it can't be the case that every, every project with success is then also afflicted. #00:35:48-6#

P1: So the error culture - building on an error culture. Exactly. Okay. Also, standing on your head. Then comes the last question. Let's assume, based on your experience, that a company comes to you and says: Hey, we want to set up an Innolab. What recommendations would you give this company? Apart from what you said about the obstacles and the opposite for the best case? What would you give them along the way? #00:36:21-8#

P2: (...) Since it comes to me from a strategic mindset. #00:36:31-7#

P1: Yes. #00:36:32-3#

P2: So: building precision. That's what was said earlier. Yes, to come up with an innovation strategy. Where do we want to go in the next one or two years? Maybe I wouldn't look any longer than that. What, what, what goals I'm pursuing with it. (...) Not forgetting what cultural goals I am also pursuing. (...)

And then also to consider which framework conditions, which movements I need in order to establish sustainability in the organisation. #00:37:21-4#

P1: And for the equipment itself? So what you said earlier about the features of an innovation lab or a room. And which ones? Which methods would you recommend if you had, say, ten or 20 of them? #00:37:37-3#

P2: (...) Let's start with everything that has to do with trends, (...) with research methods. So trend reports, first of all to see what possibilities there are out there. And the next topic is. Then working with challenges, i.e. with problems. As I said, in the area of design thinking. (...) I'm a big fan of hypotheses.

P2: And then close-ups. #00:38:35-2#

P1: Assumptions that are proven in a process. #00:38:37-3#

P2: Exactly. So quasi hypothesis-based work. There's a so-called risk matrix, which I always find very important.

P2: Four fields matrix or I can sort individual hypotheses into things that are highly critical for my business model. #00:39:03-6#

P2: And which have not yet been validated? #00:39:08-2#

P2: The aim is actually to validate these highly critical things and the things that have not yet been validated using different methods so that you can say: I'm taking the risk out of my business model because I've validated them. Because I know that the hypothesis works on the market. #00:39:36-0#

P1: Yes. Okay, let's go back to the strategic direction: Because corporate culture has fallen, it also has something to do with people's mindset. I've heard that a few times now. What does that mean? #00:39:47-9#

P2: Yes, basically it means that you have an attitude. But to constantly question things. To be curious. A culture of error. (...)

P2: The hierarchy. A certain hierarchy. Freedom. You can't validate things, discuss them with customers and then come up with a result. But then only one person, perhaps the board of directors, says: We won't do it. So the customer says yes, but only the management board says no. So there has to be a lot of justification as to why the management board doesn't want to do it.

It has something to do with commitment. Commitment - yes.

Time for a nice bon mot.

Okay. Then thank you very much, I'll stop the recording.

(...)

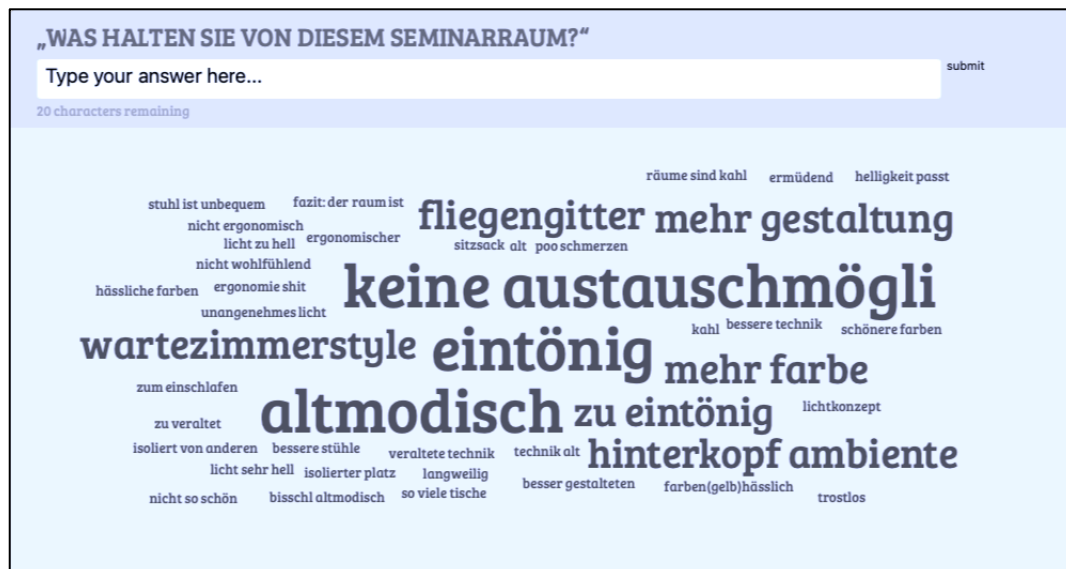
Appendix 2

Answers of the Opinion Polls

“Qualitative Study Nr. 2”

Researcher: Oliver Meschkat

Date: January 2023



"WAS SOLLTE EIN MODERNER SEMINARRAUM HABEN?"

Thanks! Type another answer here...

40 characters remaining

submit

A word cloud visualization of suggestions for a modern seminar room. The words are arranged in a circular pattern, with the most prominent words in the center and smaller words towards the edges. The suggestions include:

- moderne technik (neue bildschirme etc)
- sofa für pause
- café maschine
- ergonomie
- teppichboden
- wände weiß streichen
- schönes farbkonzept
- sofa, sitzsack für pausen
- heller gestalten
- wände anders streichen
- neue tische
- angenehmeres licht
- kaffeemaschine
- tablets/laptops
- internet auch für pausen
- neue tische z.b. gruppen tische
- pflanzen deko
- bessere stühle
- bequeme stühle
- neue pcs
- bessere fargebung
- tablets und nicht mehr pc's
- neu streichen
- whiteboard
- besser anordnung der tische
- getränkeautomat
- neue tablettis
- neue tischbelag
- neue tastaturen
- sitzbälle
- dimmbares licht
- flipchart
- besseres wlan
- fliegengitter wlan
- tischtablet tischbelag
- was fürs auge (pflanzen etc.)
- modernere technik
- bessere anordnung der tische

[illegible]

