



Developing a Digital Training Platform Concept for International Vocational Skills Competitions

Margit Tennosaar

Haaga-Helia University of Applied Sciences

Master of Business Administration

Digital Business Opportunities

Thesis

2024

Abstract

Author(s) Margit Tennosaar
Degree Master of Business Administration
Report/thesis title Developing a Digital Training Platform Concept for International Vocational Skills Competitions
Number of pages and appendix pages 59 + 4
<p>Vocational skills competitions are contests for vocational education students, primarily up to 22 years old, in around 50 skill categories representing various occupations and professions. The goal of the skills competition is to popularise and introduce vocational education. In Finland, the non-profit organisation Skills Finland coordinates the vocational competition system. Competitors for international skills competitions are selected approximately one year before the contest and will go through competition-specific preparation within skill-specific training groups.</p> <p>This thesis aimed to research the possibilities of enabling Skills Finland's digital transformation through a digital training platform that would facilitate the monitoring and documentation of the Finnish national team's preparation for the international vocational skills competitions. Two main research questions were raised to ensure the research achieves its objectives: 1) how training is currently organised and 2) what features the new training platform should have.</p> <p>The theoretical framework contains two essential subdivisions. The first part clarifies the meaning of human-centred design and opens the Service Design approach, including introducing the Double Diamond model and Lean Service Creation toolkit. The second part of the theoretical framework chapter focuses on the pedagogical approach to explain how to train for top performance, what educational theories should be followed and how this can be expanded from one competitor to the entire team.</p> <p>The research adopted the Service Design approach, followed the Double Diamond phases, and utilised the Lean Service Creation toolkit and considered educational theories conceptualizing the training platform. The research is based on qualitative research methods, such as surveys and interviews.</p> <p>During the data collection phase, an online survey was conducted to understand the Finnish national team's preparation process and how training for international vocational competitions is organised in Finland. The questionnaire comprised both quantitative and qualitative questions. A semi-structured interview method was utilised to increase the understanding and deepen the findings. The analysis revealed that the national team would benefit from a digital training platform that provides structure and simplifies the documentation of the training process.</p> <p>During the development phase, a concept for the training platform, including its essential features, was developed. A component integration diagram was used to visualize the technical architecture and detail the platform's features. Additionally, a medium-fidelity wireframe was designed to visualize the planned layout. The training platform's main aim is to consolidate training activities, document and visualize the training cycle, and offer transparency and an overview of training progress. The concept provides a solid foundation for forming a business requirements proposal.</p>
Keywords vocational skills competitions, vocational excellence, service design, double diamond model, training

Table of contents

1	Introduction.....	1
1.1	Research goal and questions	1
1.2	Research limitations	2
1.3	Glossary.....	3
2	Empirical Environment	5
2.1	WorldSkills International	5
2.2	Vocational skills competitions.....	7
2.3	Skill competition documents	10
2.4	Skills Finland.....	11
2.5	Excellence training for the vocational skills competition in Finland	12
3	Theoretical frameworks.....	15
3.1	Human-Centric Design frameworks	15
3.2	Service Design thinking	16
3.3	Double Diamond	18
3.4	Lean Service Creation	21
3.5	Validating the concept	23
3.6	Learning and training	24
3.7	Talents vs skills.....	26
3.8	Competitors' personality traits	27
3.9	Training progress and activities.....	27
4	Research-based development project.....	30
4.1	Research plan.....	30
4.2	Identifying the problem and goals	31
4.3	Benchmarking and selecting the target group	33
4.4	Survey and results	33
4.5	Interviews and findings	38
5	Development work.....	43
5.1	Ideation	43
5.2	Component interaction diagram	44
5.3	Calendar.....	45
5.4	Shared files storage.....	46
5.5	Training plan	47
5.6	Progress tracking.....	48
6	Discussion and conclusion.....	51
6.1	Answers to the research questions	51

6.2	Reliability and validity of results.....	53
6.3	Research significance and conclusion	53
6.4	Proposals for future steps.....	54
6.5	Learning process	55
	References.....	56
	Appendices	61
	Appendix 1. Survey questions	61
	Appendix 2. Interview questions	62
	Appendix 3. Example of LSC canvases usage	63
	Appendix 4. Training platform component integration diagram	64

1 Introduction

Vocational skills competitions are for vocational education students, primarily up to 22 years old, in around 50 skill categories representing various occupations and professions. The skills competitions are part of the WorldSkills movement, which includes 87 countries and regions globally. The goal of the skills competition is to popularise and introduce vocational education. The skills competition events promote the value and appeal of vocational education, underscoring its relevance and prospects in the challenging labour market. Participating in skill competitions is an outstanding way to develop the expertise of the education organisers' personnel, offer students individual learning paths, and develop international networking and benchmarking for the entire organisation (Skills Finland, 2024a). During the vocational skill competitions, participants showcase their occupational skills in a limited timeframe, facing challenges based on work-life situations and tasks.

In Finland, the non-profit organisation Skills Finland coordinates the vocational competition system based on cooperation between all parties of interest. The organisation's vision is to promote the world's best vocational expertise. Over thirty years of operation, Skills Finland has played a significant role in international vocational skills competitions. Throughout history, Finland's competitors have been successful in competitions and won nearly 150 top 3 medals, proving the excellence of the Finnish Vocational Education and Training (VET) level. Competitors for international skills competitions are selected approximately one year before the contest, and during this one-year training period, competition-specific training is arranged within skill-specific training groups.

1.1 Research goal and questions

Despite the high success rate, Skills Finland constantly seeks to improve international competition training progress. Each competitor is expected to have a personalised training plan to enhance individual learning paths. As skills competitions have a variety of occupations and professions, the training teams also have different ways of organising, monitoring, and documenting training activities. Currently, each training team works independently, and the organisation lacks insight into the status of the training process.

This thesis aims to investigate and analyse the most significant challenges for training teams and the possibilities of enabling digital transformation through a unified digital training platform that would facilitate the monitoring and documenting of training activities. For this purpose, the Service Design approach and the Human-Centred Design methods are used. Additionally, educational theories regarding training are explored to ensure that the concept being developed is

educationally appropriate. The primary outcome of this thesis is to propose a new digital approach for Skills Finland to coordinate the preparation for international skills competitions.

The thesis author has been involved in international vocational skills competitions since 2010 as an expert and trainer in Finland's and Estonia's national teams. Also, the author has voluntarily worked as a Skills Advisor for EuroSkills competitions since 2021 and as a Training Manager for Skills Finland during 2023. In addition to comprehensive experience in skills competitions, the author has over 15 years of work experience as a web development teacher and more than five years of work experience as a user experience designer and web developer. Therefore, the author has a sufficient overview of web development, digital tools, and training approaches and methodologies. In this research, the author will act as a research conductor and designer and be part of the research sample. The author will represent the Web Technology skill category, with experience organising and participating in more than 20 vocational competitions at national and international levels.

To achieve the research objective, the research questions have been broadly divided into two categories – how the training for international skills competitions has been organised and what features the new digital training platform concept should include. The first research question has been expanded with additional questions to explore the current state.

Q1: How is training for the international vocational skills competition currently arranged in Finland?

Q1.2: What personal qualities are expected from competitors?

Q1.3: What documentation are training plans and activities based?

Q1.4: What tools do the training teams use during the training cycle?

Q1.5: What challenges do training teams face while preparing for the competitions?

Q2: What features of the digital training platform are essential to support the training process effectively?

1.2 Research limitations

The leading target group combines the WorldSkills 2024 competition, Finnish national team training group members, and all Finnish international vocational skills competition skill managers. Therefore, research is limited as it focuses exclusively on the experience of training teams and excludes the broader perspectives of other stakeholders, such as educational institutions and workplace representatives.

Another limitation is that the author will do the conceptual design work alone. Working in a team can be more efficient than working alone, especially for diverse skill sets and ideation phases. The author's extensive experience in design, digital web applications, and international competitions is considered to balance this situation. It is crucial to ensure that the author does not influence the interviewees with the author's vision and views.

While writing this thesis, Grammarly and ChatGPT4 are used to ensure the text is grammatically correct and structurally fluent. Mendeley's reference manager is used to collect, and present cites and references.

1.3 Glossary

Competitor - the international skills competition competitors are selected based on their success in their vocational studies and national qualification competitions. All competitors participate in one-year additional skill-specific training programmes.

ESCO - European multilingual classification of Skills, Competencies and Occupations. ESCO provides descriptions of 3008 occupations and is translated into 28 languages.

EuroSkills - A biennial European vocational skills competition is held in odd-numbered years. Finland has participated since 1998 with a national team.

Expert - A person appointed by Skills Finland who acts as a judge and subject matter expert in international competitions. The expert is appointed for a specific competition and supported by an educational institution or a company in the field.

International Abilitylympics - The quadrennial international vocational skills competition for those who require special support. Finland has participated since 2007 with a national team.

ISCO - The International Standard Classification of Occupations is a tool for organising jobs into clearly defined groups according to their tasks and duties.

LSC - Lean Service Creation method is an open-source toolkit for innovation and creating or improving the products and services built by Futurice.

MVP - Minimum Viable Product is the simplest version that can be released to satisfy early customers and provide feedback for future development.

O*NET - The Occupational Information Network database contains hundreds of standardized and occupation-specific descriptors on nearly 1,000 occupations in the U.S.

Skill Manager - A person assigned by Skills Finland to coordinate international competition activities in Finland. Skill managers are appointed every three years and supported by an educational institution or a company in the field.

Skill Trainer - Competitors train for international skills competitions with a skill trainer. Trainers are often vocational teachers or other professionals in the field.

Taitaja - The Finnish National skills competition is Finland's largest vocational education event. Competitors advance to the final through the semi-finals. It is held annually in different locations. Skills Finland grants the rights to organise the event. The organising party is the local or regional vocational education provider.

Taitaja9 - A cleverness and agility competition aimed at 7th to 9th-grade students. The aim is to spark interest among young people in fields that require manual skills and increase awareness of these areas.

TaitajaPLUS - Finnish national skill competition for students who require special support.

Training Team - The skill-specific training group to prepare for international skills competitions. In addition to the competitor, the training team includes the Skill Manager, the Expert, and the Skill Trainer and may include a reserve competitor.

Vocational skills competitions - Nationally, regionally, and globally organised vocational events that contain skills competitions based on vocational standards and qualifications and are primarily aimed at vocational students up to 22 years old. During the competitions, participants showcase their skills in a limited timeframe, facing challenges based on work-life situations and tasks.

WorldSkills - The largest vocational skills competition in the world. Finland has participated with a national team since 1989.

2 Empirical Environment

The empirical environment chapter provides a comprehensive overview of the background of skills competitions, which is the leading study focus of this research. Over nearly 60 years, vocational competitions have been essential to developing and popularising vocational education. The chapter provides an overview of the WorldSkills movement, including the history of international vocational skills competitions and the significance and scale of the competitions worldwide. It defines different skill competition types and clarifies occupational standards' role in skill competitions. Additionally, it introduces the Skills Finland organisation, which organises and oversees vocational skill competitions in Finland. Finally, this chapter summarises how the preparations and training for the international skills competitions are conducted in Finland.

2.1 WorldSkills International

The beginning of vocational skill competitions dates to 1946, when Europe faced a vast skills shortage after the Second World War. Spain started to promote vocational education and professions through competitions. In 1950, Spain hosted a skills contest for the youth of Spain and Portugal. Germany, Great Britain, France, Morocco, and Switzerland joined the competition three years later. The competition moved from Spain to Belgium in 1958, which is considered the beginning of the WorldSkills movement expanding globally. (Tasala and Alhojärvi, 2017; WorldSkills, 2024a)

Nowadays, international skills competitions have global coverage. The first competition in Spain in 1950 had two participating countries and 24 competitors. For comparison, the upcoming WorldSkills competition in Lyon in September 2024 will welcome over 65 countries and regions, and up to 1500 competitors will demonstrate their mastery of 62 skill categories. Finland's competitors will demonstrate their vocational skills and compete for the world championship title in 20 skill categories: Industrial Mechanics, CNC Milling, Welding, Aircraft Maintenance, Plumbing and Heating, Web Technologies, Painting and Decorating, Beauty Therapy, Fashion Technology, Pâtisserie and Confectionery, Automobile Technology, Cooking, Restaurant Service, Car Painting, Landscape Gardening, Graphic Design Technology, Industry 4.0, 3D Digital Game Art, Chemical Laboratory Technology and Hotel Reception. (Skills Finland, 2024c.)

WorldSkills International is a non-profit organisation that operates worldwide and is politically and denominationally neutral (WorldSkills, 2023). Its efforts focus on raising awareness about the significance of skill excellence for economic prosperity and success through international collaboration (WorldSkills, 2016). Figure 1 on page 6 displays members' coverage worldwide in spring 2024. WorldSkills International has 87 members, connecting two-thirds of the world's

population. Each country or region can be represented by one organisation that promotes local vocational education and training (WorldSkills, 2024b). Represented by the Skills Finland organisation, Finland has been a WorldSkills International member since 1988.



Figure 1: WorldSkills movement has global coverage with 87 member countries and regions (WorldSkills, 2024b)

Since its beginning, the main goal of the WorldSkills movement has been to popularise and introduce vocational education through skills competitions. In 2016, WorldSkills International adopted Vision2025, stating that the organisation can no longer be satisfied with organising international competitions to demonstrate excellence in skills (WorldSkills, 2016).

The organisation's vision is to raise the profile and recognition of skilled people and show how necessary skills are in achieving economic growth and personal success (WorldSkills, 2023).

WorldSkills International have three broad strategic goals:

Raise ambition and opportunity in vocational education and training (VET) for young people, employers, and societies.

Enhance the quality of VET provision through stronger connections to labour markets, employers, and economies.

Help build the organisational capability of WorldSkills and the global competitiveness of its Members through skills. (WorldSkills, 2016.)

After expanding the objectives, the WorldSkills International movement has six focus areas:

- Promoting Skills
- Career Building,
- Skills Competitions,
- Education and Training,
- International Cooperation and
- Development and Research.

In this research project, the focus is on the skills competitions.

2.2 Vocational skills competitions

Vocational skills competitions are aimed at vocational education students, primarily up to 22 years old, who are acquiring or have acquired vocational education.

Vocational education is a programme designed for learners to acquire the knowledge, skills, and competencies specific to a particular occupation, trade, or class of occupations or trades (UNESCO Institute for Statistics, 2012).

In addition to professional vocational skills, these contests boost entrepreneurial skills, initiative, and performance among participants and forge a collaborative international network of experts, educators, and businesses, promoting continuous professional growth and shared expertise. Through these events, the value and appeal of vocational education are elevated, highlighting its relevance and opportunities in the demanding job market. (WorldSkills, 2016.) During the vocational skill competitions, participants showcase their skills in a limited timeframe, facing challenges based on work-life situations and tasks. Competition can be individual or pair competition.

Just as a significant sports event features competitions in multiple disciplines, vocational skill events host skill competitions across various professions. Skills competitions are categorised into six sectors that reflect vast industry areas: 1) Construction and Building Technology, 2) Creative Arts and Fashion, 3) Information and Communication Technology, 4) Manufacturing and Engineering Technology, 5) Social and Personal Services, and 6) Transportation and Logistics (WorldSkills, 2024c). Each sector contains a range of professions and trades with common characteristics, technologies, and skill sets. At the national level, the categories may differ according to the regional job market and specialities offered by local vocational education but are generally similar to regional and global competitions.

The tasks and assessments in competitions are designed to align with vocational qualification requirements and primarily target educational programs at levels 3 and 4 (Table 1, page 8) with an age limit of up to 22 years. The increasing expectations in the job market have led to a situation

where many professions now expect an amplified skill set compared to those provided in upper secondary education. Consequently, for some occupations, the participation in skill competition requirements corresponds to educational program levels 5 and 6, leading to a rise in the age limit in these skill competitions up to 26 years.

In Finland, vocational education and training start at the upper secondary level and include initial, further, and specialist vocational qualifications. Initial vocational qualifications are 180 ECVET points, further vocational qualifications are 150 points, and specialist vocational qualifications are 180 points. Finland's vocational education and training (VET) aims to maintain people's vocational skills and competence. Finland has set the goal that everyone completes at least upper secondary qualification. Nearly 50 per cent of Finnish youth pursue vocational education immediately after completing lower secondary education. (Ministry of Education and Culture, 2024.)

Table 1: ISCED 2011 classification for education programmes. Vocational education programs are marked with a blue background (adaptive from UNESCO Institute for Statistics, 2012)

0	Early childhood education	5	Short-cycle tertiary education
1	Primary education	6	Bachelor's or equivalent level
2	Lower secondary education	7	Master's or equivalent level
3	Upper secondary education	8	Doctoral or equivalent level
4	Post-secondary education	9	Not elsewhere classified

International vocational skills competitions are considered valuable tools for the development of vocational education and for benchmarking in Finland. Finland participates in WorldSkills, EuroSkills and Abilympics and organises an annual national skills competition called Taitaja. (Ministry of Education and Culture and Finnish National Agency of Education, 2023.)



Figure 2: Vocational skills competitions at national, regional, and international levels.

Figure 2 displays vocational skills competitions at various levels, from in-school contests to World Championships. The first Finnish national skill competition, the Taitaja competition, was organised in 1988. In the following year, 1989, Finland participated in an international world championship competition for the first time. Since 2007, Finland has been a part of The International Abilympics competition. The first EuroSkills competition was organised in 2008, and Finland has been a part of

EuroSkills since the beginning. (Skills Finland, 2024a.) In all competitions, gold, silver, and bronze medals are awarded. In addition to the top three medals at the WorldSkills and EuroSkills competitions, students who score above the mean receive a Medallion for Excellence. It is notable that typically, one competitor can take part in WorldSkills and EuroSkills once.

Taitaja, the Finnish National Skills Competition, is Finland's most significant annual VET event. It showcases up to 50 vocational professions and gathers tens of thousands of visitors. Approximately 400 vocational education students have been selected through the semi-finals to compete in the finals. Schools often organise their qualification competitions before the Taitaja semi-finals, as many skills limit the number of participants one school can send to the national competition. In 2024, 1900 students from all around Finland participated in the semi-finals (Taitaja 2024, 2024). Simultaneously with the main event, Taitaja includes a competition for students with special needs, **TaitajaPLUS**. TaitajaPLUS is without an age limit and annually showcases 3-5 skills (Skills Finland, 2024). To promote vocational education in primary school students, Taitaja has a sub-competition, **Taitaja9**, for students aged 13 to 16 (Skills Finland, 2024e).

EuroSkills, the European vocational skills championship held every odd-numbered year, is managed by WorldSkills Europe. WorldSkills Europe has 32 members, and Finland is one of the founding members. Finland's goal in the EuroSkills competitions is the development of Finnish excellence in skills and the strengthening of European cooperation in vocational education and training. (SkillsFinland, 2024.)

The International **Abilympics** competition is the world championship in skills for disabled people and professionals requiring exceptional support, held every four years. It is managed by the International Abilympic Federation, which has 50 member countries. Finland's goal in the International Abilympics is the development of excellence in vocational special needs education skills and the strengthening of internationalisation. (SkillsFinland, 2024.) Finland will host and organise the Abilympics 2027 competition.

WorldSkills, the most significant vocational skills competition, is held in even-numbered years and organised by WorldSkills International. In the upcoming competition in September 2024, 65 countries and regions will participate, along with 1500 competitors. Finland's goal in the WorldSkills competitions is the development of Finnish excellence in skills and the internationalisation of vocational education and training. (SkillsFinland, 2024.)

For Finland, skills competitions are vital for developing and benchmarking VET. They also help raise awareness of the importance of professional excellence. (Pirttiniemi 2017, 31.)

2.3 Skill competition documents

The basis of each skill competition is a Technical Description document. The document defines, among other things, the following aspects important to the competition: the name of the skill competition, associated occupation or job title, WorldSkills Occupational Standards, guidance for assessment, marking scheme template, and the Test Project's structure and other competition-related technical details. The Test Project describes competitors' tasks to demonstrate their professional skills. The tasks must fit within a given time frame; for example, the total competition time is 16-22 hours over four days at WorldSkills competitions. WorldSkills Occupational Standards define what a capable professional must know, understand, and do. Occupational Standards describe the competition's framework and align with global occupational classifications like ISCO, ESCO, and o*net, representing a broad spectrum of occupational expertise and proficiency. Standards are updated every two years and contain global independent business feedback to ensure they reflect the best practices and trends worldwide. (WorldSkills, 2024e.)

In addition to being a framework for skills competitions, the primary value of the WorldSkills Occupational Standards is to provide a benchmark for national and regional standards and enable the levelling of skills and knowledge across borders as economies and markets become increasingly international. In WorldSkills International future vision, WorldSkills occupational standards support national vocational qualification curriculum development and are the core of vocational education and training qualification requirements. (WorldSkills, 2016.)

In Finland, vocational qualification curricula are based on the needs and feedback of representatives of working life, VET providers, students, and key stakeholders. WorldSkills Occupational Standards are not used or reflected in the qualification requirements development process. Despite this, participation or training in skills competitions can be considered when completing vocational studies. Since the vocational education reform 2018, all Finnish vocational qualifications have included the "Working as a Top Expert" study unit, with 15 ECVET points. According to the requirements, the student must demonstrate competence by working on demanding tasks in their vocational field. They may demonstrate their skills in national and international competitions or when preparing for such competitions. (eRequirements, 2018.)

In addition to the Technical Description, the Infrastructure List and the Competition Rules are other foundational documents for the competition. The Infrastructure List includes the materials and equipment needed for a skill competition. The Competition Rules document, which is almost 100 pages long, governs every competition, and all participants must follow it. (WorldSkills, 2024d.) All listed documents form the basis for organising the competitions and are essential for preparing and training for skill competitions.

2.4 Skills Finland

The first national Skills competition, Taitaja, was held in Hämeenlinna in 1988, and the first competitors were sent to the international WorldSkills Competition in 1989. The Taitaja competition aimed to inspire young people to become skilled professionals in their trade and increase their interest in developing their vocational skills. Another aim was to draw positive publicity for students' skills, increasing their appreciation of VET. It serves as a meeting place for professionals of different trades and a showcase of trades and training in various sectors for young people and their parents. (Tasala and Alhojärvi, 2017.)

The non-profit organisation Skills Finland was founded five years later in 1993 by the Ministry of Education and Culture, the Finnish National Agency for Education, vocational institutions, and key labour market and educational organisations to promote Finnish vocational skills and their appreciation through competition activities. The organisation's mission was to elevate appreciation and awareness of VET in society, its learning outcomes, and students' interest in continuously developing their vocational skills and independent entrepreneurship. (Tasala and Alhojärvi, 2017.)

Figure 3 shows how Finland has grown into a significant actor in international vocational skills competitions over the years. This has benefited Finnish vocational skills and vocational education and training (Tasala and Alhojärvi, 2017). Nowadays, Skills Finland members include around 60 VET providers, the Finnish National Agency for Education, labour market organisations, and teacher and student organisations (Skills Finland, 2024b). Skills Finland is funded by the Ministry of Education and Culture, different foundations, and membership fees.



Figure 3: Skills Finland history

Skills Finland's vision is to promote the world's best vocational expertise, and strategic goals in 2030 are:

Competitions and skills training:

- Offer opportunities to develop individual learning paths that improve learning results.
- Develop vocational competencies to meet changing job market demands.
- Increase participants' employability, entrepreneurship, and placement in further studies.
- Offer a chance for mutual learning and encourage individuals, companies, and educational institutions toward continuous learning.
- Raise awareness of VET and the opportunities within it, as well as improve its attractiveness. (Skills Finland, 2020.)

2.5 Excellence training for the vocational skills competition in Finland

The belief that the training for competitions must take place within a training team and only appropriate candidates should be selected for the team was already expressed in 1989 when Finnish Technical Delegate Veijo Hintsanen reflected on his experiences in the first international skills competition in Birmingham and emphasised, among other things, that:

Only choose competitors who have the nerve for it.

A training ring would have to be built for each skill, comprising the youths being trained and their trainers and training managers. (Tasala and Alhojärvi, 2017.)

Today, Skills Finland coordinates the competition system based on cooperation between all parties of interest. Skill Managers appointed by Skills Finland coordinate the international competition training for each skill. Figure 4 displays the training system where each training team include the student, skill manager, skill trainers, expert for the upcoming competition, and company representatives. Every competitor is supported and funded by their background organisation, usually a vocational school. Skill training teams are open to all students who want to develop their skills. Besides training the competitors, the training system aims to create new teaching methods and deepen the cooperation between VET and the labour market. Skill competitions and skills training offer opportunities to develop individual learning paths that improve learning results. (Skills Finland, 2024g.)

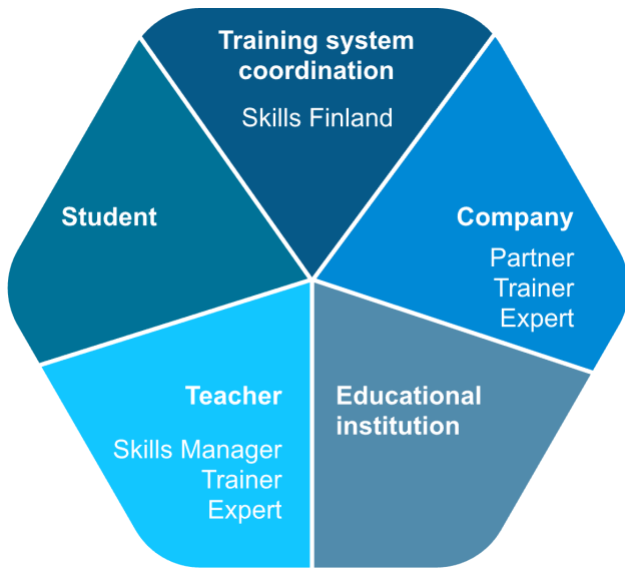


Figure 4: Skills Finland training system (adaptive from Skills Finland, 2024)

The international competitors are selected approximately one year before the competition through national qualification competitions, which test their vocational skills and knowledge in tasks like those in the upcoming international competition. All selected competitors participate in additional training programmes - individualised skills-specific training organised in cooperation between vocational institutions and industry. Each competitor has one or multiple skill trainers, usually vocational teachers, who are experts in the field. Additionally, the training team includes an expert appointed by Skills Finland, who serves as part of the international judging panel in the competition and accompanies the competitor throughout the event. Training teams are monitored for one year, and training can be conducted in school, workplace, or a combination of both.

A KILTA study conducted from 2011 to 2014 explored the impacts of skills competitions and training on teachers, schools, and companies. Figure 5 summarises the results, revealing that teachers and school management consider competition and training activities essential for developing vocational education. Participation in competitions leads to the development of students' vocational skills, the enhancement of vocational education's reputation, and the growth of teachers' skills. Teachers' professional skills and subject-matter expertise have increased during competition activities. Because of the competitions, they have updated and improved the educational materials and acquired new skills to convey knowledge more effectively. Additionally, teachers' ability to identify talented students has improved, and their overall assessment capability has heightened. Functioning within an international network has boosted motivation and enthusiasm for one's work and increased readiness for self-development. Training a student also develops the teacher because it constantly compels them to improve themselves and practice the best working methods. (Skills Finland 2014, 12-16.)

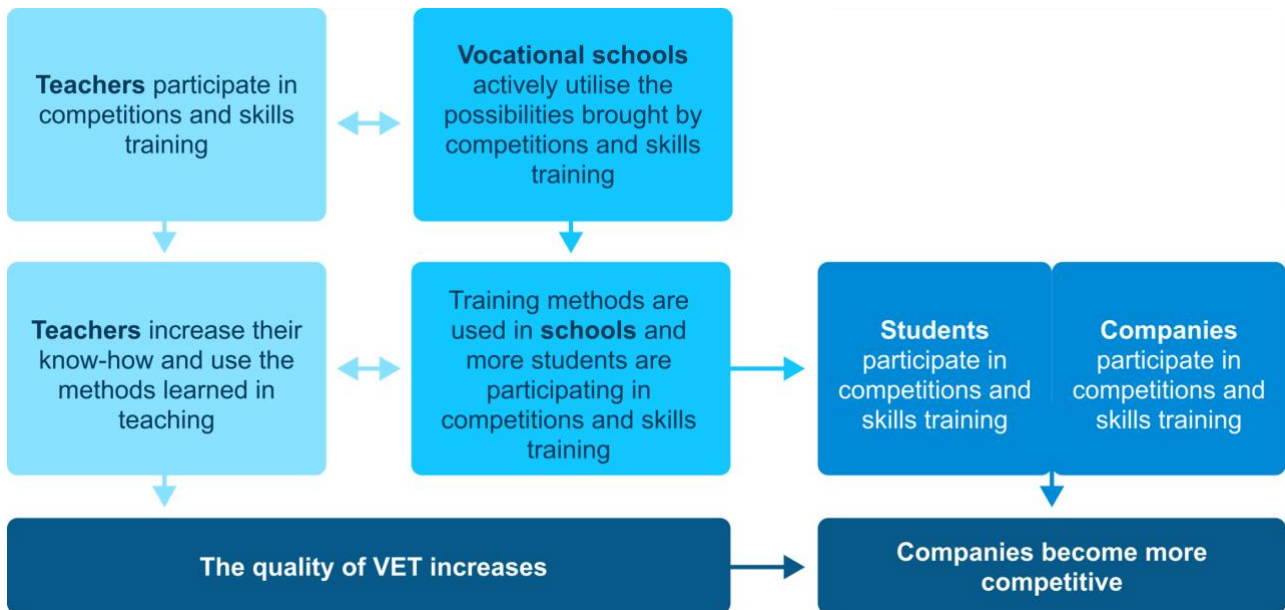


Figure 5: The impacts of competitions and skills training (adaptive from Skills Finland, 2014)

The Finnish national team for EuroSkills and WorldSkills typically consists of 20 to 30 competitors. For the Abilympics, it has 10 to 15 competitors. The minimal objective for the Finnish national team is to get a Medallion for Excellence. The total counts for Team Finland's results in the previous competitions since 1989 are as follows:

- Gold Medals: 43
- Silver Medals: 47
- Bronze Medals: 59
- Medallions for Excellence: 210. (Skills Finland, 2024d.)

Despite the high success rate, Skills Finland constantly seeks opportunities to enhance and standardise training activities by developing an individualised approach to each competitor's training. Systematising the training activities allows for the sharing of best practices, facilitated monitoring, and simplified distribution of acquired knowledge. Accordingly, the organisation is interested in exploring what measures and tools could increase training process transparency, reduce the amount of informal information, and how the preparation for international competitions could be modelled for future training teams.

3 Theoretical frameworks

The theoretical framework chapter of this research-based development project contains two essential subdivisions. The first part clarifies the meaning of human-centred design and opens the service design approach. Subsequently, it examines how to create a new service, which processes should be followed when developing a new digital tool for Skills Finland and ensuring that the product meets the commissioner's desires and addresses the presented problem. The second part of the theoretical framework chapter explains how to train for top performance, what educational theories should be followed and how this can be expanded from one competitor to the entire team.

It is essential for the researcher to accurately select and present the theories in this chapter to find results and complete the task of developing this thesis. The goal is to create a new digital training platform as a service that coordinates preparation and training for international skills competitions. Details on the development progress are further elaborated in Chapter 4.

3.1 Human-Centric Design frameworks

Human-centric design is about understanding people, empathising with them profoundly, and creating innovative solutions based on their needs (IDEO.org, 2015). It is an evidence-based approach where deep research forms part of the design process (Macdermid 2022, 39). A well-planned, human-centric solution is desirable for customers, feasible for business, and technologically viable.

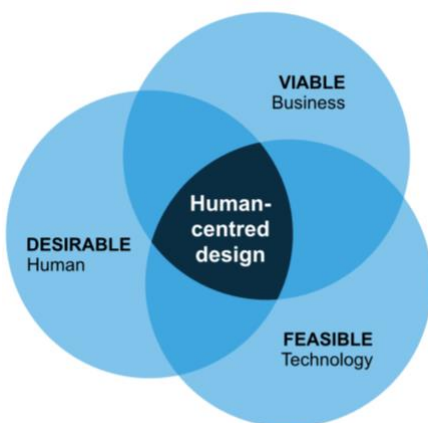


Figure 6: DVF model (adaptive from IDEO.org, 2015)

Figure 6 displays the relationship between three aspects of the DVF model (IDEO.org, 2015). A given model can be used to test whether an idea and solution will create a real impact. For a human-centric approach, it is essential to understand what users want and need. Secondly, consider how the solution suits the environment where it will be used and whether it is technically

feasible. From an economic perspective, considering the resources needed to build this solution and how the solution is economically viable. The so-called sweet spot for innovation is where all three mindsets meet. (IDEO.org, 2015; Macdermid 2022, 57-58)

Design Thinking, Lean, and Agile are globally recognised leading frameworks in today's product development (Schneider, 2017). As shown in Figure 7, each framework contributes uniquely to product development. Combining or adapting them allows for a tailored approach to the project. The common goal of all these frameworks is to enhance the development process by being responsive, user-centred, and efficient.

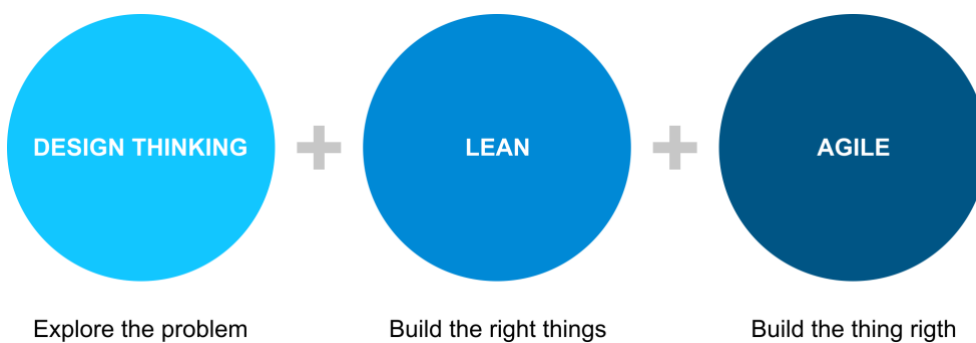


Figure 7: Design Thinking, Lean and Agile (adopted from Schneider, 2017)

Design thinking is a framework that focuses on empathising while defining problems, understanding user needs, and developing human-centred products and services. Lean prioritises product improvement by creating minimal viable products and adjusting based on customer feedback. It involves quick, iterative cycles for developing projects or solutions. Agile methodology focuses on iterative development, collaboration, and flexibility. Agile priority quality through continuous improvement while promoting rapid and flexible responses to change. (Schneider, 2017.)

This research project focuses primarily on design thinking, human-centred design, and the initial solution conceptualisation. Design thinking focuses on user needs and innovation, while agile optimises software delivery with iterative updates and feedback. Conversely, lean improves work systems, efficiency, and value by reducing waste and refining processes.

3.2 Service Design thinking

Design Thinking is a human-centred approach based on human needs, technological possibilities, and business success (Brown, 2024). Design Thinking is not solely aimed at designers but is part of the work culture and mindset. It adapts to any context, domain, or problem. Design is something that people do and how they do it, not the product or the outcome. (Schneider, 2017.) The design

thinking framework stands out from other innovation processes because it is user-centred rather than problem-centred (Brown, 2020). Design Thinking becomes a Service Design when Design Thinking principles and methods are used to create or improve a service. (Outwitly, 2021; Interaction Design Foundation, 2023)

Service Design focuses on service sustainability, while human-centred design focuses on empathy. Both emphasise improvement, while human-centred design aims to empower the user (Di Russo, 2012). Organisations use Service Design to improve their services or create and develop new value propositions (Stickdorn et al. 2018). Service Design is not limited to digital or a single service; it can be adaptive to all service development levels (Moilanen, Ojasalo and Ritalahti 2022, 93). It is a methodology based on organising service provision around user interactions, touchpoints, service personnel, and backstage actors aiming to improve the service (Lake, 2016).

Service Design names and meanings have been widely discussed and covered. Various sources highlight the similarities between Service Design, Experience Design, Design Thinking, User Experience Design, Human-Centred Design, and more. (Lake, 2016; Stickdorn *et al.*, 2018; Outwitly, 2021) Figure 8 displays the overlapping between design methods and frameworks. Depending on the client, project, and problem, companies combine approaches and processes, using them at different stages. The standard line is that all these practices are human-centred, process-based approaches, assuming that the right solution draws from research, testing, and iterations. Service Design focuses on improving the service by understanding the user and environment and rapidly testing different solutions to enhance the quality of service.

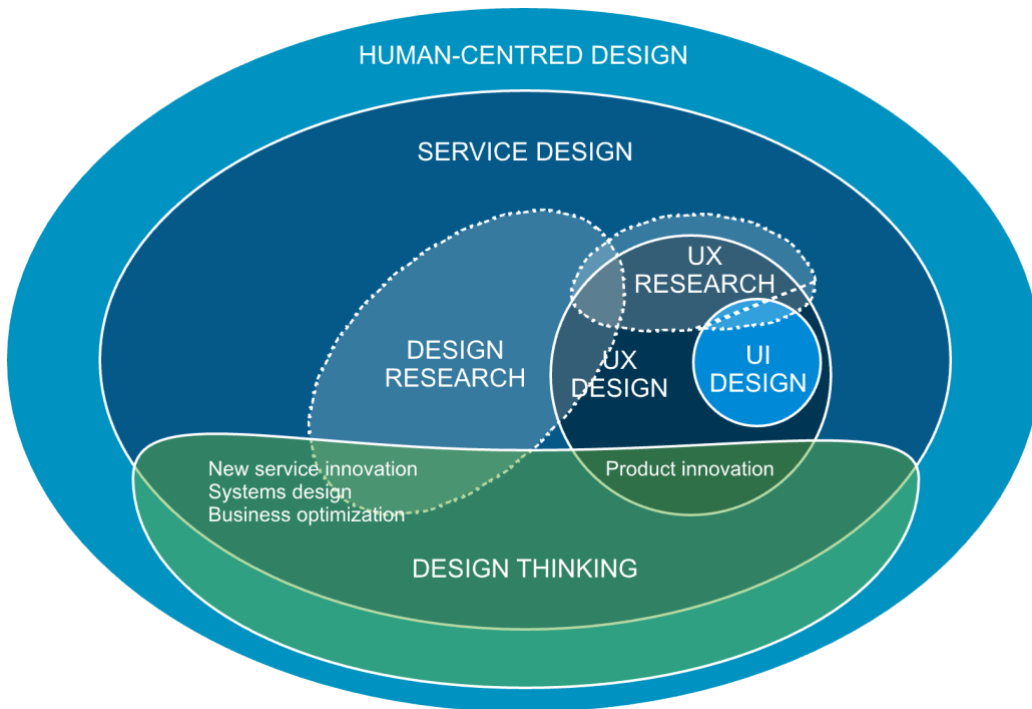


Figure 8: Human-centred design and research disciplines (adaptive from Outwitly, 2021)

Regardless of the model used in designing the solutions, human-centred design today encompasses all stakeholders, our environment, and sustainability, and it is open to changes.

3.3 Double Diamond

The Design Council (2015, 11) divides the design process into three stages: inspiration, ideation, and implementation. During these phases, ideas and possibilities diverge and converge, and with each cycle, the market-ready solution matures. The Double Diamond model, from early 2000, shown in Figure 9, represents how design and innovation are addressed in human-centred design. It provides a structured approach to formulating problems and finding solutions while being creative and focused on articulating the problem, divergent thinking, and creating the right solutions convergent thinking.

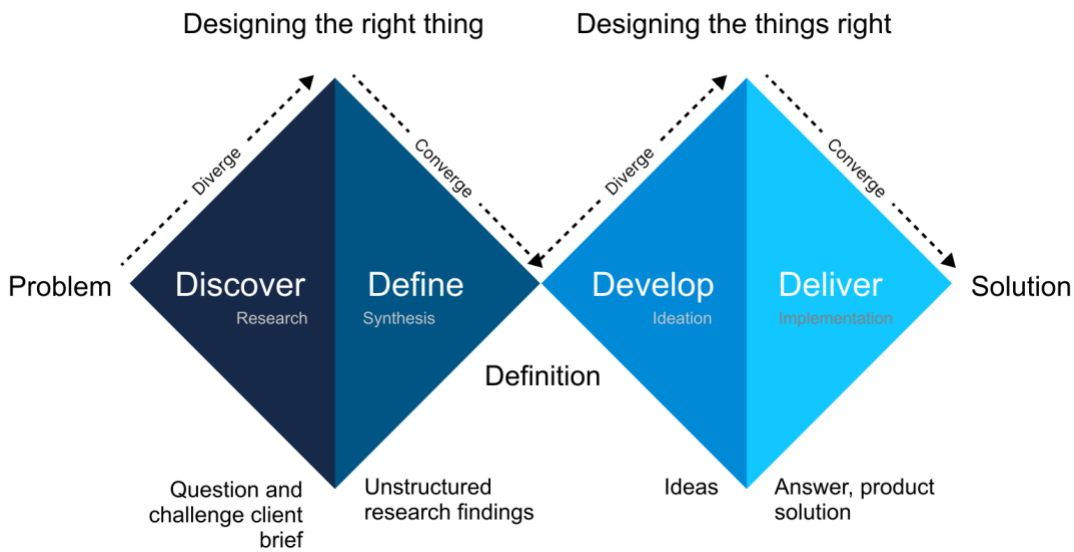


Figure 9: Double Diamond model (adaptive from Macdermid 2022, 90)

The first diamond focuses on identifying and defining the problem. The emphasis is on understanding, not guessing. In the discovering phase, during the research, it is crucial to interact with people connected to the situation to gain insights into the problem. The defining phase will result in the main issue being articulated and determined based on the information collected and insight analysis. Before continuing with the second diamond, the main problem must be defined. The second diamond focuses on development and delivery. In the development phase, developers create various solutions, test their effectiveness with the target group, and repeat the process until they identify suitable solutions. It might involve prototyping potential solutions and subsequently testing these ideas with customers. Finally, the focus is on delivering the working solution to users, focusing on ideas that work while discarding other ideas. After delivery, they should remain prepared for feedback and the next iteration to improve the solution. (Macdermid 2022, 90-114.)

According to Eisermann (2023), Design Council's previous Director of Design and Innovation, claims that due to rapid digital design development, the existing Double Diamond model has become outdated because of its linear process. In 2021, the Design Council introduced the Systemic Design Framework, which aims to be a base for developing or adapting new design methods and tools (Design Council, 2021). The framework's core is updated Double Diamond with divergent and convergent thinking. Still, the revised framework enhances the importance of invisible activities and segments and seeing the bigger picture. The framework deliberately calls the actions differently from the original version. Figure 10 displays the updated Double Diamond model with explore, reframe, create, and catalyse phases rather than discover, define, develop, and deliver phases. (Drew, 2021.) This theoretical work follows the Double Diamond model and uses updated phase names according to the Systemic Design Framework.

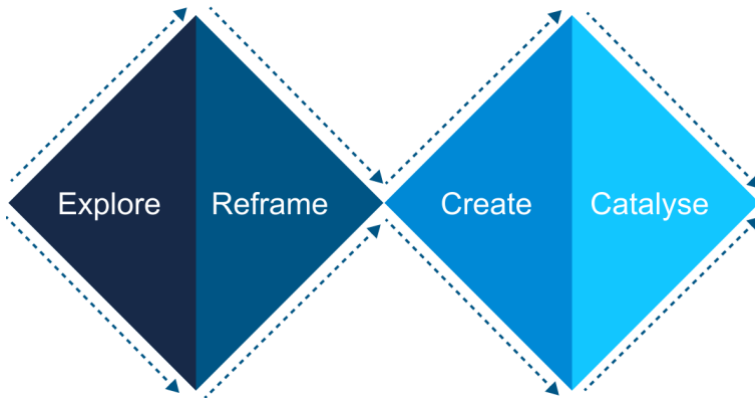


Figure 10: Updated Double Diamond phase names based on Systemic Design Framework (Design Council, 2021)

The Exploring phase, previously known as the Discover phase, aims to investigate the root cause and comprehend what is happening thoroughly and extensively. Differentiated thinking gathers insights from different people to better understand various perspectives by exploring how things are interconnected and paying attention to informal knowledge. The opportunities will be articulated based on the data, and initial prototypes will be created if possible.

The Reframing phase, previously known as the Define phase, aims to approach the problem from various angles to facilitate the generation of new ideas. It brings together different target groups and enables collaborative creativity to give a broader viewpoint for understanding how things are interconnected and how this affects other groups. Convergent thinking is used to narrow down the observations and determine what is most relevant, synthesising the discoveries from research to define the problem in detail.

The Creation phase, known as the Development phase, aims to generate various ideas based on different points of view and views. In this phase, the team develops and works with many other concepts and tests these ideas. Bold and provocative concepts might not be suitable for the final solution. However, they may lay the groundwork for new potential ideas and innovation. At the end of this phase, the team has an idea or shortlist of ideas.

In the Catalysing phase, named Delivering, convergent thinking leads to validating ideas, and prototyping is an essential method for testing how the proposed solution functions and fits with other solutions and exploring what new possibilities may arise from it. Keeping an open mind and

being ready for changes when working with prototypes is essential. In this stage, the team builds, learns, and iterates until they are confident that the solution is feasible and viable.

3.4 Lean Service Creation

In 2013, software development company Futurice started visualising its design processes and combined a toolkit of canvases they use with their customers. Futurice, founded in 2000 in Finland, has grown into a business of over 650 people in five countries with a turnover of 73 million euros. The company has been constantly improving the toolkit, and in 2018, it released the third edition of the Lean Service Creation toolkit. (Futurice, 2024.)

Lean Service Creation (LSC) is a systematic and customisable way for multidisciplinary teams to create new services (Futurice, 2018; Toiminen, 2018).

The Lean Service Creation (LSC) method and canvases are based on the Lean, Agile, and Design Thinking methodologies (Futurice, 2018). LSC is an open-source toolkit that provides a checklist for finding problems and organising the answers (Toiminen, 2018). The method is step-by-step instructive, containing questions characteristic of the given stage in an agile, customer-centric way. The Lean Service Creation follows five principles: 1) Enabling creativity, 2) focusing on the problem, 3) ensuring transparency, 4) welcoming iterations and 5) seeing the bigger picture. (Toiminen 2018.)

Table 2 on page 21 introduces LSC canvases and each canvas's association with the Double Diamond phases in the Systemic Design Framework. Toolkit creators emphasise that there is no need to use all canvases, and the team should select which worksheets they need, the project's scope, the service or product created, and the end goal.

Table 2: List of LSC canvases (adopted from Futurice, 2019) and their relation to the Double Diamond framework phases.

Phase	Canvas	Canvas description	Double Diamond phase
Business objective	Business Objective and Context	Initiates the exploration of the project scope, objectives, and contextual understanding, filled with stakeholders.	Explore
Business objective	Immersion	Deepens the exploration with detailed research and understanding of the environment and user needs.	Explore
Users' needs	Customer Grouping	Aids in exploring different customer segments and their unique needs, preferences, and behaviours.	Explore
Users' needs	Script Creator	Creates a clear plan for the interviews following the customer journey.	Explore
Users' needs	Insight	Converts research findings into actionable insights, helping to reframe the understanding of user needs.	Reframe
Ideation	Ideation Sandbox	Focusing on the user's problem and creating the first round of ideas.	Create
Ideation	Idea Accelerator	Choosing three ideas and accelerating these to make the idea better.	Create
Concepting	Rational Concept Sheet	Working out the concept, focusing on the customer's problem, making it feasible, and understanding the business potential.	Catalyse
Concepting	Concept Sheet	Work out the real core of the value you create for the user.	Catalyse
Concepting	Impact Optimiser	Ideate service to maximise positive impact on the world.	Catalyse
Concepting	Customer Engagement	Develops strategies for engaging with customers to refine and validate the concept.	Catalyse
Business model	Business Model & Market Size	Explores and defines the business model and estimates the market size and potential.	Explore
Validation	Feasibility Study	Evaluating the risks more concretely and profiling the concept.	Catalyse
Validation	Evaluating the Concept	Evaluating the risks more concrete and profile the concept.	Catalyse
Validation	Validation	Helps question and validate your concept.	Catalyse
Wrapping it all up	Minimum Lovable Product	Explore the essential features that serve the user's needs.	Catalyse
Wrapping it all up	Pitch Creator	Wrapping it up and preparing to present the concept.	Catalyse

The LSC method provides an opportunity to view the service from various perspectives involving various persons. It is a fast, visible, and simple way to communicate and obtain feedback. It applies to different services and products and is a proven tool, as many companies have successfully used and tested it. (Toiminen, 2018.)

3.5 Validating the concept

One main principle of design thinking is to validate proposals quickly and get feedback to ensure the solution addresses the right problem (Futurice, 2019). One central feature of Service Design is visualising generated ideas and concepts to illustrate abstract service situations (Moilanen, Ojasalo and Ritalahti 2022, 94).

Wireframes and prototypes are essential parts of the design process, as they visualise the possible solution, gather feedback, and modify the idea to make it suitable for the product. Wireframes can be divided into three categories depending on their level of detail (Canziba 2018, 175-187):

- Low-fidelity or paper wireframes are in a maximum of two colours and use only boxes, text, and lines. They provide an abstract overview of the planned design and are suitable for rapid visioning.
- Medium-fidelity wireframes define elements more precisely, forming a clear visual hierarchy. They are created using software and in a monochromatic palette. Medium-fidelity wireframes are recommended for prototyping as creating them is faster than developing the application, and testing can reveal how the proposed solution works in the early development phase.
- High-fidelity wireframes present the user interface as it will be when it is developed. The use of branding colours, fonts, and all other design elements creates a realistic application feel. Because of its detail-richness, creating a high-fidelity wireframe takes time; it is usually made at the end of the design phase to visualise the final interface.

Component diagrams can be used to illustrate a system's software architecture, visualise the solution's structure, and organise all components and features. Component diagrams can offer an overview of the technical solution before making any changes or enhancements. (IBM, 2023.)

The minimum viable product (MVP) is a commonly used method for Agile software development (Nesta and IDEO, 2016). The MVP is created to test the essential core of the concept with real users, assuming it will undergo rapid innovation and development to achieve a desired state or that the idea will be abandoned if the product or service proves unstable or undesirable (Interaction Design Foundation, 2021). This approach allows for testing whether the created concept meets expectations with minimal resources in the early stages of development.

3.6 Learning and training

Engeström defines that education is a goal-oriented influence on human development. It includes schooling provided by parents and educational institutions and self-learning, an individual's effort to gain growth. Training is education aimed at particular skills and competencies. Instructing or teaching aims at conscious, goal-directed learning and affects the student's personality. The instructing task is to motivate, direct, and facilitate studying. (Engeström, 1994.) Vehviläinen adds that mentoring is a collaborative process that supports the mentee's learning and development so that the mentee learns, makes choices, and changes behaviour (Vehviläinen 2020). Productive learning occurs when the learner, as a curious observer and problem-solver, is interested in explanations and solutions (Engeström, 1994). Figure 11 displays productive learning as a cyclic movement between the learner, object, and instrument. The stronger the connections, the more meaningful the learning.

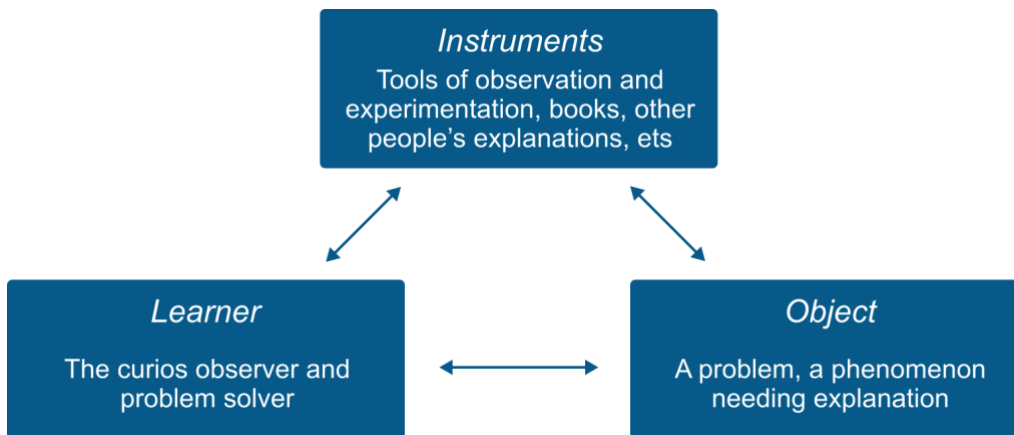


Figure 11: The productive learning structure in everyday situations (adaptive from Engeström, 1994b)

Different types or levels of learning may be distinguished depending on how narrow or wide the learning focus is. Investigative learning means learning to be productive, investigative, and depth oriented. It contains four key components: learning motivation, organising content, advancing through the learning process, and social interaction and collaboration. (Engeström, 1994.) As learning happens in the community with specific rules and roles, Engeström expanded the learning model to expansive learning, in which individuals and groups may learn something new in addition to known structures, creating new systems or ways of understanding and acting (Engeström, 2005). Figure 12 on page 24 displays how individuals and groups interact according to activity theory, emphasising the role of collaboration, tools, and community in the learning process. Therefore, learning is a process during which all parties develop, and new values, knowledge, and behaviours may be created.

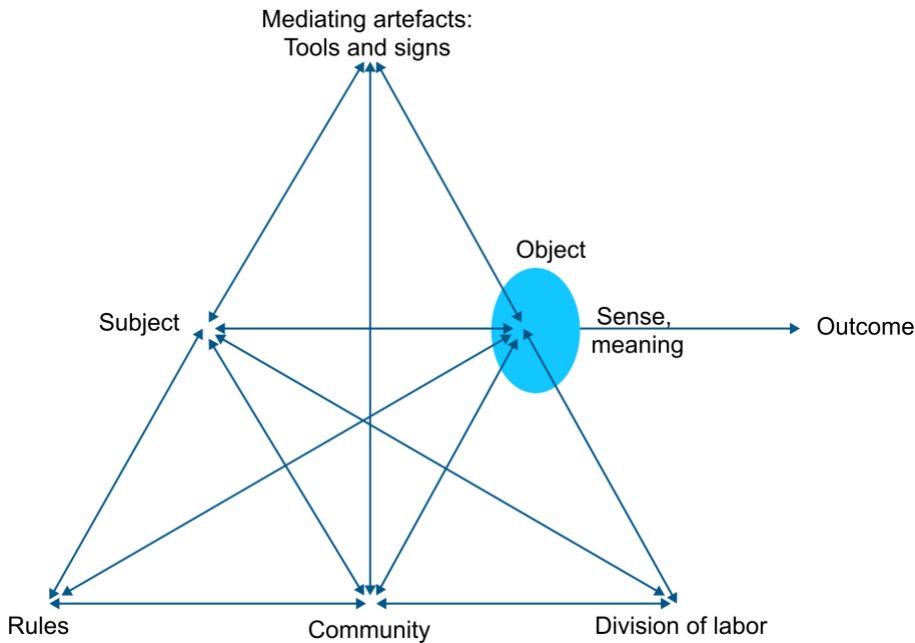


Figure 12: Engeström activity system in expansive learning (adaptive from Engelström 2005, 61)

Developmental processes have four distinct forms: maturation, informal learning, formal non-institutional learning, and formal institutional learning, each supporting personal growth and skill acquisition in different ways. Informal and formal learning (both institutional and non-institutional) involves acquiring knowledge and skills, with formal education often leading to recognised competencies or talents, being particularly significant in developing skills compared to natural gifts. (Gagné, 2004.)

Developing vocational excellence can be differentiated into four phases: 1) Getting acquainted with the profession (mostly informal learning), 2) learning the profession (learning and developing the skills needed for the profession), 3) working in the occupation (the independent practice of the work), 4) functioning as an expert (mastering the profession at a high level) (Nokelainen, 2010). Developing vocational excellence correlates with a person's internal motivation and interest in learning new things, and it is a natural part of vocational growth (Nokelainen, Ruohotie and Korpelainen, 2009). Highly skilled professionals make correct decisions at the right time, without mistakes, and perform tasks efficiently and skillfully (Isokorpi, 2013).

Mentoring and training can be process-oriented or output-oriented. Process-oriented training focuses on what the trainee brings with their experiences, activities, and work methodologies. For example, workplace training concentrates on the trainee's needs and the challenges arising from the work. Process-oriented training is flexible and occurs in stages. In contrast, output-oriented training consists of straightforward, pre-prepared tasks to achieve the desired result. Often, training is a mix of process-oriented and output-oriented approaches. (Vehviläinen 2020.)

3.7 Talents vs skills

Gagné (2004) published the Differentiated Model of Giftedness and Talent (DMGT), distinguishing natural gifts from systematically developed skills. He also discussed how gifts, intrapersonal and environmental catalysts, and chance play a role in talent development. Pylväs and Nokelainen (2017) continued Gagné's work and developed the Developmental Model of Vocational and Professional Excellence (DMVE). DMVE model in Figure 13 contains the following components: natural abilities (gifts), intrinsic characteristics, extrinsic conditions, and deliberate practice. The model illustrates how inborn gifts develop into talents; deliberate practice is essential for this progress. Deliberate practice can make people competent professionals, and even if an individual lacks some components, they may reach vocational excellence.

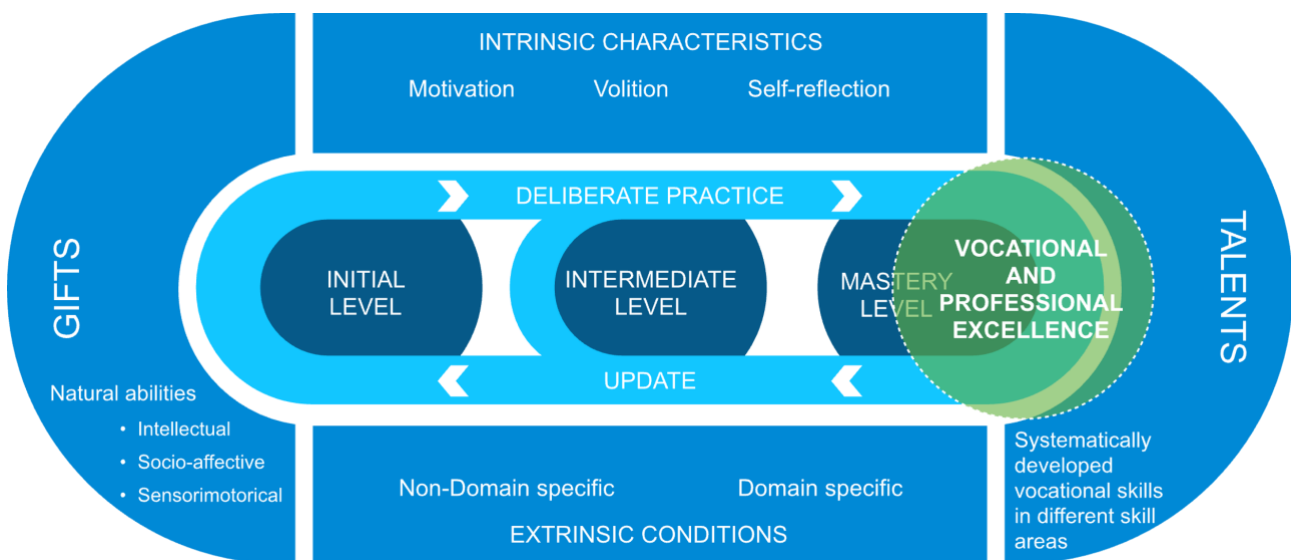


Figure 13: Developmental model of professional and vocational excellence (DMVE) (adaptive from Pylväs and Nokelainen, 2017)

Ericsson (2018) underlines that deliberate practice must be well-structured, purposeful, and dedicated to improving performance and developing expertise in the long term. Increasing working hours or performing the same activities over and over without immediate feedback on the outcomes will not develop expertise and can instead reduce the level of effort. In deliberate practice, the teacher or coach individually assesses the student's current skills and techniques, identifies the following goals, and participates in the training activity to support achieving these goals. For a successful training session, the student must monitor their performance and make the necessary changes to achieve the desired outcome. Ericsson also highlights that training sessions should ideally be up to five hours daily. (Ericsson, 2018.)

3.8 Competitors' personality traits

Numerous studies have been conducted in Finland on vocational skills competition excellence. (Tasala and Alhojärvi, 2017). Between 2007 and 2009, researchers investigated the characteristics and developmental factors of individuals who wanted to achieve vocational excellence (Nokelainen, Ruohotie and Korpelainen, 2009). Subsequently, from 2009 to 2011, aspects influencing the winners were examined (Nokelainen, 2010). Consequently, in 2012-2014, researchers investigated what happens to the champions after competitions and as they transition into the workforce (Pylväs and Nokelainen, 2017)

Nokelainen et al. (2009) found that vocational skills competitions competitors have identical key characteristics to US Athletics and STEM Olympiads:

1. Stress tolerance (calmness, composure).
2. Persistence (accuracy, concentration, determination, diligence).
3. Developmental ability (dexterity, visualisation ability, problem-solving ability, speed).
4. Competitiveness (ambition).
5. Interest in work.
6. Sociability.
7. Time management (systematisation).

In subcontinual research, the findings confirmed that volition, self-reflection, innate gifts, and internal motivation are essential for vocational excellence achievers. Underlined interpersonal skills were “knowledge of human nature, an extroverted personality, an energetic and positive attitude, open-mindedness and encouragement, flexibility and humility, customer service orientation, and teaching and mentoring skills”. (Nokelainen, 2010.) In later phases of life, participants emphasised the importance of problem-solving skills, cognitive skills, and creativity. Creativity is directly related to artistic and visual skills and inspires a person to create something new, such as a new idea or method of working. (Pylväs and Nokelainen, 2017.) Top performers act according to their values, recognise their strengths, and utilise them optimally (Isokorpi, 2013).

3.9 Training progress and activities

The training aims to develop the competitor's ability to perform tasks in everyday work life and in demanding competition situations. The focus should be on developing professional vocational skills, but attention must also be paid to other skills directly related to achieving vocational excellence. Lacking confidence, motivation, commitment, and discipline can affect the competitor's achievement, although a competitor's vocational skills may be high. (Minkkinen, Pylvänen and Airaksinen, 2011.) Therefore, when creating a training plan, it is crucial to consider the

development of both professional and interpersonal soft skills (Minkkinen, Pylvänen and Airaksinen, 2011; Isokorpi, 2013).

To be successful, you have to learn to act like a winner (Minkkinen, Pylvänen and Airaksinen, 2011).

At the beginning of training, when planning the training activities, it is essential to consider the trainee's goals, values, and skills and make plans for activities and progress progression. Trainees must reflect on their vision of the process advancement and course activities and contributions to follow the process to achieve the goal. The trainee's contribution and commitment to achieving goals are crucial in training. (Vehviläinen, 2020.)

Internal goal orientation is more important in developing an interest in the profession and, after training, as professional skills develop. External goal orientation is more critical during training. The importance of both motivational factors decreases when approaching a high level of professional competence, in which case future employment and challenging work prospects become central motivational factors. (Nokelainen, Ruohotie and Korpelainen, 2009.)

Training for the competition can be differentiated into three phases: 1) preparing for the competition, 2) competing, and 3) analysing and learning from the achievement. In the preparation phase, it is essential to focus on focusing and self-confidence, acknowledging the feelings, and adequately dealing with these. Winning is not always happening, but one can still perform excellently. Competitions are learning places, and competitors should aim for the best possible vocational achievement in competing times. After the competition, it is crucial to analyse the performance and 1) focus on positive achievements and results and 2) learn from possible negative emotions and failures. (Isokorpi, 2013.)

The trainee should evaluate and present growth before moving to the next training phase. A training diary is efficient for documenting development and can be used for evaluation (Isokorpi, 2013). Minkkinen, Pylvänen, and Airaksinen proposed a daybook practice for performance-control development. They highlight that only regular practice can evoke development. The daybook in Table 3 can track mental exercises or vocational tasks. The feeling and observation columns add value, giving the performance a personal touch and enhancing learning outcomes.

Table 3: Daybook of performance-control development

Period	Day	Exercise + duration	Feeling before exercise (0-10)	Feeling after exercise (0-10)	Observations, insights, development ideas

The role of the educational institution teachers and competition trainers is essential in all stages of professional development (Nokelainen, Ruohotie and Korpelainen, 2009; Nokelainen, 2010; Pylväs and Nokelainen, 2017). A teacher's positive attitude, patience, and tolerance are crucial characteristics. Instructions and encouragement should be given personally and in the group (Isokorpi, 2013)

Training in a group involves different skills, and everyone has a role to play. All team members need to have a similar understanding of the goals. Before working in a group, it is essential to agree on how progress is measured, who measures it, and the roles of those who do what.

Training with multiple trainers can enrich the learning process as things are not dependent on one person's skills alone, and the responsibility for guidance is not solely on one individual. Training with multiple experts helps observe things from different perspectives, and group members bring their skills and strengths. Shared guidance is an excellent opportunity to learn how to be a mentor. The negative side is the assumption that mentoring is well-planned and organised. Without good planning, mentoring in a group can cause stress and take up much time. (Vehviläinen, 2020.)

Training success can be evaluated based on achieved results, observed change, or the training process evaluation.

- Achieved results: Mastery of competence criteria and achievement of set goals.
- Observed change: Acquired new skills, professional development, or improved well-being. Spontaneous findings can be reflected in a learning diary, capturing post-performance thoughts and feelings.
- Evaluating the process: Assess whether the desired goals have been achieved, determine if goals have changed during the process, and identify what has influenced the change. Assess how the training has progressed. An overview of the training process should be documented for evaluation. (Vehviläinen 2020.)

4 Research-based development project

Since 2010, the author has participated in international and national vocational skills competitions as a Web Development skill expert and the skill trainer in Finland's and Estonia's national teams. Over this period, the author observed that training teams have different solutions for organising, monitoring, and documenting training activities. Solutions range from notes written on paper to highly organised file systems. Understandably, training for various professions and skill areas requires different approaches, tools, and equipment. However, the training cycles from a documentation point of view are fundamentally similarly structured. To gain a better overview and familiarise with the Finnish team's training approaches in different competition fields, the author worked part-time as a training manager in 2023. Based on observations collected over time, the author proposed to Skills Finland to research the possibilities of digital transformation to create a unified training platform that would facilitate the organisation, monitoring, and documentation of training activities. The preliminary goal of the research was to map the current practices of the training teams and determine whether and which digital solution could help improve the documentation and structuring of the training process.

4.1 Research plan

The research-based development project has two parallel directions: the first focuses on following the master thesis structure and stages, and the second follows the Double Diamond model for Service Design. Figure 14 on page 30 displays the phases in both directions. The Double Diamond side, on the right, includes the LSC canvases used in each section labelled with C and sequence numbers. The first diamond of the Double Diamond model focuses on designing the right thing and understanding the users' needs and the real problem. The second diamond focuses on designing things right. The project follows updated Double Diamond phases:

- In the exploring phase, the author lays the foundation for service development by identifying the client's expectations, determining the target group, and forming initial assumptions about the problem to be solved. Surveys and interviews were conducted to analyse the data. LSC canvases used were Business Objective and Context, Customer Groups, Immersion, and Script Creator.
- In the reframing phase, the author analyses the collected data to find pain points and insights about the target group's needs, wants, feelings, and problems. The phase ends with a conclusion about the main issue and the initial solution ideas. LSC canvases used for this phase: Insights.
- In the creation phase, all ideas are gathered to identify connections between them and facilitate new ideas' emergence. This is the most creative stage when brainstorming

happens. By the end of this phase, the author has an essential list of features for the MVP. LSC canvases used for this phase: Ideation Sandbox and Idea Accelerator.

- In the final Double Diamond stage, the catalysing phase, the author prepares a proposal for core components and features for the training platform. At the end of this phase, a component integration diagram and an example wireframe will be created to visualise the training platform.

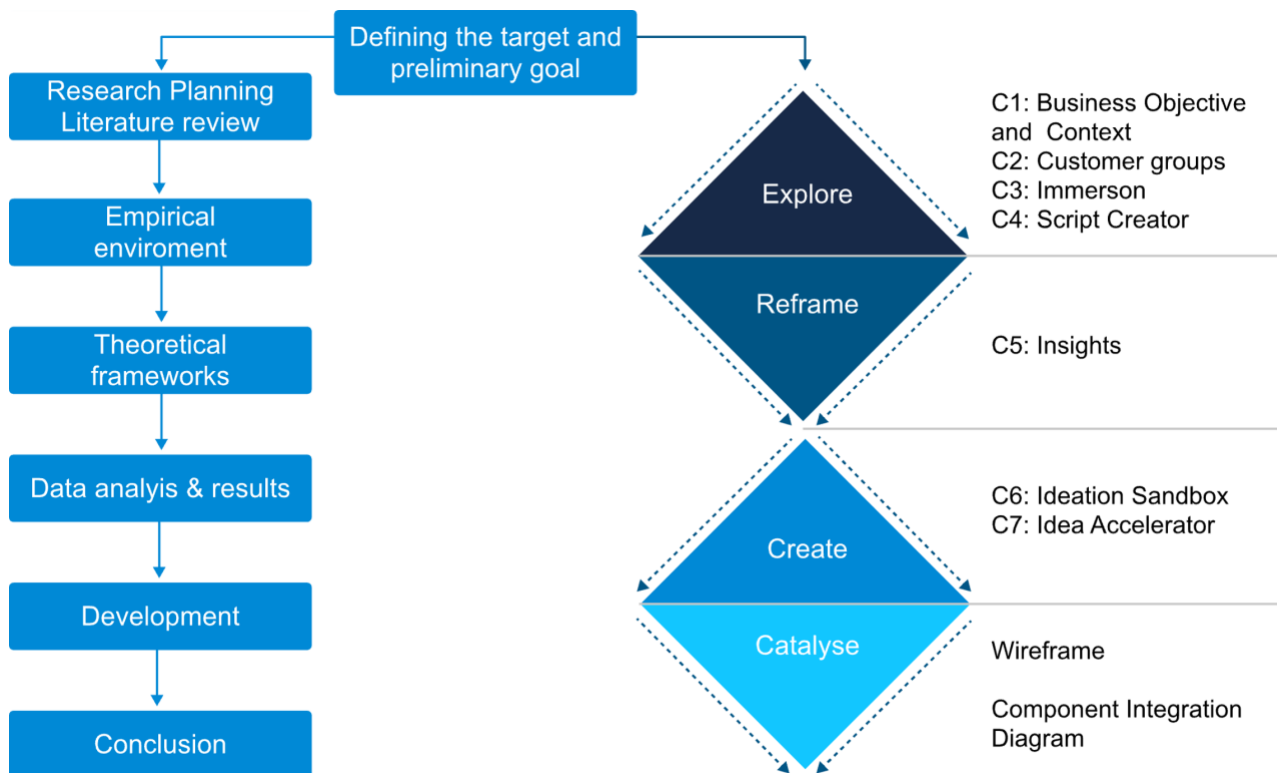


Figure 14: Research-based development project plan.

Project work started in October 2023, when initial agreements were made about the research topic and theme. The project has taken about six months, of which active project work accounts for four months. The commissioner of the work is Skills Finland, a non-profit organisation whose vision is to promote the world's best vocational expertise through vocational skills competitions and seeks opportunities to enhance and standardise international skills competition training.

4.2 Identifying the problem and goals

Understanding and managing stakeholder interests and goals is crucial for project success. It is essential to consider expectations around the business impact of the designed product or service to keep the focus on the right decisions that support the business goals (Futurice, 2019). In an online session in January 2023, Skills Finland's Chief Training Manager, Ms. Teija Ripattila, represented Skills Finland at the stakeholder meeting. The LSC toolkit canvas Business Objective

and Context was completed with the author during the session. As a result, the commissioner's needs, strategic expectations, problems, and possible risks for the project were clarified and phrased.

High-quality professional training is not just preparation for competitions – it offers opportunities to develop and become top experts in the job market. Therefore, it is essential for Skills Finland that the training is well-organized and that competitors get individualised training programs which match their skills, needs, strengths, and goals.

The stakeholder interview confirmed the thesis author's observations that there is an uneven level of organising training and the need for more transparency regarding the conduct of training. There are excellent examples and very well-organised training teams. However, at the same time, there are teams for which it needs to be clarified whether and how the training is organised. Many teams document the training process inadequately or not, resulting in much informal information that is difficult to pass on to subsequent teams. The training manager must contact each team separately to determine how the training is organised and progressing. The solution could be a transparent, easy-to-follow, and effortlessly accessible digital training platform that will combine all documentation in one place. The main aim is for the training process to be more transparent for future training cycles from Skills Finland's point of view.

The research project has two main phases – data acquisition and development. The data accruing phase focuses on finding the answers to the following research questions:

Q1: How is training for the international vocational skills competition currently arranged in Finland?

Q1.2: What personal qualities are expected from competitors?

Q1.3: What documentation are training plans and activities based?

Q1.4: What tools do the training teams use during the training cycle?

Q1.5: What challenges do training teams face while preparing for the competitions?

After processing the data, the development phase will answer the last research question:

Q2: "What features of the digital training platform are essential to support the training process effectively?" The primary outcome of the development phase is to deliver the initial conceptualisation for the digital training platform solution, which will give an overview of the core features.

This research project will use the Service Design approach, as discussed in Chapter 3.2, to develop the concept of a digital training platform. Human-centred design is used to explore the problem empathetically and comprehend the needs of the training teams to understand the current

situation in training teams. The Double Diamond model from Chapter 3.3 is used to follow the design phases, where ideas and possibilities diverge and converge. The LSC toolkit introduced in Chapter 3.4 will be used to structure the design process. Proposing suitable solutions, the training and learning processes, deliberated training, training phases and competitors' personality traits from an educational standpoint, as discussed in chapters 3.7-3.9, are considered.

4.3 Benchmarking and selecting the target group

As discussed in Chapter 3.1, human-centric design is about understanding people and empathising with them solutions based on their needs. The Customer Groups worksheet helps increase the researcher's empathic view from the customer's perspective to understand who the customers are, what is important to them and what problem they need to solve (Futurice, 2019). The target group for the research work is members of international vocational competition Finnish training teams. Competitors need a personalised approach to develop vocational competencies and improve learning results to meet job market demands. Experts need a clear structure for organising training, considering competitors' characteristics and the professional competencies arising from their field. Skill managers need an overview of how the training process unfolds and evolves. The initial research focus will be on competitors, as their professional development and improving their future opportunities are one of Skills Finland's strategic objectives.

The Immersion worksheet is an intermediary for understanding the business concept from the users' perspective (Futurice, 2019). As a result of working with this canvas, the initial assumption is that training teams need support to understand the competition assessments and criteria, advice on documenting the training process, and a clear structure for organising the training. It must be considered that people with different roles in the training teams have different expectations for the training outcome and processes. Other professions have different competencies and needs, and there is varying readiness to use digital tools. To understand different skills training setups and methods, it is essential to study how the training is currently arranged and documented and what it is currently based on.

4.4 Survey and results

A survey allows data collection from many people and can be conducted quickly. Fallbacks are that estimating how seriously participants have been taking the survey is difficult. (Moilanen, Ojasalo and Ritalahti 2022, 155-169.) The online survey was conducted to map the Finnish national team's current situation and get an overview of how training for the international vocational skill competition is currently arranged in Finland. The questionnaire included quantitative and qualitative questions. The survey investigated the tools currently in use, the present challenges during the

training, and how effective the current training is perceived to be. Qualitative questions were included to explore ideas and suggestions for developing a new platform and gain insights about the training platform's features and the general attitude towards creating a new one.

The online survey was carried out in January 2023. A reminder email and message were sent to the National team group chat and email one week before the deadline. The survey sample contained all people directly involved with the WorldSkills 2024 training – 22 competitors, 22 experts, and 12 skill trainers, totalling 56 people across 22 professions. Additionally, all 31 skill managers were invited to participate in the survey, which made up 87 people. There was a total of 39 responses, resulting in a response rate of 45%. The questionnaire is included as an appendix (Appendix 1). Figure 15 displays the roles of participants by competing skills and the total count of participants based on roles. A simple percentage calculation method was used to analyse responses, where the number of answers was divided by the number of participants and training teams.

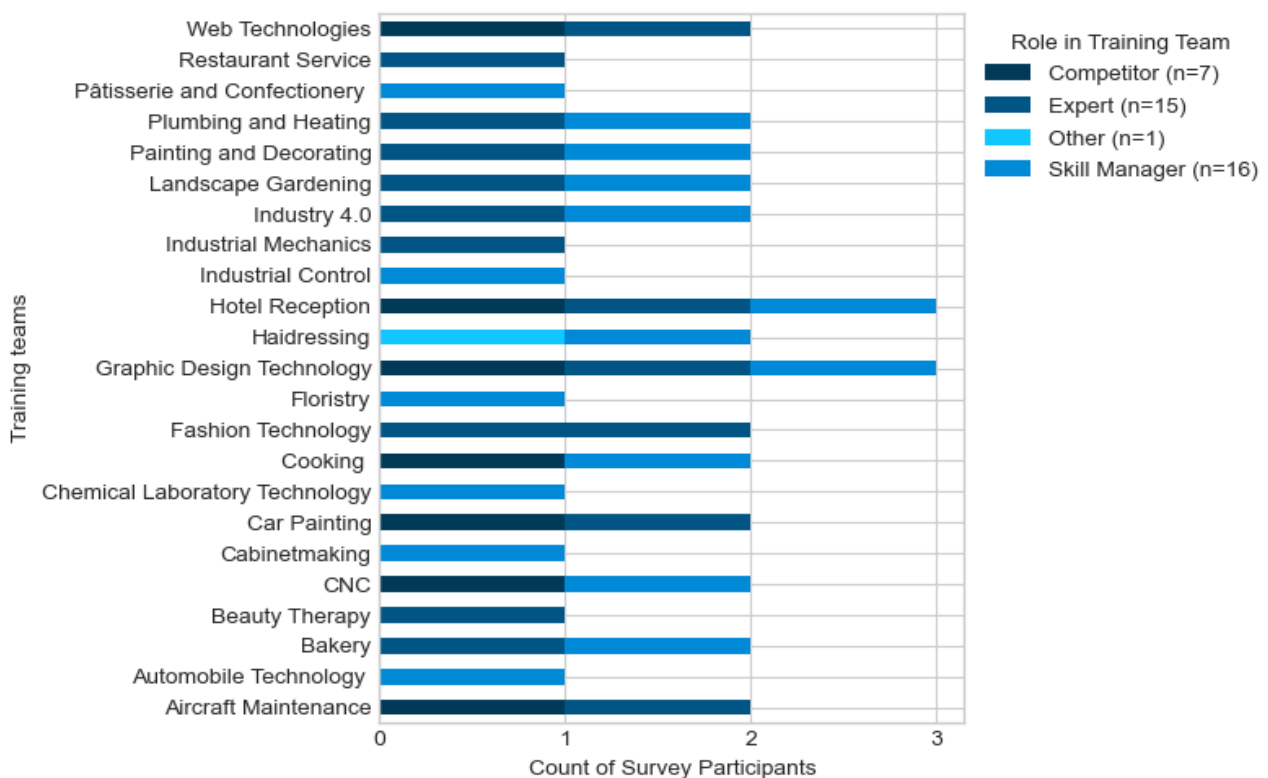


Figure 15: Survey participants based on their skill area and role in the training team.

As discussed in Chapter 2.3, skill competition tasks and assessments are based on WorldSkills Occupational Standards, part of the competition Technical Description document. A semi-structured question was posed to explain which documents are used as the basis for creating training plans. At the individual level, 95% (n=37) mentioned using Technical Description, 90%

(n=35) Test Projects, 62% (n=24) Infrastructure List, and 51% (n=20) Occupational Standards as a basis for training. Only 23% (n=9) of all participants mentioned using the National Curriculum as a base document. Answers were combined to see the situation in the training team. If one team member mentioned the document, it was counted as the training team using it. Results display that of 23 skills, 100% (n=23) mentioned using Technical Description, 96% (n=22) Test Projects, 78% (n=18) Infrastructure List and 74% (n=17) occupational Standards as a base for training. Using the National Curriculum was still low, with 35% (n=8) of skills mentioning using it as a training base. (Figure 16). When comparing responses by roles, the survey results suggest that the expert is the most aware of documents used as a base for the training, and the skill manager is the least. Of the 23 skills, in 8 cases, the expert shared a more detailed list of documents used in training than the skill manager. In one case, a competitor provided more details than the expert.

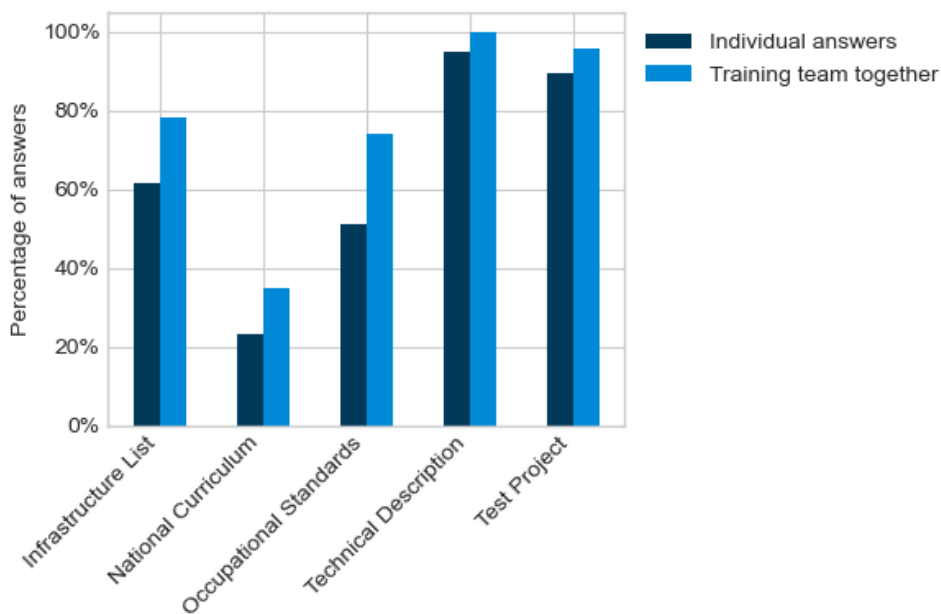


Figure 16: Documentation used for training plans.

For clarification, as most of the tasks in the WorldSkills 2024 competition are secret and will be revealed right before a competition, the Test Project means previous years' competition tasks. However, focusing solely on old competition tasks limits the training and does not adequately prepare competitors for future work demands. Also, the questionnaire did not clarify the type of Occupational Standards; therefore, answers could indicate the usage of national occupational standards.

Responding to the question, "What tools or technologies do you use during training? (e.g., software, apps, equipment)." 51% (n=20) mentioned skill-specific tools and equipment, 40% (n=17) MS Teams, and 46% (n=18) referred to Microsoft Office products (Word et al.). Surprisingly,

WhatsApp emerged as a popular tool during training, highlighted 11 times, with 28%. Social media and YouTube were listed five times, and emails, phone calls, OneDrive, and training diaries were mentioned twice.

The question “How do you share training information and updates?” was asked to understand how communication occurs within the training group and beyond. 54% (n=21) answered WhatsApp, Microsoft Teams 46% (n=18) and email 44% (n=17). Using phone calls and Social Media channels resulted in 13% (cases n=5). Direct communication was mentioned only four times, which may indicate that face-to-face communication is not considered a communication tool. Based on these responses, it can be inferred that communication primarily occurs within the group, and communication outside the training group happens less frequently or is absent. Observing similarities in the responses to both tools-related questions, it can be inferred that training teams use digital tools mainly for communication and documentation.

Participants were asked to rate the effectiveness of the current training tools on a scale of 1 to 5, where one stands for ineffective and five highly effective. Competitors were the most positive, with an average rating of 3.86, followed by experts at 3.29, and skill managers were the least satisfied, with an average of 2.75. When combining this question results with the results regarding which documents the training is based on, it can be inferred that the low involvement of skill managers in the training process may create different expectations. It should also be noted that competitors participate a maximum of two times in the competition cycle. Still, experts and skill managers may have years of experience and, therefore, might have additional anticipations regarding the training process and tools.

Based on the questionnaire results, the biggest challenge for training teams is the long distances (n=12). Competitors and experts may be from different schools, making organising face-to-face meetings difficult. Time-related challenges were mentioned 23 times, with 12 instances where participants claimed insufficient time for training and 11 times when time usage and planning were problematic. The lack of resources and sponsors was highlighted 15 times, including repeated mentions that employers do not sufficiently compensate for the working hours dedicated to training. Figure 17 on page 36 displays challenges based on role. The most mentioned challenges are time-related issues, location-related problems, and money and lack of resources.

In contrast to skill managers, it is good to notice that competitors do not feel that money is an obstacle to training. It was also pointed out that information sharing within the group is disrupted or that adding new people as experts change is challenging. Difficulties in finding competitors, experts, or coaches were mentioned three times. Several experts expressed that finding suitable tasks for the competitor is complex, and they need help defining what to train.

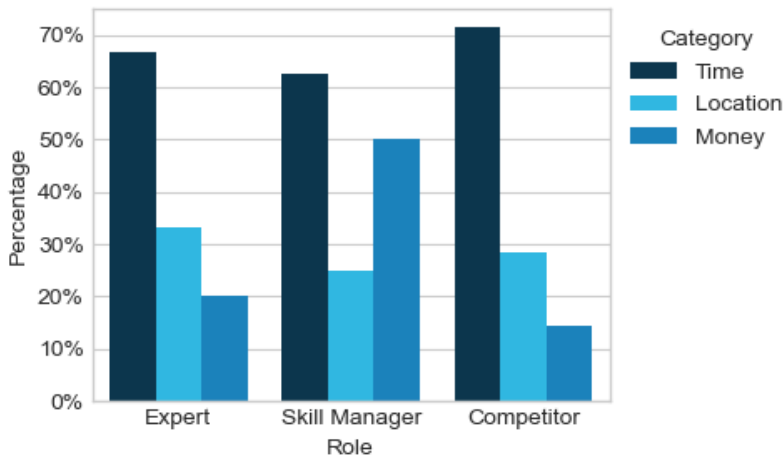


Figure 17: Challenges teams facing

To gather training team feedback and ideas on what features should be included in the training platform, 49% of participants (n=19) mentioned a calendar with related features like essential dates, schedules, and reminders. File sharing, including an opportunity to share photos and videos, documents, and meeting links, was mentioned by 44 % of participants (n=17). Progress tracking, such as training diary, tasks, homework, and training time spent calculator, was highlighted by 33% (n=13) of participants. And 21% (n=8) wished to have a training plan on the training platform. It is worth mentioning that previous years' history, training goals, and overall info about competitions and training team roles were also listed. From the communication tools, 6 cases of online meetings and chats from this platform were mentioned, and five times underscored that it must work well on mobile phones.

Regarding how easily a new tool could be integrated into the current training process, competitors were the most positively inclined in their responses, averaging 2,43, when experts said 2,33 and skill managers answered 2,31. A Spearman correlation matrix was used to understand whether there is a correlation between evaluating the effectiveness of the current training tools and adopting the new training tool for current training. The analysis revealed a perfect positive correlation between both variables, with a Spearman's rho (ρ) of 1.0 for all pairings, indicating a strong direct relationship, where increases in the perceived effectiveness of training tools are associated with increases in adopting the new tool to the training process, and vice versa.

Finally, regarding the new system, 38% of participants hoped that the new digital training platform would make training planning and processes easier, and 21% added that it would be more convenient because everything would be in the same place. Transparency and the opportunity to share knowledge were expressed by 15% of participants, and 13% assumed that it would save time in the future. The ability to track the progress was a 10% mentioned benefit. To gain

confidence that the training team was doing the right thing was mentioned by 5% of participants. It is also essential to highlight that in 3 cases, participants noted that there are too many tools already, and the new tool must be efficient and pleasing.

4.5 Interviews and findings

The interview is a data acquisition method for gaining a deeper understanding (Moilanen, Ojasalo and Ritalahti, 2022, 136). The interview aims to identify users' needs, habits, emotions, and values. The Script Creator canvas helps to assemble interview questions that mainly focus on the customer journey perspective (Futurice, 2019). Initially, the author filled out the Script Creator canvas in English and translated it into Finnish because semi-structured interviews were conducted in Finnish. A semi-structured interview means that questions have been formulated beforehand. However, the interviewer can change their order and exact wording. (Moilanen, Ojasalo and Ritalahti, 2022, 139.)

While visualising the Finnish national team's customer journey (Figure 18), the training cycle was used as a base and divided into pre-competition and post-competition periods (Isokorpi, 2013). It is important to note that if a competitor withdraws for any reason in the middle of the training period, the cycle starts from the beginning, regardless of how much time is left until the competition. The interview questions followed the training cycle phases by containing questions about how training is currently arranged in Finland: who creates and what training plans contain, how plans are followed, how the training progress and results are analysed and used in the next cycle, and ideas what training platform should include. The interview questions in Finnish are listed in appendices (Appendix 2).



Figure 18: Training cycle as a customer journey

A crucial criterion for forming the sample was that one or two professions from each sector be represented to ensure a comprehensive cross-section across disciplines. Since organising and managing international competition training is the skill manager's responsibility, interviews were agreed upon with the skill manager, who expanded the invitation to the training team (expert, competitor, and trainer). Each interview lasted 55-120 minutes, was conducted remotely in

February 2024, and recorded for transcription. In total, eight training teams from six competition sectors, with a total of 15 people interviewed:

- Creative Arts and Fashion – Graphic Design Technology (skill manager, expert, trainer, competitor)
- Information and Communication Technology – Web Technology (author represents Web Technology viewpoints as an expert)
- Transportation and Logistics – Automobile Technology (skill manager)
- Manufacturing and Engineering Technology – Industry 4.0 (skill manager, expert)
- Construction and Building Technology – Painting and Decorating (skill manager), Landscape Gardening (skill manager, expert)
- Service Industry - Beauty Therapy (skill manager, expert), Hotel Reception (skill manager, expert, trainer)

To synthesise the results of the interviews, the author listened and read each interview transcript and wrote down keywords and notes from each interview separately on an Insights canvas. Subsequently, the author used colour coding to group each training team's feelings, challenges, techniques, and ideas. After that, the author combined notes from interviews according to the phases of the training process. (Figure 19). Finally, by carefully reading, the author prepared summaries of the findings for each category. Although the creators of the LSC toolkit emphasise the need to focus on the main conclusions and avoid over-analysing each interview (Futurece, 2019), the author will subsequently summarise the results, as it is essential for empathetically sense the interviewees' desires, needs, and experiences.



Figure 19: Example of color-coded notes extracted from interviews, sorted based on theme.

As shown in Figure 4 on page 13, most of the training teams interviewed confirmed that the training circle is a minimum of three persons - a skill manager, an expert, and a competitor. If the

competitor is from another school, then in some cases, a teacher from the school is part of the training team as a local trainer. A local trainer will make sure that daily training is happening in a planned way. Interviewees highlighted that it is essential to have a comprehensive training group to expand the know-how and experience in different areas and skills. Multiple skill managers underscored that they have or plan to have an expanded training circle, including all schools from Finland, to support the competitor with materials and training opportunities. Also, it was noted that previous competitors are considered future members of the training circle.

Exploring what constitutes the ideal competitor revealed that experts and skill managers expect similar personal qualities, as listed in Chapter 3.8. Competitors are expected to be proactive and motivated, 100% dedicated to competition and understand what taking part in international skill competition means and how much training it takes. At the same time, competitors must be easy-going, peaceful, customer-centred and have good hearts. They must have good time-management skills and pressure tolerance, be self-assured and ambitious, and want to win. The best competitor is the one who has previously taken part in a similar competition and has working experience. Technical skills are also necessary, but multiple participants highlighted that vocational skills can be taught, but motivation and mindset cannot. Based on the interviews and survey results, the biggest problem related to international competition is finding an eligible candidate. In addition to elevated expectations for the competitors, the difficulty is compounded by the fact that schools fund the participation of students and teachers.

Technically, the skill manager is responsible for loading the training plan. However, participants emphasised that the skill trainer and competitor do the initial plan, as the trainer knows the competitor and the expert understands the competition requirements. The framework of the training plan is similar from competition to competition. Therefore, it does not need to be figured out from scratch for every cycle; only the training content changes based on competitors' skills, needs, and possibilities. Similarly, as Vehviläinen (2020) recommended, creating a training plan starts with a discussion to map the competitor's skill levels and training needs compared with competition requirements, aligning with the competitor's life situation and commitment possibilities. Most participants highlighted that each competitor's training plan must be personal and done separately. The training plan is just a structure, and it needs to be flexible and changeable as new information arises and development progresses. The minimum amount of the training plan is checked and evaluated three times during the training cycle: in the beginning, about three months after the start and after training competitions, such as national or special competitions arranged for training purposes.

More than half of the participants stated that the training is primarily based on old competition tasks, as many modules are well-known and similar from competition to competition. Occupational standards are checked for the requirements, but as they do not change often, the training team has confidence that they know the profession already. Most training teams reported a big gap between requirements for international competitions and national curricula. As discussed in Chapter 2.2, international skill competitions may combine multiple similar professions, so they must have more comprehensive skills coverage. Some required skills are not taught or expected to be higher education content at the national level. Therefore, special training must be arranged for these sections, and a collaboration between schools and professional experts is needed to cover higher and broader requirements. Expansive learning, covered in Chapter 3.6, happens when people solve situations that are not predefined, and they identify and work through contradictions within their current activity system and create new conceptual and material tools to transform their activities. The training team must be creative to offer suitable tasks and situations for the competitors, which will develop not only the competitors but also the experts and trainers.

To clarify how training progress is documented, the responses show that the training plan and learning diary are typically cloud-based documents that each member can edit and change. The plan contains schedules, training session content, and aims. Updates occur once a week, once a month, or sometimes after each training session. Experts add comments and feedback if necessary. Some participants mentioned that the spreadsheet table was filled at the beginning of the training. However, as time passed, it was forgotten and was not actively used. Usually, the document is written by an expert who lists all-year activities. The competitor makes the entries if the training team has a training diary. Some skills noted that the training plan is agreed upon verbally, and there is no documentation. However, they want a written plan so everyone can access it and get the overview.

The interviews revealed that training for international vocational competitions imitates the competition environment's work-life situations. Therefore, the best training is considered to happen at the workplace. Also, participants stressed the need to train against the clock and under pressure. For handicraft skills, they emphasised that arranging the training is complicated because of the limitations of resources, materials, and spaces. Service sector skills underscored the need to concentrate on problem-solving skills and customer needs. On several occasions, the issue arose that workplace-based training is very beneficial but needs to be more specific about whether it constitutes work or training. Therefore, participants suggested that the training diary should also record working hours and activities. During the training session, the expert or trainer observes how the competitor performs the task and gives feedback during or after the session. At the beginning of the cycle, practising known modules at the primary level is more common. The more the

competitor develops, the more detailed training will be, concentrating on details and specialisation to the profession. Some participants expressed the worry that training teams lack the knowledge of mental training.

To explain transparency and monitoring of training progress, it became clear that experts or trainers meet with competitors regularly. The skill managers are usually behind the scenes. In most cases, they are not directly involved in the training, so there needs to be more visibility and overview of the progress. Some teams use WhatsApp to keep all parties updated, but there needs to be a systematic check of what has been trained and done. If there is a training diary, then only the competitor, expert, or trainer follows it. Participants believed there was no need to report to anyone outside the training team. However, some skill managers noted that mandatory reporting could be beneficial for documenting the process.

Interviews confirmed that the main challenges for training teams are time, location, and resources, as displayed in Figure 17 on page 38 of the survey results. Schools do not have enough resources or interest to support or train competitors and allow teachers to focus on training tasks. Training is expected to be part of everyday teaching, challenging a personalised approach, especially when a competitor is from another school. Finding suitable times and places to meet for the training sessions is time-consuming and requires extra resources. Participants also expressed concern that the training team changes occasionally, and new members lack knowledge of the training process or competitions. In the training team, much informal information is lost when people change. Due to scant or missing training process documentation, processes must be reformulated, making it challenging to consider previous experiences. Multiple participants said they rarely write anything because all team members are in the same school, and documentation feels unnecessary. Others admitted that they lack confidence and do not know the best practices because they have no visibility of what and how things were done before. These concerns match survey results, where experts hoped a unified training platform would give them a more transparent structure and conviction. Changes in the training circle also cause an unclear understanding of the training team's responsibilities and roles. Interview participants stated they need clarification on who is responsible for what in the training process.

5 Development work

5.1 Ideation

After collecting and summarising the results, the creation phase in the Double Diamond model starts by compiling ideas to identify patterns and generate new ideas. The main aim is to propose the concept idea based on the data analysis. The LSC canvas, the Ideation Sandbox, enables the connection of findings from the data collection to the original business objectives and goals (Futurice, 2019). As learned from the first meeting with the commissioner in chapter 4.2, it is crucial to Skills Finland that training is personalised and will be more structured and transparent. As an outcome of the work with the Ideation Sandbox canvas and the findings from interviews and surveys, the author concludes that a digital training platform could benefit the training teams. Using that structured training system, users build confidence, as the possibility of following, documenting, and visualising the training cycle will provide transparency and an overview of the training progress.

After the initial ideation phase and selecting the unified digital training platform as the central concept, the author proceeded with the Idea Accelerator canvas method to identify the unique aspects of the training platform idea. Idea Accelerator canvas is used to iterate concepts to see ideas from different angles and find possible solutions for behavioural gaps and weaknesses of the concept from the business objective (Futurice, 2019).

From the users' perspective, the most influential risk could be that users already use numerous digital tools, and adding another one might create extra obligations without providing added value. As a solution, the author suggests that the platform must be simple and easy to use, including only necessary features and combining the collection of essential tools currently used in different platforms. To add value, consider implementing visualisation and adding gamification elements like earning badges or sharing likes for performance.

From the client's perspective, the weakness is that over-structuring the training plan may cause a loss of personal approach and focus more on the performance than the competitor's development. To ensure that the training program structure will be personalised, the author recommends starting the training plan with competitors' analysis and creating a training plan focusing on competitors' strengths, weaknesses, and skills. Moreover, the plan's personalisation can be enhanced by providing immediate feedback and analysing skill-based achievements. Looking at the concept more broadly, this concept can be an example and template for schools to create personalised learning paths. The platform can also showcase the Finnish training system for other WorldSkills members. This platform could evolve into a personal development tool that allows users to set and

track their goals. A centralised and accessible training platform can enhance the documentation and sharing of training activities.

5.2 Component interaction diagram

The essential foundation of this stage is to propose the answers based on the research question: “What features of the digital training platform MVP are necessary to support the training process effectively?” For this purpose, the author carefully considered all the issues and ideas from the research analysis, collected ideas from the ideation phase, and sorted similar features. The author then considered the training process's flow, discussed in chapter 3.9, and decided which ideas would form the central core features. Finally, the author created a flowchart to visualise how the main core features would work together following the training's progress. At the end of this phase, the author provides a flowchart with a component interaction diagram that explains and visualises the Minimum Viable Product architecture. A full-size diagram is added to the appendices (Appendix 4). The purpose of this flowchart is to explain how core components and features work, what information components input and how it affects other components. As discussed in Chapter 3.1, the human-centred design must be feasible and viable. With this flowchart, the client can define MVP requirements and scope, which allows them to estimate the feasibility and viability of this concept and decide if it would be reasonable to continue with this approach.

The proposed system includes three core components: a calendar, file storage, and monitoring training process. The training process is divided into three phases - creating and updating the training plan, recording the training sessions, and analysing training. A general component of the training team that enhances transparency and clarifies roles is included to add additional value. The diagram is based on a general overview and does not consider technical limitations. However, the assumption is that the platform will be developed according to client wishes and, where possible, securely utilise third-party features to optimise the application's development and maintenance. Skills Finland manages the platform being created, and the structure for one team is similar for all training teams, regardless of their speciality, type of competition, and length of the training period.

The system will have at least four user roles: administrators, training team members, competitors, and observers. Administrators manage the system overall and create and manage a list of skills. Each skill has its branch to ensure the flow of information from year to year. Administrators can develop competitions for each skill category based on the international competition calendar. A training team is formed and assigned whenever a new competition is created. In the initial MVP version, transparency for the training team is limited to their skill branch only. Training team members can add, modify and upload files, see the training records and add and modify the

training plan. Competitor roles have similar rights as other training team members, but the focus is on the training activities. In the case of pair competition, both competitors have their training records and overall training summaries. Observers can see the summaries of the training and documentation from previous years. Each role has a distinct application dashboard for improving the user experience and highlighting the most essential tools for each user.

5.3 Calendar

The first core component is the calendar; as the analysis revealed, nearly half of the respondents expected an integrated calendar to be part of the system. A calendar will combine features like essential dates, schedules, and reminders. Figure 20 displays the calendar component structure as it gets information from external and internal sources. External sources are training team members' inputs. Participants highlighted that in addition to National Team official events and dates, training team members' essential dates like holidays, training camps, and competitor work schedules should be added and displayed to the calendar. Events could be modified by type and colour-coded to create a better visual overview. In an advanced version, the user can turn colour coding off to focus on the content instead of visuals. Internal inputs will come from the entered training plan and recorded training sessions. Possible by default tasks are competition, training camp, free time, and tasks. Task-type events can set reminders, which will send an email to the user's email. Administrators can set each calendar task in the advanced version and invoke reminders to all training teams for specific competition rounds.

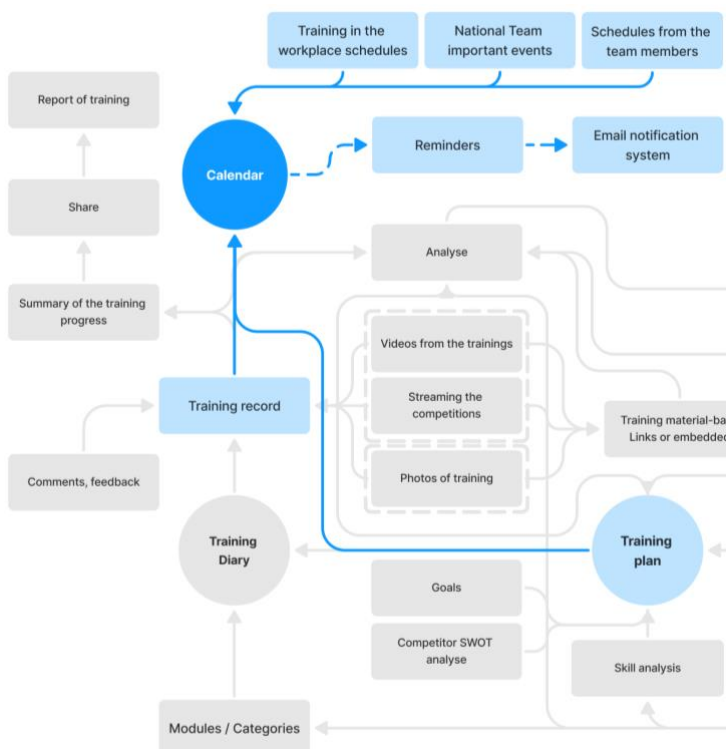


Figure 20: Calendar component diagram

5.4 Shared files storage

The research results show that participants are not happy with the current practice of storing and sharing documentation. The primary documents teams need are the training plan, meeting memos, training analysis, recorded video, and photo materials from training sessions. Each competition has mandatory official competition documents: Test Project, Technical Description, and Infrastructure List with the toolbox inventory list. Currently, training teams use multiple tools and platforms and documents are scattered across various schools' internal networks and cloud services, making it difficult to find necessary resources. Usually, the competition expert and the training team create training and load, and each member can edit and change it. Typically, the training plan and the learning diary for recording the training activities are cloud-based documents.

The author proposes that shared documentation is the second core component. It is a file storage system, which is, by default, sorted by competition history (Figure 21). In the advanced version, there could be an option to sort files by competition or type of document. Each competition will have competition-based documents and training progress documents. Participants also wished that photos and videos taken during the exercise would be stored in the competition folder. From a technical standpoint, storing files directly in the platform raises concerns due to the need for large data warehouses and server resources. Additionally, security measures need to be considered. Therefore, third-party cloud storage solutions through API integration should be considered instead of building their system for file storage. Also, storing photos and videos directly on the platform would be unnecessary storage usage. Instead, video and photo platforms should be used, and images and videos could be collected as links or embedded materials. In the diagram, third-party applications are marked with a dashed line rectangle.

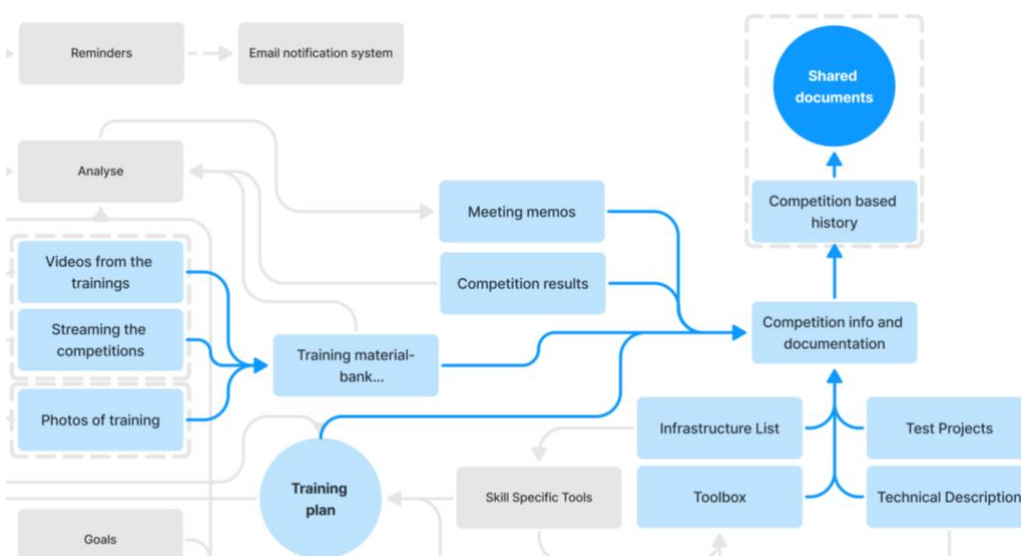


Figure 21: File sharing storage component diagram

5.5 Training plan

As discussed in Chapter 3.9, the competitor's goals, values, and skills must be considered when planning the training activities. Competitors should have a personalised training plan with planned activities and expected results. The training plan component in Figure 22 displays all connections from the planning phase to the plan's usage for the training progress. When creating a training plan for the first time, it must consider the competition's occupational skills requirements and the competitor's existing skills. Therefore, a skills analysis based on occupational standards and a SWOT analysis based on personal characteristics should be performed initially.

Consequently, based on the skills analysis results, a concrete training action plan can be created. An efficient training plan will also need a goal. It is recommended that goals be set for different periods until the competition. Smaller goals help to set training action focus and give a concrete base for analysing the training results. Subsequently, the training plan can be seamlessly integrated with the calendar component, identifying training tasks and goals, which helps the training team monitor the training process. The training plan could be displayed as a Gantt table. Upon saving, new versions of the training plan are created and stored among the competition documentation. It's important to note that the training plan should be regularly reviewed, supplemented, and updated based on the training progress analysis.

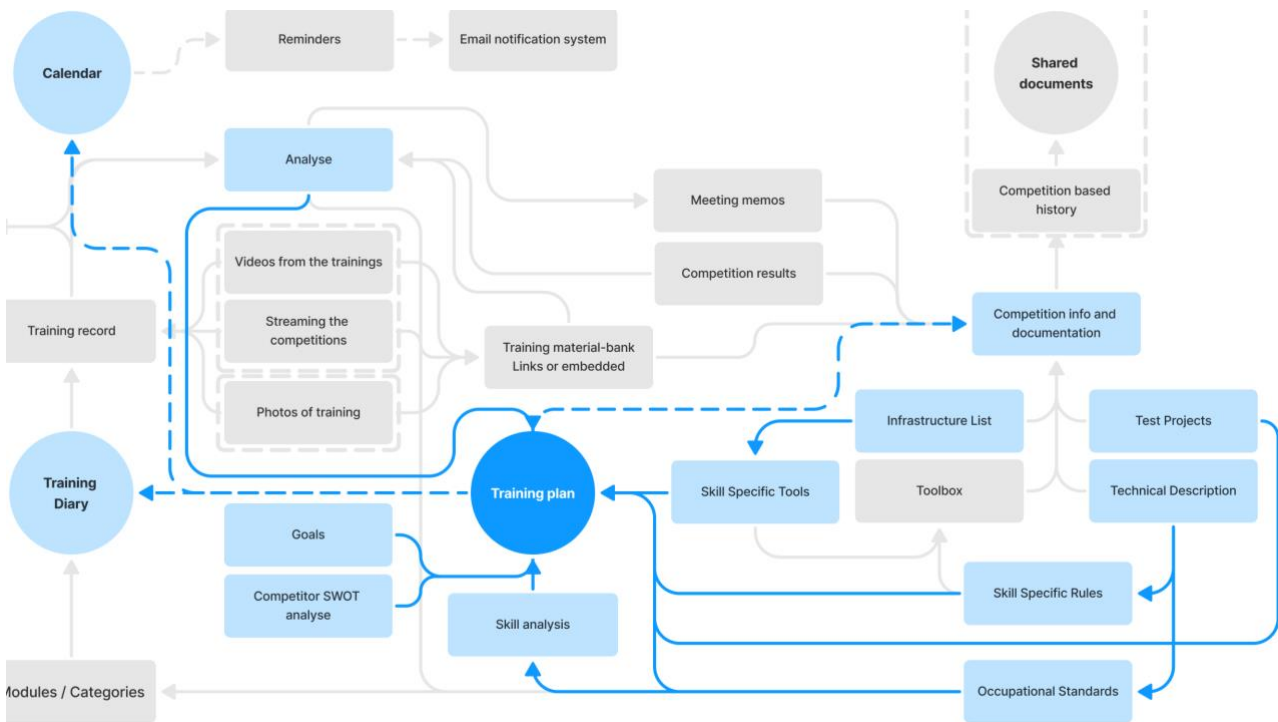


Figure 22: Training plan component diagram

5.6 Progress tracking

The most crucial component of this application will be recording and monitoring the training process. As outlined in Chapter 3.7 – vocational excellence is achieved through deliberate practice. Competitors must monitor their performance and make necessary changes to achieve their goals. The coach gives individual feedback about skills and techniques and participates in training. The training platform's primary goal is to document, track, and analyse the training process. Several participants, including the research commissioner, Skills Finland, desire a more transparent overview of the training process. Therefore, this feature must be simple, easy to use, and used frequently.

The training diary is based on the daybook in Table 3 on page 29, which contains the entries from the training sessions (Figure 23). Entering the session has fields for the date, type of event, category, or module in the competition, spent time, notes, and reflection about the session indicated with stars feeling before and after the training session. Categories are predefined based on Occupational Standards sections to make filling forms easier. Competitors can add links to outside-sourced photos or video materials.

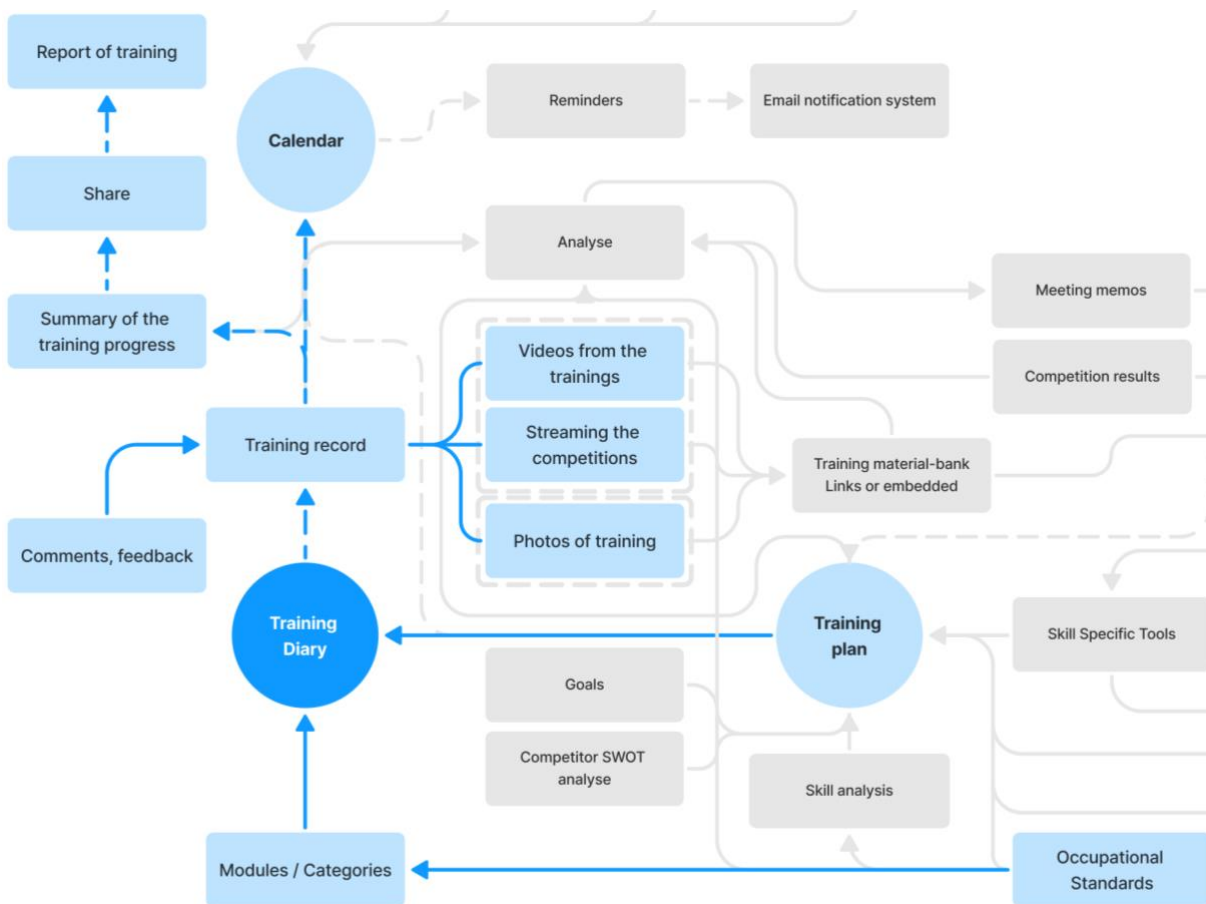


Figure 23: Training diary and training tracking interactions diagram

Figure 24 showcases the medium-fidelity training diary wireframe to illustrate the tracking of training progress. All records are displayed as a sortable table. Each record can be edited afterwards. Training team members can comment and give feedback to each record. The training diary will summarise the training records for total hours spent on training and hours spent in the month. Also, an overview of the last year, displayed as a bar chart, will show the most active months. Balance in preparing for the competition modules is displayed as a pie chart. The summary can be shared outside of the training platform. All entries will be displayed in the calendar component to give a timely overview of training sessions.

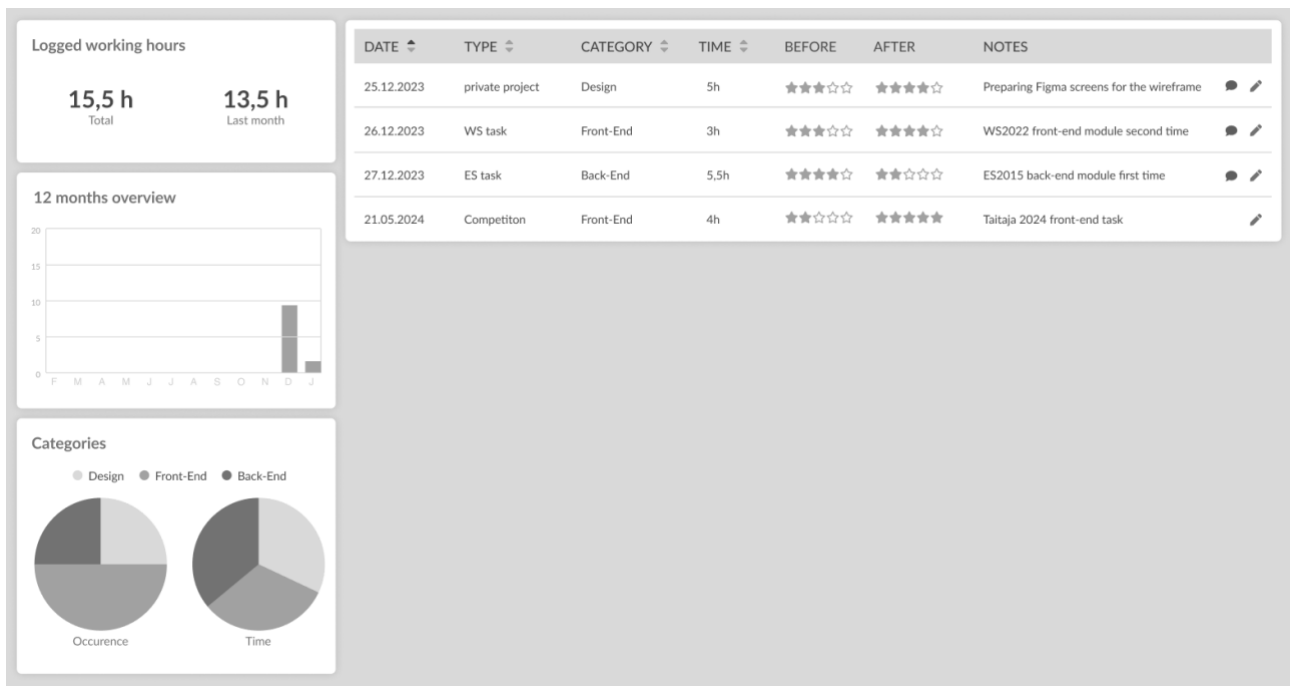


Figure 24: Training Diary wireframe

As detailed in subsection 3.9, competitions and training are great places for learning, and it is crucial to analyse the performance and adapt training plans accordingly. Therefore, training progress analysis on this platform is separately explained, even though it is not directly defined as an independent component. (Figure 25, 49). The analysis is a process that involves getting input from training records, a summary of the training progress, training material bank, and competition results, and comparing it with skills required in the competition and listed in occupational standards.

Analyse results will be stored as memos in the documentation, and learnings will be used to adjust the training plan.

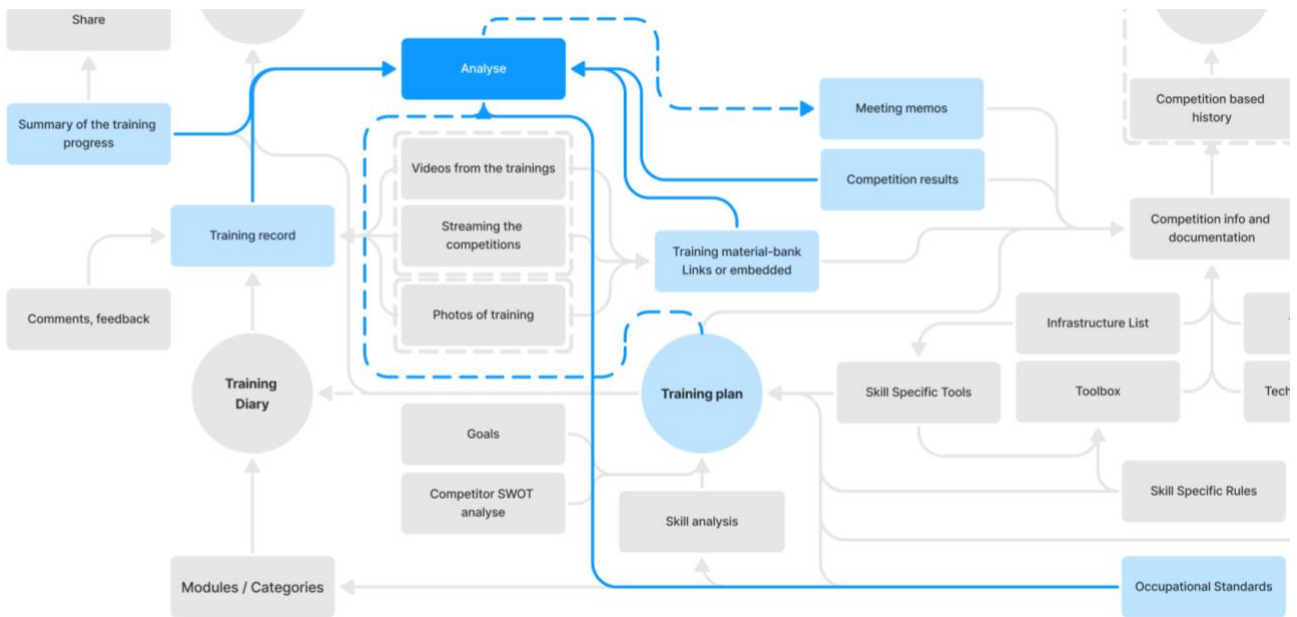


Figure 25: Training analysis integration diagram

6 Discussion and conclusion

This thesis aimed to research the possibilities of enabling Skills Finland's digital transformation through a digital training platform that would facilitate the monitoring and documenting the Finnish national team's preparation for the international vocational skills competitions. Two main research questions were raised to ensure the research achieves its objectives: 1) how training is currently organised in the Finnish national team and 2) what essential features the new training platform should include. The study followed a human-centred design thinking approach, employing an empathetic perspective to address these questions and support achieving the main objectives. The Service Design approach with Double Diamond model phases followed the design thinking process. The research project had two main phases: 1) data acquisition and analysis to map the current situation and 2) a development phase to propose the new digital training platform.

In the first phase, survey and semi-structured interviews were conducted to map the current situation. LSC canvases were utilised to prepare for the research and analyse the results. By the end of this phase, an overview of the participants' expectations, needs, and challenges regarding training progress was collected and is presented in chapters 4.4 and 4.5. In the second development phase, the essential features of the new training platform were specified based on the user's data and the training process's flow and progress, as discussed in Chapter 3.9. At the end of development phase, a flowchart with a component interaction diagram was created. This diagram explains and visualises the essential features of the Minimum Viable Product architecture and how core components interact. The development process and the main features are presented in Chapter 5. Based on concept flowchart, the commissioner can continue the development process by defining MVP requirements and scope, which allows them to estimate the feasibility and viability of this idea and decide if it would be reasonable to continue with this application.

6.1 Answers to the research questions

Q1: How is training for the international vocational skills competition currently arranged in Finland?

Q1.2: What personal qualities are expected from competitors?

Q1.3: What documentation are training plans and activities based?

Q1.4: What tools do the training teams use during the training cycle?

Q1.5: What challenges do training teams face while preparing for the competitions?

Survey results show that the Technical Description, Occupational Standards, Test Projects from previous years, and the Infrastructure List are the primary base documents for initiating a training

plan. National Curriculum is used sparingly, as international skill competitions may combine multiple similar professions, so they might have more comprehensive skills coverage. Training teams use profession-specific tools for training vocational skills and other digital tools, mainly for communication and documentation. The biggest challenges for the training teams are time management, lack of resources and materials, and location related issues. Participants expressed that more than one year of training is needed to find resources and materials and arrange face-to-face training sessions. Also, it became apparent that teams share hope that a digital training platform will give more time to focus on the training itself and that coordinated training will give a better overview of the process and make planning and following it more accessible.

The interview results about competitors expected personal traits match the features explored in Chapter 3.8, stating that competitors must be proactive, motivated, patient, and ambitious and have good self-discipline and pressure tolerance. It also emerged from the interviews that usage of the training plan varies among training teams. Filling and following the training plan is more active at the beginning of the training cycle. However, as the process progresses, documentation gradually decreases, and often, post-competition analysis is done verbally and not documented at all. A training diary is used in multiple training teams for competitors to track and record training sessions, but it needs to be more organised and structured. Interviews confirmed survey findings that the main challenges for training teams are time, location, and resources.

Q2: What features of the digital training platform are essential to support the training process effectively?

Based on the current situation analysis and training teams' challenges, the author concluded that a structured and easily accessible training platform would ease the problems presented. The calendar feature would facilitate issues related to time management. A calendar will combine features like essential dates, schedules, and reminders. The calendar feature synchronises training team calendars, and training activities are organised into a clear and understandable overview. The second feature is shared file storage, which collects files and documentation used in the training cycle and will act as an archive for the documentation. This solution ensures that documented knowledge and experiences are gathered in one place, and the information remains within the training team if a team member changes. The third feature is the creation of a training plan, along with its monitoring and documentation. This is the platform's most fundamental, crucial, and unique feature. It includes creating a personalised training plan, recording the training sessions, and visualising the progress. The platform's features are explained in detail in chapters 5.3-5.6.

6.2 Reliability and validity of results

The research was based on qualitative research methods, such as surveys and interviews. The stakeholders were consulted before the survey was created to ensure that the questions were understandable and comprehensible. The survey sample included experts, skill trainers, competitors, and skill managers. By including all interest groups participating in the training progress, the author ensured that the responses were not biased towards any particular interest group. Responses were processed in the same manner and on equal footing, ensuring that all responses were documented and analysed on the same basis. The questionnaire is included in Appendix 1. Such an approach provides a basis for verifying that the results are reliable and treated the same way. The LSC worksheet script creator canvas was used to prepare for interviews, which helped focus on research questions while considering the stages of the training cycle as a customer journey. The semi-structured interview questions are included in Appendix 2. All interviews were recorded and processed based on the same principles. To synthesise the results of the interviews, the author listened and read each interview transcript and wrote down keywords and notes from each interview separately. Subsequently, the author grouped the notes based on categories and then combined them based on the training cycle. This approach ensured that all interviews were treated equally, and no training teams were favoured. The author used LSC worksheets and followed the best practices to ensure the design process proceeded according to requirements.

However, it must be acknowledged that the research had limitations that could impact its reliability and suggest areas for improvement. The concept idea has yet to be tested with the user group. One main principle of design thinking is to validate proposals quickly and get feedback to ensure the solution addresses the right problem (Futurice, 2019). Additionally, research focused on the design phase, and the feasibility and viability tests have yet to be included. A well-planned, human-centric solution is desirable for customers, feasible for business, and technologically viable (IDEO.org, 2015). Feasibility and viability should be addressed in the next phase of the development process. Slight biases might have inclined the idealisation of the concept, given the author's strong vision for the training platform and close work with training teams as a training manager. This unnoticed inclination towards favouring the new concept could influence participants.

6.3 Research significance and conclusion

Numerous studies have been conducted in Finland on the excellence of vocational skills competitions (Tasala and Alhojärvi, 2017). In this research, the results of some of them have been referred to: Competitiveness and Quality for Vocational Education Through Excellence in Skills (KILTA)

project (Skills Finland, 2014), which studied the impact of international vocational competitions, which characteristics of skills competition competitors' prerequisites from Modelling Vocational Excellence (MoVE) project (Nokelainen, Ruohotie and Korpelainen, 2009), also aspects influencing the winners from Actualizing Vocational Excellence (AVE) project (Nokelainen, 2010) and finally champions integration into the labour market from Pathways to Vocational Excellence (PaVe) project (Pylväs and Nokelainen, 2017). However, there has been a lack of research on mapping the entire national team's training process and offering new, modern solutions for facilitating and monitoring the training activities. Skills Finland is consequently keen to investigate measures and tools that could make the training process more transparent, decrease the reliance on informal information and model the preparation for international competitions for future training teams.

As a result of the provided research, Skills Finland understands the current situation in the training teams and apprehends whether there is a justified need for a digital training platform. The developed concept of a component's integration diagram offers a technical architectural blueprint detailing how the main features of a minimum viable product interact. The diagram and concept created are the foundation for the business requirement proposal, which is the next step in realising this development project. In evaluating the risks associated with the concept, the author found that from the users' perspective, the main risk is that adding another tool confuses the users and doesn't add any extra value. To counter this, the platform should be user-friendly, merge essential tools from various platforms, and include visual enhancements and gamification elements. From a commissioner's point of view, an overly structured training plan might focus more on performance than the competitors' development process. The author suggests including competitor analysis and providing immediate feedback for a more personalised approach.

The author's contribution also lies in combining two prevalent methods from working with theoretical frameworks. The Double Diamond method has been used since the early 2000s, but its creators emphasise today that the model needs to be updated, and they have developed a new framework. Therefore, the author adopted a new approach, utilising the Double Diamond model's updated terminology to reference the new framework. The author also connected the updated Double Diamond model phases and LSC canvases (Table 3, 21).

6.4 Proposals for future steps

To continue the development work, the author recommends conducting feasibility and viability checks and validating the idea and concept with the users. Then, based on the test results and feedback, improve the concept, and iterate the process until it serves the users best. When the idea is ready, create a business requirement proposal to ensure all stakeholders understand the development project goals and requirements. The business-requirements proposal links the initial

concept and the detailed planning phase, providing clear guidance on what the project should achieve from a business perspective.

In development work, it's essential to consider technological advancements and evaluate the possibilities for using artificial intelligence. For example, the author suggests investing in the potential for AI to automate the creation of training plans by analysing occupational standards and previous training history and proposing a base for the training plan. The training team can then modify and personalise the plan to ensure it matches the concrete competitor's needs, skills, strengths, and goals.

Broadly, this concept could serve as a model for creating individual learning paths in schools and demonstrate Finnish training excellence globally. It could also become a personal development tool with goal setting and tracking capabilities.

6.5 Learning process

The Service Design with the Double Diamond model and the research methods used in this thesis were already familiar to the author, but this was the first time the author could focus on each of them so thoroughly. Significantly, the Lean Service Creation method, which the author used only once earlier but became very familiar with during this thesis. Working with theoretical material, the author linked the phases of the updated Double Diamond model with LSC canvases. The LSC toolkit is a solid foundation for design work and guiding processes. The author finds the tool very practical for organising the process; an overview of how it was used is added in Appendix 3. While working with the tool, it became evident that it is more effective in a team setting than working alone, especially in the ideation and brainstorming phases. Additionally, the author received confirmation on educational foundations for preparing and organizing training for international vocational skills competitions.

The author has been involved in vocational skills competitions since 2010, accumulating experience in various roles and teams. This research represents the author's attempt to give back to the WorldSkills movement by helping to create something new and valuable. The author hopes that, following feasibility and viability tests and efficiency analysis, the developed concept will indeed be implemented, and the digital training platform will be created to enhance the work of training teams.

References

- Brown, T. (2020) 'Design Thinking', in *HBR's 10 must reads on design thinking*. Boston, Massachusetts : Harvard Business Review (HBR's 10 must reads).
- Brown, T. (2024) *IDEO Design Thinking*. Available at: <https://designthinking.ideo.com/> (Accessed: 16 March 2024).
- Canziba, E. (2018) *Hands-on UX design for developers*. Packt Publishing.
- Design Council (2021) *A Systemic Design Approach Beyond Net Zero*. Available at: <https://www.designcouncil.org.uk/our-resources/systemic-design-framework/> (Accessed: 21 March 2024).
- Drew, C. (2021) *Developing our new Systemic Design Framework*, Medium. Available at: <https://medium.com/design-council/developing-our-new-systemic-design-framework-e0f74fe118f7> (Accessed: 7 March 2024).
- Eisermann, R. (2023) *The Double Diamond design process — still fit for purpose?*, Medium. Available at: <https://medium.com/design-council/the-double-diamond-design-process-still-fit-for-purpose-fc619bbd2ad3> (Accessed: 7 March 2024).
- Engeström, Y. (1994) *Training for change : new approach to instruction and learning in working life*. Geneva : International Labour Office.
- Engeström, Y. (2005) *Developmental work research : expanding activity theorie in practice*, *International Cultural-historical Human Sciences*, 12. Berlin : Lehmanns Media (ICHS : International Cultural-historical Human Sciences / Joachim Lompscher und Georg Rückriem).
- eRequirements (2022) *eRequirements*. Available at: <https://eperusteet.opintopolku.fi/#/en/ammattillinen/7861752/tutkinnonosat/8071973> (Accessed: 9 March 2024).
- Ericsson, K.A. (2018) 'The Differential Influence on Experience, Practice, and Deliberate Practice on the Development of Superior Individual Performance of Experts', in *The Cambridge handbook of expertise and expert performance*. Second edition. Cambridge, United Kingdom ; New York, NY : Cambridge University Press, pp. 745–769.
- Futurice (2018) *Lean Service Creation and Design*. Available at: <https://futurice.com/lean-service-creation> (Accessed: 12 March 2024).

Futurice (2019) *The lean service creation handbook: the lean way to create: loveable services, better future, successful business, future-capable organisation*. 1. painos. Helsinki : Futurice Oy.

Futurice (2024) *Company History*. Available at: <https://futurice.com/about/our-journey> (Accessed: 13 March 2024).

Gagné, F. (2004) 'Transforming gifts into talents: The DMGT as a developmental theory'. *High Ability Studies*, 15(2), pp. 119–147. Available at: <https://doi.org/10.1080/1359813042000314682>.

IBM (2023) *Component diagrams, IBM Documentation*. Available at: <https://www.ibm.com/docs/en/dma?topic=diagrams-component> (Accessed: 7 April 2024).

IDEO.org (2015) 'The Field Guide to Human-Centered Design'. Available at: https://design-kit-production.s3.us-west-1.amazonaws.com/Field_Guides/Field+Guide+to+Human-Centered+Design_IDEOorg_English.pdf?utf8=√&_method=patch&authenticity_token=QZRbnzBBPY3M%2FCd3xeDx424iAXgVkgcTAi74f6cW4pU%3D&resource%5Btitle%5D=&resource%5Bsubtle%5D=&resource%5Bauthor%5D=&resource%5Babout%5D= (Accessed: 6 March 2024).

Interaction Design Foundation - IxDF (2021) *Minimum Viable Product (MVP) and Design - Balancing Risk to Gain Reward*. Available at: <https://www.interaction-design.org/literature/article/minimum-viable-product-mvp-and-design-balancing-risk-to-gain-reward> (Accessed: 23 March 2024).

Interaction Design Foundation - IxDF (2023) *The Principles of Service Design Thinking - Building Better Services*. Available at: <https://www.interaction-design.org/literature/article/the-principles-of-service-design-thinking-building-better-services> (Accessed: 16 March 2024).

Isokorpi, T. (2013) 'Huippuosaamisen pedagogiikka : Näkökulmia oman ammatillisen huippuosaamisen saavuttamiseksi'. Available at: <http://www.theseus.fi/handle/10024/67052> (Accessed: 23 March 2024).

Lake, F. (2016) *Human Centred Design vs Design Thinking vs Service Design vs UX What do they all mean?*. *LinkedIn*. Available at: <https://www.linkedin.com/pulse/human-centred-design-vs-thinking-service-ux-what-do-all-simonds/> (Accessed: 12 March 2024).

Laukia, J. (2017) 'Vocational education with a Finnish touch', in *Vocational education with a Finnish touch*. [Helsinki] : Haaga-Helia University of Applied Sciences (Haaga-Helian julkaisut).

Macdermid, K. (2022) *Human-centred design for IT service management*. First edition.

Ministry of Education and Culture (2024) *Finnish education system*. Available at: <https://okm.fi/en/education-system> (Accessed: 31 March 2024).

Ministry of Education and Culture and Finnish National Agency of Education (2023) *Finnish VET in a Nutshell*. Available at: https://okm.fi/documents/1410845/4150027/Finnish+VET+in+a+nutshell_2023.pdf (Accessed: 31 March 2024).

Minkkinen, J., Pylvänen, I. and Airaksinen, A. (2011) *Mental Training Workbook*.

Moilanen, T., Ojasalo, K. and Ritalahti, J. (2022) *Methods for development work : new kinds of competencies in business operations*. [updated edition]. Helsinki, Finland : BoD - Books on Demand.

Nesta and IDEO (2016) *Designing for Public Services*. Available at: <https://www.ideo.com/journal/designing-for-public-services> (Accessed: 23 March 2024).

Nokelainen, P. (2010) 'Mistä on ammatilliset huippuosaajat tehty?'. *Ammattikasvatuksen aikakauskirja*, 12(2).

Nokelainen, P., Ruohotie, P. and Korpelainen, K. (2009) 'Ammatillisen huippuosaamisen kehittymiseen vaikuttavat tekijät: Tapausesimerkinä suomalaiset ammattitaidon maailmanmestaruuskilpailuihin osallistuvat ja valmentautuvat nuoret.'. *Ammattikasvatuksen aikakauskirja*, 11(2), pp. 41–53. Available at: <https://journal.fi/akakk/article/view/114751> (Accessed: 17 January 2024).

Outwitly (2021) *Service Design, UX, & HCD: What's the difference?*. *Medium*. Available at: <https://outwitly.medium.com/service-design-ux-hcd-whats-the-difference-69881ea9f87> (Accessed: 16 March 2024).

Pylväs, L. and Nokelainen, P. (2017) 'Finnish worldskills achievers' vocational talent development and school-to-work pathways'. *International Journal for Research in Vocational Education and Training*, 4(2), pp. 95–116. Available at: <https://doi.org/10.13152/IJRVET.4.2.1>.

Di Russo, S. (2012) *A Brief History of Design Thinking: How Design Thinking Came to 'Be'*. Available at: <https://ithinkidesign.wordpress.com/2012/06/08/a-brief-history-of-design-thinking-how-design-thinking-came-to-be/> (Accessed: 16 March 2024).

Schneider, J. (2017) *Understanding Design Thinking, Lean, and Agile*. O'Reilly Media, Inc.

Skills Finland (2014) *KILTA-valmennushankkeen vaikuttavuusarviointi*. Available at: <https://www.skillsfinland.fi/ajankohtaista/julkaisutmaterialipankki/kilta-valmennushankkeen-vaikuttavuusarviointi> (Accessed: 10 March 2024).

Skills Finland (2020) *Strategy 2030 – Skills Finland towards the world’s best vocational expertise*. Available at: <https://www.skillsfinland.fi/eng/News/news-and-press-releases/archive/2020/blogi-strategia-2030-skills-finland-matkalla-kohti-maailman-parasta-ammattiosaamista> (Accessed: 27 February 2024).

Skills Finland (2024a) *About competitions*. Available at: <https://www.skillsfinland.fi/eng/about-competitions/about-competitions> (Accessed: 28 February 2024).

Skills Finland (2024b) *Jäsenyys*. Available at: <https://www.skillsfinland.fi/tietoa-meista/jasenyys> (Accessed: 27 February 2024).

Skills Finland (2024c) *Maajoukkue*. Available at: <https://www.skillsfinland.fi/maajoukkue> (Accessed: 23 January 2024).

Skills Finland (2024d) *Suomen kisamenestys*. Available at: <https://www.skillsfinland.fi/kansainvaliset-kilpailut/suomen-kisamenestys-kautta-aikojen> (Accessed: 22 March 2024).

Skills Finland (2024e) *Taitaja9*. Available at: <https://www.skillsfinland.fi/eng/national-skills-competition-taitaja/taitaja9> (Accessed: 31 March 2024).

Skills Finland (2024f) *TaitajaPLUS*. Available at: <https://www.skillsfinland.fi/eng/national-skills-competition-taitaja/taitajaplus> (Accessed: 31 March 2024).

Skills Finland (2024g) *Training system*. Available at: <https://www.skillsfinland.fi/eng/about-competitions/training-system> (Accessed: 1 April 2024).

Stickdorn, M. et al. (2018) *This Is Service Design Doing*. O’Reilly Media, Inc.

Taitaja2024 (2024) *Yli 1900 ammatillista opiskelijaa kilpailee Taitaja2024-semifinaaleissa*. Available at: <https://taitaja2024.fi/fi/uutiset/yli-1900-ammattillista-opiskelijaa-kilpailee-taitaja2024-semifinaaleissa/> (Accessed: 9 March 2024).

Tasala, M. and Alhojärvi, E. (2017) *In advocacy of vocational skills – Skills Finland 1993–2013, In advocacy of vocational skills – Skills Finland 1993–2013*. Available at: https://skillsfinland.fi/download_file/view/1566 (Accessed: 27 February 2024).

Toiminen, M. (2018) *Open source tools for change agents - the what, the how and the why : lean service creation*. [Helsinki] : Futurice.

UNESCO Institute for Statistics (2012) *International Standard Classification of Education*. Available at: <https://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf> (Accessed: 6 March 2024).

Vehviläinen, Sanna. (2020) *Ohjaustyön opas : yhteistyössä kohti toimijuutta*. [Helsinki] : Gaudeamus.

WorldSkills (2016) 'WorldSkills Vision 2025'. Available at: <https://worldskills.org/about/worldskills-vision-2025/> (Accessed: 27 February 2024).

WorldSkills (2023) *Constitution WorldSkills International*. Available at: <https://api.worldskills.org/resources/download/3747/21691/22656?l=en> (Accessed: 28 February 2024).

WorldSkills (2024a) *History*. Available at: <https://worldskills.org/about/#history> (Accessed: 27 February 2024).

WorldSkills (2024b) *Member Countries and Regions*. Available at: <https://worldskills.org/members/> (Accessed: 27 February 2024).

WorldSkills (2024c) *Skills*. Available at: <https://worldskills.org/skills/> (Accessed: 20 February 2024).

WorldSkills (2024d) *WorldSkills Glossary*. Available at: <https://glossary.worldskills.org/home?l=en> (Accessed: 1 April 2024).

WorldSkills (2024e) *WorldSkills Occupational Standards*. Available at: <https://worldskills.org/what/projects/wsos/> (Accessed: 2 March 2024).

Appendices

Appendix 1. Survey questions

- What's your role? (If you have had different jobs or positions, please pick one to use as your point of view to answer the questions.)
- Expert, Skill Manager; Competitor; Skills Finland representative; Other
- Are you currently involved in the national team's training process?
- Yes; No
- What is your skill (name and number)?
- What are the base documents you use for the training plan?
- Test Project (TP); Technical Description (TD); Infrastructure List (IL); National Curriculum (ePerusteet); Occupational Standard (ammattistandardi); other.
- What tools or technologies do you use during training? (e.g., software, apps, equipment)
- What are the top challenges you face in training?
- How do you share training information and updates?
- List the top three features you would like in a new digital training platform.
- How effective do you find the current training tools?
- (1-5 scale; one Ineffective and five Highly Effective)
- How easily could a new digital training platform integrate with your current training?
- Very easily; somewhat easily, Not easily
- How could a digital training platform help you, and why? Or, why might it not be helpful?
- Do you have any more thoughts or suggestions for the digital training platform for vocational competitions?

Appendix 2. Interview questions

Interviews were conducted in Finnish. Questions were designed by following the LSC canvas Script Creator worksheet.

Johdanto

- Haastattelijan lyhyt esittely ja haastattelun tarkoitus.
- Haastateltavan esittely: Nimi, ammattiala ja kisakokemus

Osa 1: Kilpailijan valinta

- Mihin perustuen kilpailijat valitaan?
- Miten määrittelet kilpailijan motivaation?
- Mikä on pääasia, mitä etsit kilpailijasta?

Osa 2: Valmennussuunnitelma ja sen seuranta

- Kuka ovat mukana valmennussuunnitelman luomisessa ja seuraamisessa?
- Mitkä ovat vaikeimpia asioita suunnitelman luomisessa?
- Kuinka usein valmennussuunnitelmaasi tehdään muutoksia ja miksi?
- Miten suunnitelmaa personoidaan kilpailijalle ja kisalle?
- Miten seuraat valmennusprosessia?
- Täytyykö raportoida siitä jollekulle?

Osa 4: Tulosten käsittely ja tulevaisuuden suunnittelu

- Miten käsittelet kilpailutuloksia ja päätät, onko valmennussuunnitelma valmistanut kilpailijaa onnistuneesti?
- Kuinka kokemusta hyödynnetään tulevissa kilpailuissa?

Lopetus

- Mitä haluaisit lisätä tai jonka uskot olevan tärkeää mainita liittyen kilpailuihin valmistautumiseen tai koulutukseen?

Appendix 3. Example of LSC canvases usage

The image displays a collection of LSC (Learning Service Canvas) templates used for designing educational programs. The templates are arranged in a grid and include the following sections:

- Business Objective and Context:** A canvas for defining the program's purpose, target audience, and business model.
- Immersion:** A canvas for detailing the learning experience, including content, activities, and assessment methods.
- Script Creator:** A canvas for creating a detailed script of the learning experience, including content, activities, and assessment methods.
- Insight:** A canvas for identifying customer needs and pain points, used to inform the design of the learning experience.
- Ideation Sandbox:** A canvas for generating and refining ideas for the learning experience.
- Idea Accelerator:** A canvas for accelerating the development of the learning experience, including content, activities, and assessment methods.

Each canvas is a structured workspace with various sections, text boxes, and icons, designed to facilitate the design and development of a learning service. The templates are presented in a grid layout, with some examples showing filled-in content and others showing the empty structure.

Appendix 4. Training platform component integration diagram

