

Usefulness Analysis of a Public-Sector Online Service

Case: Pilot Version of My Enterprise
Finland Networking Section

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Timo Voutilainen

Lahti University of Applied Sciences
Degree Programme in International Business

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ABSTRACT

Digitalisation of public-sector services, for both private persons and enterprises, is one of the key projects of the Finnish Government. As a result, the Ministry of Economic Affairs and Employment has coordinated the integration of the previously scattered field of public-sector enterprise services into a service platform called Enterprise Finland, which offers service primarily through digital channels. Objective of the thesis is to provide the commissioner, the Ministry of Economic Affairs and Employment, with actionable information about the usefulness of the pilot version of the Networking Section, a new online collaboration utility inside My Enterprise Finland online service, for its development purposes.

The study examines the usefulness of the Networking Section through the precepts of Jakob Nielsen's usability evaluation methods and heuristics. In this context, usefulness means whether the users of the service achieve their goal of successful online collaboration and working in virtual teams.

During a one-month testing period, the five test groups with a total of 65 members used the Networking Section to conduct a part of their work duties in virtual teams. After the testing period, data collection was conducted utilizing an online survey questionnaire, through which the testers reported their experiences and findings.

The results indicate that there are multiple areas in both the utility and usability of the Networking Section that require improvement. The Networking Section fails in seven of the Nielsen's ten heuristic categories and is missing needed features such as means for synchronous communication. Hence, development activities need to be initiated to correct the deficiencies before launching the service to the public.

Key words: Usability, public-sector, enterprise services, online collaboration, virtual team, Internet

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TIIVISTELMÄ

Julkispalvelujen digitalisaatio on yksi Suomen hallituksen kärkihankkeista. Digitalisaatiopyrkimysten seurauksena työ- ja elinkeinoministeriö on koordinoanut aiemmin erittäin hajautuneen julkisten yrityspalveluorganisaatioiden palvelukentän yhdeksi palvelukokonaisuudeksi nimeltä Yritys-Suomi, jossa palvelut pyritään tarjoamaan ensisijaisesti digitaalisissa kanavissa. Lopputyön tavoitteena oli antaa työn toimeksiantajalle, työ- ja elinkeinoministeriölle, tietoa Oma Yritys-Suomi -verkkopalvelun uuden verkostot-osion pilottiversiohyödyllisyydestä, jota voidaan konkreettisesti käyttää edelleen palvelun kehittämisessä.

Työssä tarkasteltiin Oma Yritys-Suomen verkostot-osion hyödyllisyyttä Jakob Nielsenin kehittämää käytettävyys-ajattelutapaa ja heuristiikkoja hyväksikäyttäen. Tässä yhteydessä hyödyllisyys tarkoittaa, pystyvätkö käyttäjät tekemään palvelun avulla onnistuneesti hajautettua työtä virtuaalitiimeinä Internetin välityksellä.

Tutkimuksessa mukana olleiden viiden testiryhmän jäsenet, yhteensä 65 henkilöä, käyttivät kuukauden mittaisen testijakson aikana verkostot-osiota yhtenä työntekonsa välineenä ja tekivät töitä virtuaalitiimeinä. Testaajien kokemukset ja havainnot kerättiin testijakson jälkeen verkkokyselyn kautta.

Kyselyn tulokset osoittavat, että sekä verkostot-osion käyttökelpoisuudesta, että sen käytettävyydestä löytyy useita parannuskohteita. Osioista löytyy puutteita muun muassa seitsemässä kymmenestä Nielsenin heuristiikka-kategoriasta ja sieltä puuttuu lisäksi käyttäjien tarvitsemia ominaisuuksia, kuten esimerkiksi mahdollisuus kommunikoida reaaliaikaisesti tiimin sisällä. Osio tarvitsee siis kehittämistoimenpiteitä ja puutteiden korjausta ennen kuin se julkistetaan yleiseen käyttöön.

Asiasanat: Käytettävyys, julkissektori, yrityspalvelut, online-yhteistyö, hajautettu työ, Internet

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ABBREVIATIONS

MEAE	The Ministry of Economic Affairs and Employment
MEF	My Enterprise Finland
MEFCS workspace	My Enterprise Finland Customer Service workspace
MEFNS	My Enterprise Finland Networking Section
SADe	Action Program for eServices and eDemocracy
SME	Small and medium-sized enterprises

1 INTRODUCTION

This chapter gives the reader background information about the research topic, explains the aim of the study, and defines the research problem, questions and limitations. The final part of the chapter outlines the structure of the thesis and presents the theoretical framework used in research.

1.1 Background

Public-sector services all over the world are currently in their turning point and facing a demand for complete transformation from traditional service models towards utilizing digital channels. In this day and age, citizens and enterprises expect public-sector information and services to be readily available online. In the year 2014, already more than 130 countries in the world were trying to meet these expectations by providing online public services in some form – however, most were still far from capturing full benefits of digitalisation. (Dilmegani, Korkmaz & Lundqvist 2014.)

Although transforming services from traditional to digital channels in public-sector can be vastly more challenging and complex when compared to private-sector, the benefits of capturing the full potential of digitalisation are, indeed, immensely larger than merely fulfilling the customers' expectations. It is estimated that, in global perspective, it could be possible to save as much as 1,000,000,000,000 USD worth of economic value annually through improved cost and operational performance of governments. Digitalisation provides governments possibilities of total efficiency increases on such a scale that, especially in this time of increasing budgetary pressures, they simply cannot afford not to develop their digital services. (Dilmegani, Korkmaz & Lundqvist 2014.)

In Finland, the benefits of digitalisation are both needed, as the levels of general government deficit and debt are on the rise (Findicator 2016), and possible to realize, as motivation and capabilities to develop modern digital services already exist (Ministry of Employment and the Economy 2013).

Digitalisation of public services and creating a growth environment for digital business operations are amongst the key projects of the current Government lead by Prime Minister Juha Sipilä (Finnish Government 2016b). Digitalisation of Finnish public services promote user-based approach, where services are easier to use, information is shared between different public service agencies (so the customer does not need to give out same information twice), and the service is primarily through digital channels (Ministry of Finance 2015).

These two key projects follow the progress already set forward by the previous Government of Finland (active during 2011-2014). This becomes evident from the Operating and Financial Plan of the Ministry of Employment and the Economy for years 2015-2018. The Plan, published in February 2014, states that public services for enterprise clients will be improved, streamlined, and made more effective and customer oriented. The public services in this field, that were previously scattered, are going to be integrated and served under a public service platform called Enterprise Finland. Improvements are also going to be made in the private persons' employment services: all services, including functionary services of employment offices, should be available electronically by the year 2015. (Ministry of Employment and the Economy 2014a.)

Designing customer oriented services, irrespective whether they are digital or not, inherently means that the services should work in a logical, efficient, and easy-to-use manner from the viewpoint of the customer – and ultimately allow the customer accomplish their goal. The challenge is that, in most cases, services are designed and produced by technologists that likely have totally different skill sets and ways of thinking compared to the average customer. This can cause a disconnect in the way the service is designed to operate and how it works in practice. To make sure that the service actually meets the needs and expectations of the intended customer, usability engineering and testing is needed. (Sherman 2006, 1-4; Sinkkonen et al. 2006, 11-16.) After all, making online public services more usable saves money from both the citizen and the government, and

increases citizens' trust towards the government (Buie & Murray 2012, 22-23).

The author conducted a five-month internship in the the Ministry of Employment and the Economy of Finland in 2015. Main focus of the internship was to conduct usability studies for some of the Enterprise Finland online services. The thesis covers selected parts of the research the author conducted for a new feature within the Enterprise Finland platform called My Enterprise Finland Networking Section, which provides (Enterprise Finland 2015) its users a platform for electronic collaboration and working in virtual teams.

My Enterprise Finland Networking Section was in its piloting deployment phase during Spring and early Summer of 2015. Piloting deployment is a term used in software development that means testing new software with a selected group of users within the organization to find out how the software works in its intended use, what kinds of problems arise, and what needs to be fixed before full-scale deployment (Posey 2006). Once piloting was active, usability and utility of the first development version of the service was evaluated to support the development activities.

1.2 Research Objective, Problem and Questions

The research objective is to provide the Ministry of Employment and the Economy with actionable information about the usefulness (comprising of usability and utility) of the pilot version of My Enterprise Finland Networking Section, which has not been studied before with the help of real end-users of the service. This information is supplementary to the list of software error data collected during the piloting deployment and is intended to support decision making in the development process of My Enterprise Finland Networking Section. The research problem and questions are concordant with the Ministry of Employment and the Economy provided information requirements and are planned to provide answers to them.

The main research problem and research questions guide empirical research. They are the starting point for the research activities that in turn return information, i.e. data, and lead to the completion of the research report that organizes the data in a way that it can be interpreted and composed as a story. The story brings the information together in a logical and understandable manner, and tells what has been learned about the subject. (Scott & Garner 2013, 31-32.)

The research includes qualitative research questions only.

The main research problem (RP) is formulated as follows:

RP: How useful is the My Enterprise Finland Networking Section in its intended use as an online collaboration tool?

The four research questions (RQ's) that support the main research problem are:

RQ1: What is the level of usability of the Networking Section?

RQ2: What is the level of utility of the Networking Section?

RQ3: What are the current tools within the Networking Section that best support inter-organizational collaboration?

RQ4: What are the tools missing from the Networking Section that would be needed for effective inter-organizational collaboration?

1.3 Research Limitations

Research conducted for the My Enterprise Finland Networking Section during the author's internship period included e.g. performing cost-benefit analyses for all of the piloting groups, collecting a list of error data i.e. information about the system errors identified during usage of the system, and conducting semi-structured interviews of the piloting group leaders. The amount of collected data is far beyond the scope of requirements of

research for a bachelor's level thesis. The topic for the parts of research included in this thesis has hence been limited to only contain usefulness analysis of the Networking Section.

The results of this research are specifically bound to the context of My Enterprise Finland Networking Section and cannot be directly replicated or applied to any other context. The conclusions are therefore also case specific.

As My Enterprise Finland Networking Section is a part of an online service, it is essentially composed of code and scripts that need to be altered to make changes to the service. Programming aspects of development and e.g. feasibility of implementing wanted changes from programming perspective are not discussed in this thesis.

Introducing new software to an organization usually means that leadership must initiate change management strategies that effectively embed the use of this new software to be used as a part of work methods toolkit. Change management is not discussed in this thesis, even though the findings presented in this thesis can potentially be used in change management activities.

Resources available to conduct the research determine what type of data collection methods can be used and what is the time horizon of the study. In this research, it needs to be noted that all the users taking part in the research were testing the service during their workdays and all testing was performed in addition to participants' other work duties. This is why resource intensive tests such as classical usability tests were avoided to try not to hamper with the participants' ability to do their actual work. Instead, testing was conducted through the users utilizing the Networking Section to perform a part of their work duties and then reporting their findings to the researcher at the end of the piloting period. This way of conducting research, however, limits the type and amount of data that can be collected and the results are not as precise as they could be under optimal conditions.

Moreover, it is important to note that, after the piloting deployment and testing period is completed, the service is intended for an audience that is vastly more diverse and significantly larger than the population of testers, which means that in scientific sense the research is not conducted using a representative sample of the end users. However, as explained in chapter 4.5, the nature of this particular research does not necessitate statistically accurate measurements to be able to collect valid data that can be used for development purposes.

1.4 Thesis Structure and Theoretical Framework

The thesis comprises of nine chapters that first present the background information about the research domain, then present the theoretical framework related to the research, and lastly present the empirical parts of the research.

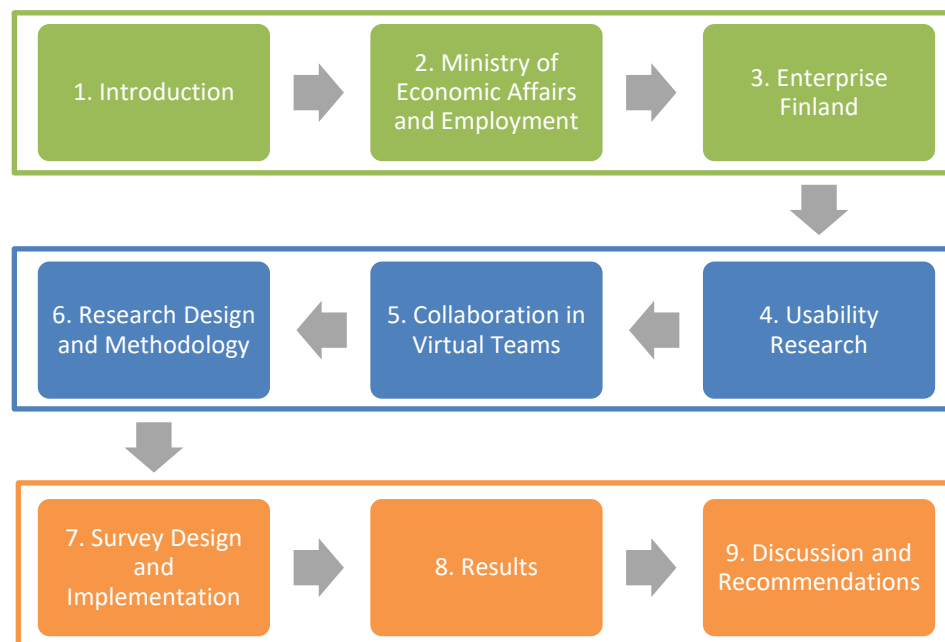


FIGURE 1. Chapters of the thesis divided into background information (green), theory (blue), and empirical (orange) parts.

The first three chapters, marked green in figure 1, unfold the necessary background information that the reader needs to understand the domain of the research. First chapter establishes an understanding on the

background of the thesis itself, followed by the second chapter that introduces the commissioner of the thesis and the groups included in the research process, and the third chapter that explains the Enterprise Finland service concept including My Enterprise Finland Networking Section.

Chapters four to six, marked blue in figure 1, contain the theoretical framework used in this thesis.

The first theory part, covered in chapter four, is about usability research mainly based on Jakob Nielsen's (1993) classic approach on usability. Nielsen's usability doctrines devised in the 1990's are still amongst the *de facto* standards in usability design and research methodology that are also referenced in scientific publications.

The second theory part, covered in chapter five, explains what virtual teams and electronic collaboration mean. The topics include e.g. the methods, benefits, and weaknesses of electronic collaboration

The third theory part, covered in chapter five, discusses scientific research design and its methods. Combined with the theory of research are the explanations of respective choices that have been made in this study.

The last three of the nine chapters, marked orange in figure 1, discuss the empirical part of the research. Chapter seven introduces the data collection method of choice and presents how the data collection was conducted. Chapter eight displays the results of the study and, finally, chapter nine presents analysis on what the results actually mean.

2 MINISTRY OF ECONOMIC AFFAIRS AND EMPLOYMENT

This chapter introduces the commissioning party of the thesis and the five participant groups of the piloting deployment.

As stated in the introduction, the thesis is commissioned by The Ministry of the Employment and the Economy of Finland. In June 2016, the ministry changed its English name and is currently known as the Ministry of Economic Affairs and Employment (Ministry of Economic Affairs and Employment 2016e).

The Ministry of Economic Affairs and Employment (later MEAE) is one of the 12 ministries in the Finnish Government (Finnish Government 2016a). The MEAE is responsible for the fields of entrepreneurship and innovation development, function of labor market and employment capabilities of work force, as well as regional development in Finland. The MEAE employs approximately 560 personnel, including two ministers: Minister of Economic Affairs and Minister of Justice and Employment. (Ministry of Economic Affairs and Employment 2016f.)

2.1 MEAE Group

In addition to its internal organizational structure, the MEAE directs and oversees the operation of the MEAE Group that comprises of (Ministry of Economic Affairs and Employment 2016f):

- 7 government agencies,
- 15 Centres for Economic Development, Transport and the Environment,
- 15 Employment and Economic Development Offices,
- 6 companies, and
- 3 funds.

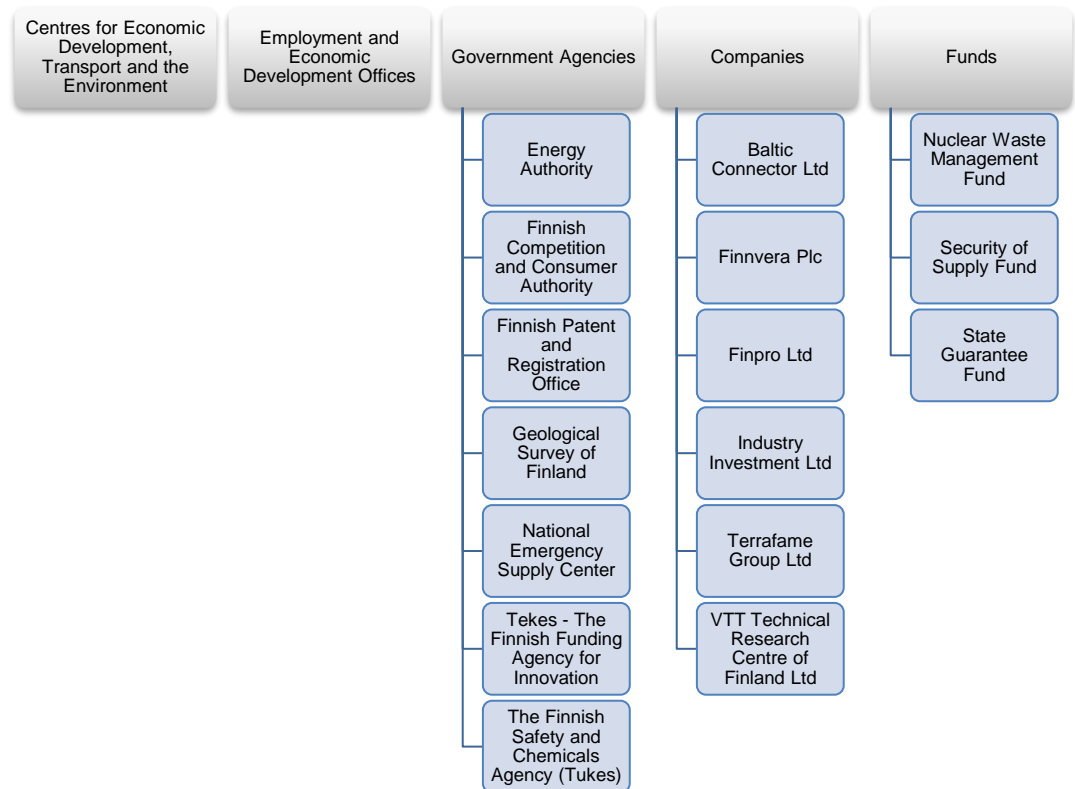


FIGURE 2. Composition of the MEAE Group (Ministry of Economic Affairs and Employment 2016c).

The composition and structure of the MEAE Group can be seen in figure 2. As can be seen from the figure, the MEAE Group's field of operations is considerably broad. Therefore, it is not feasible to introduce every centre, office, agency, company, and fund in this chapter. Instead, the organizations within the MEAE Group that are relevant to this study are introduced in the next sub-chapter.

2.2 Participant Groups of the Piloting Deployment

The body of participants recruited to take part in testing of the piloting deployment of My Enterprise Finland Networking Section included a total of 65 persons from 30 different organizations, divided into five piloting groups. Each of the five piloting groups was led by a group leader (or a

couple of leaders) that is employed full-time in one of the organizations within the MEAE Group. (Ministry of Employment and the Economy 2015.)

All of the piloting groups used the Networking Section as a collaboration and networking tool in their respective work fields. Following is a very brief introduction to each of the piloting groups.

1. Working Life 2020

Working life 2020 piloting group consisted of a team of 2 leaders and 3 professionals. Working life 2020 is a project lead by the Ministry of Economic Affairs and Employment that creates a national collaboration network that is further divided into 15 regional networks of agents. The agents are committed to cooperate in efforts to improve productivity and innovation creation, labour know-how, occupational well-being and health, trust and collaboration in Finland. The aim of the project is to make Finnish working life the best in Europe by 2020. (Ministry of Employment and the Economy 2014b; Working Life 2020 2016.)

2. Satakunta Region Cleantech Business Survey

The Satakunta region cleantech business survey group consisted of a team of 1 leader and 10 professionals. The aim of the group is to find and identify developing cleantech businesses in Pirkanmaa region, whose growth and export activities could be boosted through various types of support (Leader of Satakunta Cleantech Business Survey Group 2015).

3. Finland Proper Regional Business Services

The Finland Proper business services group consisted of a team of 1 leader and 21 professionals working in public service organisations located and operating in southwestern Finland, Finland Proper province. The group was led by an advisor from Finland Proper Centre for Economic Development, Transport and the Environment. The aim of the group is to provide the best possible business services to the enterprises within the

province region. (Leader of Finland Proper Regional Services Group 2015.)

4. Export Ring (Vientirengas)

Export ring piloting group consisted of a team of 2 leaders and 5 business executives. An export ring is a collection of 4-6 Finnish small and medium-sized enterprises (later SMEs) that are taking part in a joint export project led by an experienced export manager and funded by The Finnish Funding Agency for Innovation (Tekes). Aim is to help SMEs to begin exporting their products or services and create new sales and marketing channels. (Tekes 2016.)

5. Product Track (Tuoteväylä)

Product Track piloting group consisted of a team of 1 leader and 19 professionals. Product track is a national service offered by the Centres for Economic Development, Transport and the Environment that offers advice and support for development of inventions. The service is free of charge. Aim of the service is to find promising ideas and inventions with international growth potential and help turning them into profitable businesses. (Product Track 2015.)

3 ENTERPRISE FINLAND

This chapter explains the background of Enterprise Finland and gives the reader basic information about the service and its design.

3.1 Origins of Enterprise Finland

Before going into details about Enterprise Finland, it is useful to understand its origins. The roots of Enterprise Finland are in a project called Action Program for eServices and eDemocracy (later SADe). Whilst active from April 2009 to December 2015, SADe was funded and coordinated by the Ministry of Finance, and aimed to provide high-quality public-sector services through digital channels. SADe included seven electronic service development projects that would “improve cost-efficiency, create savings, and generate benefits to citizens, businesses, organisations and local and government authorities”. Enterprise Finland is an integral part of Enterprise Services Package within SADe. (Ministry of Finance 2016a; Ministry of Finance 2016b.)

3.2 Composition of Enterprise Finland

Enterprise Finland is a service coordinated by the MEAE and created as a joint effort of public business service organisations (Ministry of Economic Affairs and Employment 2016b; Enterprise Finland 2016a). As illustrated in figure 3, Enterprise Finland is not only an online service but combines together three types of public business services: online, telephone, and local service points (Enterprise Finland 2016b).

The aim of this combination is to provide public business services through multiple channels in a way that, regardless of the situation, the customer can find a solution within the Enterprise Finland service network without needing to know which service organization they should actually contact. In other words, the customer only needs to know that they can find the needed information by accessing the Enterprise Finland service network

through a channel of their choice. (Enterprise Finland 2016b.)



FIGURE 3. Trinity of Enterprise Finland service model.

The online service provides information about entrepreneurship through its website, yrityssuomi.fi. As stated on the website, the online service “offers enterprises and start-up entrepreneurs up-to-date information on entrepreneurship and corporate activities, as well as corporate services and tools. Yrityssuomi.fi contains all of the key forms that are needed in the establishment of an enterprise and in functioning as an enterprise”. (Enterprise Finland 2016b; Ministry of Economic Affairs and Employment 2016d.)

The telephone service provides entrepreneurs – and those planning to become entrepreneurs – business adviser guidance over telephone (Enterprise Finland 2016b). The guidance is available during operating hours, which were during the writing of this thesis between 09:00-16:15 from Monday to Friday (Enterprise Finland 2016d). To receive telephone service in English language, however, one need to initially request it by submitting an online service request form where details about the topic and other information requirements are given in advance (Enterprise Finland 2016c). The telephone service business advisers also give guidance via text chat option through the Enterprise Finland website, available on weekdays between 13:00-16:00 (Enterprise Finland 2016d).

Lastly, the local service points are a nationwide network of Finnish national

and regional public business service organizations that offer face-to-face service in the customers' region. These organizations include members from the MEAE Group, the Tax Administration, and regional corporate services around Finland. (Enterprise Finland 2016b.)

TABLE 1. Enterprise Finland in figures; adapted from yrityssuomi.fi website (Enterprise Finland 2016a).

ENTERPRISE FINLAND IN FIGURES (6/2016)	
Total number of visitors to Enterprisefinland.fi per year 1,300,000	Total number of users of My Enterprise Finland service 20,000
Total number of content pages 530	ENTERPRISE FINLAND TELEPHONE SERVICE IN FIGURES
Descriptions of services provided for enterprises 1,000	Number of calls per year 21,000
Descriptions of permits and notifications required in order to engage in business activities 150	Number of service request submitted on electronic forms 1,700
Forms and electronic services 3,000	ENTERPRISE FINLAND NETWORK IN FIGURES
External links 670	National organisations 60
Regional websites 68	Regional organisations nationwide 560

The manysidedness of the Enterprise Finland service is clearly visible from the above table 1 that presents key figures of the service.

3.2.1 My Enterprise Finland

My Enterprise Finland (later MEF) is an extension of the Enterprise Finland online service that offers both already established and starting entrepreneurs a personalized online workspace (as seen in figure 4) that can be used e.g. to plan enterprise's operations, to seek information related to entrepreneurship, and to store important documents. The service compiles together a large number of tools and information that is offered automatically in a personalized selection according to the user's profile information. (Ministry of Economic Affairs and Employment 2015; Enterprise Finland 2016b.)

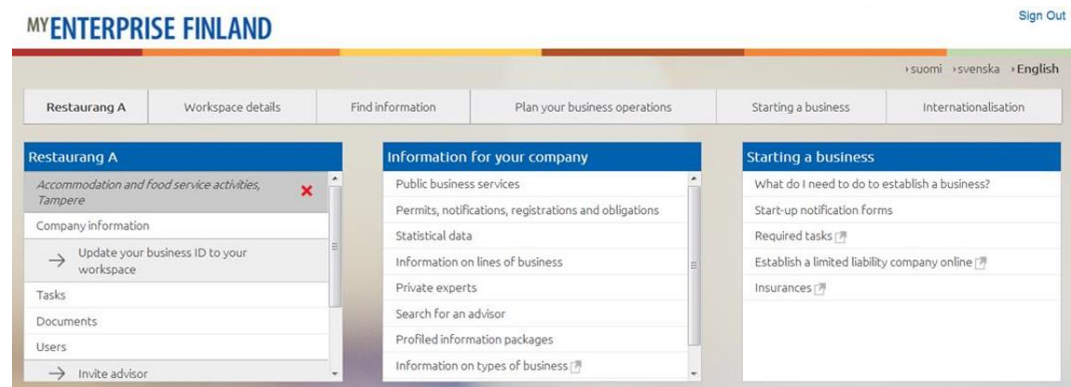


FIGURE 4. Cropped screenshot of MEF workspace content (Ministry of Economic Affairs and Employment 2015).

Examples of functionality found in MEF include guidance in business plan creation, permit or license acquisition (when needed), and establishing the business itself. One can also complete an “entrepreneur test” to see whether he or she is ready to endeavor entrepreneurship. (Ministry of Economic Affairs and Employment 2016a.)

MEF also incorporates public sector consultants' and business advisors' services in electronic form. For this purpose, MEF includes a customer service workspace (later MEFCS workspace) that allows the experts to offer service directly within the online platform. (Ministry of Economic Affairs and Employment 2016a; Ministry of Economic Affairs and Employment 2016b.)

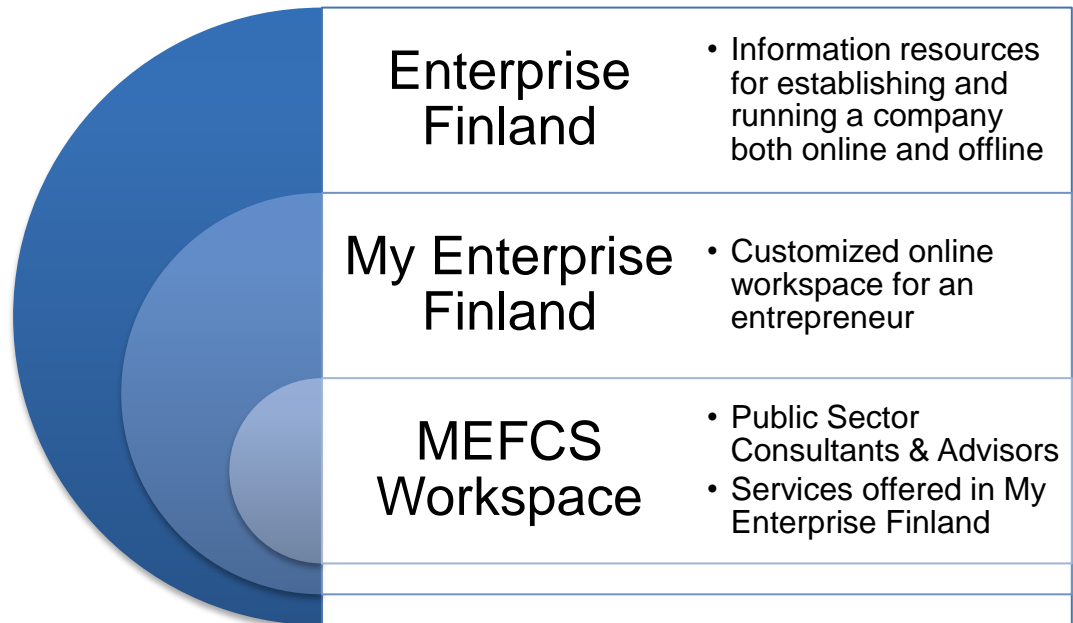


FIGURE 5. Simplified, layered design of Enterprise Finland.

Figure 5 shows the relationships between above mentioned online services. As can be seen from the figure, Enterprise Finland is a layered service that includes MEF, which further includes the MEFCS workspace.

3.2.2 My Enterprise Finland Networking Section

As stated in the introduction part of the thesis, My Enterprise Finland Networking Section (later MEFNS) is an extension of MEF that provides a platform for electronic collaboration and working in virtual teams. Within MEFNS, the MEF users can, with no cost, establish virtual networks that enable teams and project groups to work online in an information secure environment. (Enterprise Finland 2015b.)

The information presented in the following paragraphs shows the functionality and features of the MEFNS that were actual during the piloting deployment period. At the time of writing this thesis the functionality has already been modified and improved, however this chapter presents a snapshot of the situation when the research was conducted.

Logging into the MEFNS is done from its own section within MEF workspace, illustrated in figure 6. In the first view the user can choose whether he or she wants to log into an existing network they are already a member of, to create a completely new network, or to browse existing networks that they are currently a member of. (Enterprise Finland 2015a.)

The screenshot displays the MyEnterprise Finland workspace interface. The main navigation pane on the left includes sections like 'My workspace and company', 'Research and plan', and 'Starting a business'. The central content area is divided into 'Current issues' and 'Private experts'. A red box highlights the 'Verkostot' (Networks) section, which is titled 'Verkostot' and contains a list of 'Omat verkostot' (My networks) with links to 'Pilotti Testaus', 'AOYS kehitystiimi', 'Satakunnan cleantech-yritysten kartoitus', and 'Hämeen Tuoteväylä-kokous 9.4.2015'. Below the list are buttons for 'CREATE A NEW NETWORK' and 'BROWSE NETWORKS'. A smaller inset box shows a detailed view of the 'Verkostot' section, including a 'Verkostojen työlista' (Networks worklist) section that states 'There are no tasks on your work list'.

FIGURE 6. Location of the MEFNS section embedded in the MEF workspace (Enterprise Finland 2015a). In this example, “Verkostot” equals MEFNS.

Once logged into one of the networks within the MEFNS, the user is taken to the respective network's home page, which looks quite similar as the example home page shown in figure 7. Inside, the user's view comprises of the header bar at the top of the page and the content section below the header. The content section is further divided into three parts: the menu bar on the left side, announcements and latest activities in the middle of the page, and other useful information on the right side. From the menu bar the user can choose to enter one of the network functionalities that include following options: calendar, documents, forums, and members. For network administrators and owners there is also one extra menu item that allows the administration of the network but is hidden from regular members of the network. (Enterprise Finland 2015a.)

FIGURE 7. An example network home page within the MEFNS (Enterprise Finland 2015a).

Without going too deep into detail about the functionalities within a network of the MEFNS, the following is what the functionalities provide to the users:

- Calendar: A shared calendar for the network members. Functionality includes e.g. possibility to add events with descriptions.
- Documents: A shared file storage that includes file versioning and user access control. Users can e.g. create folders for organizing the file structure and designate users that can access and edit the files. No possibility to edit files online, instead they have to be downloaded for editing and, once done, uploaded as a new version.
- Forums: Discussion forums for the network members. Users can e.g. add new threads and topics, embed files and links to the discussion.
- Members: Contains information about the members of the network.
- Admin: For administrators and owners only. Allows e.g. inviting users, designating members different user groups, and generally editing the network properties such as home page elements' appearance.

As can be seen from figure 7, once the user is inside a network of the MEFNS he or she can only see the network's user interface. To return to MEF workspace the user needs to exit the network completely by clicking the "back to workspace" button at the top of the screen.

4 USABILITY RESEARCH

This chapter presents the theories linked to usability research, which further provides the basis for the concepts of utility and usefulness.

The concept of usability includes a multilateral mix of elements from e.g. psychology (Sinkkonen et al. 2006), information technology (Nielsen 1993), and economics (Jones & Bonsignour 2012). Usability affects a humongous scale of items, ranging from nationwide information systems (Buie & Murray 2012) to basic everyday things (Norman 2013) such as a door knob. The basic idea behind usability is that there is a user, many times a human, and a product or service that the user utilizes to achieve a certain goal. Usability is a quality of this particular product or service that defines how well the user achieves his goal. (Sinkkonen et al. 2006, 9-19.)

There are several ways to try to define usability. One definition of usability can found in ISO 9241 Standard (The International Organization for Standardization 1998) that states usability is:

Extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.

Another definition, put in a less scientific way, comes from Krug (2006, 5) who states:

Usability really just means making sure that something works well: that a person of average (or even below average) ability and experience can use the thing – whether it's a Web site, a fighter jet, or a revolving door – for its intended purpose without getting hopelessly frustrated.

4.1 Usability as a Part of System Acceptability

According to Nielsen (1993, 24), usability is only one part in a larger picture. He states that usability is one of the components of system acceptability, which defines whether the system adequately satisfies all of the users' requirements and needs.

System acceptability comprises of two components: social acceptability and practical acceptability. Social acceptability means how compatible the system is in relation to the culture and beliefs of the group of persons using the system. Practical acceptability, on the other hand, includes several categories such as usefulness, cost, and compatibility. Nielsen's model of attributes of system acceptability is presented in figure 8. (Nielsen 1993, 24-25.)

Social acceptability could be harder of the two to understand, so here is an example: if there was a system that could tell, without a chance of error, the date when a certain person is going to die, this could be socially unacceptable. One of the reasons for this is that the persons might not necessarily wish to know this information beforehand even though it is correct – and furthermore they might not want anyone else, such as insurance companies, to know this information either.

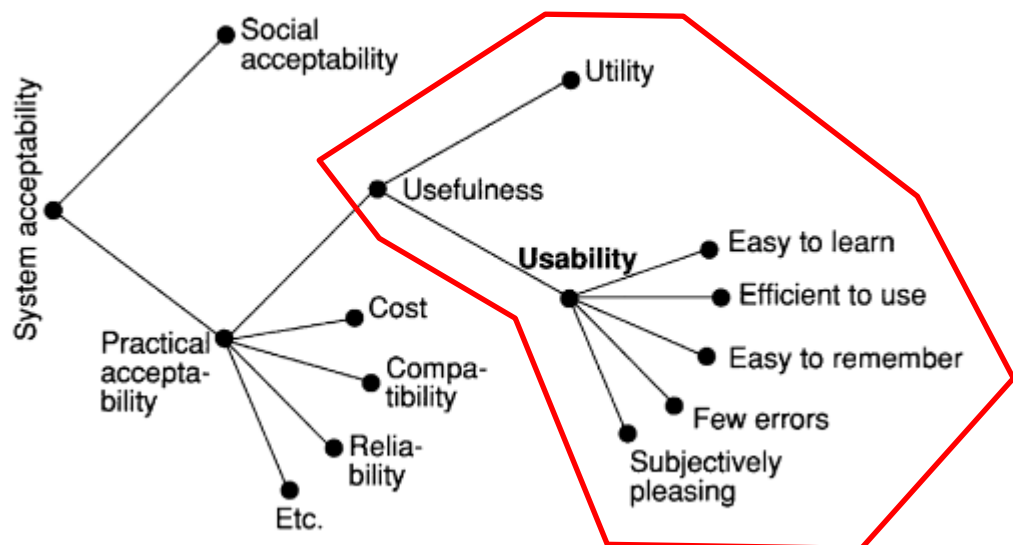


FIGURE 8. A model of the attributes of system acceptability (Nielsen 1993, 25). The area of interest in this thesis is marked with red line.

Usefulness in this context means whether the users of the particular system can achieve their desired goal. As can be seen in figure 8, usefulness is further divided into two parts that are utility and usability.

Utility can be defined simply as whether the system has the functionalities that are needed. Usability answers how well the users can use these functionalities. (Nielsen 1993, 25.)

4.2 Usability versus User Experience

User experience is a design practice that puts the user into the center of attention. The aim is to create interactions that are easy and satisfying for the user. Good user experience design has three attributes: it is useful, usable and desirable – and it needs to be all of these at the same time. (Nichols & Chesnut 2014, 8-9.)

When comparing to Nielsen's (1993, 24-25) approach, one can identify that the first two of the attributes, usefulness and usability, are used in both approaches. The definitions of the terms are also very similar even though division and relation of the terms are different. In user experience context usefulness means that the system provides content, features or functions that fulfill the user's needs. Usability means that the system provides functionality that is easy and intuitive to use. The third attribute of user experience, desirability, is also at least partly covered in Nielsen's (1993, 33-37) approach under the usability attribute called "subjective satisfaction". Desirability means how well the service engages the user in an enjoyable, compelling way. (Nichols & Chesnut 2014, 8-9.)

Although the definition of good user experience is seemingly simple when looking at these three attributes, providing good user experience in practice in the context of online public services is a highly complex and demanding task. To give some perspective, Buie and Murray (2012) have compiled a book on the subject of usability in government systems that totals more than 400 pages. For the purposes of this thesis, going into such detail about user experience design is not needed but it is useful to acknowledge what the interrelation of usability and user experience is.

In conclusion, usability and user experience are not synonyms but usability is one part of user experience.

4.3 Attributes of Usability

Usability can be further divided into smaller attributes that can be measured. Nielsen (1993, 26) uses five different attributes in his definition of usability. These attributes are:

1. **Learnability:** How easy the system is to learn so that the user can rapidly start getting some work done with the system.
2. **Efficiency:** How efficient the system is to use once learned.
3. **Memorability:** How easy the system is to remember so that a casual user is able to return and use the system after some period of not using it.
4. **Errors:** How many errors there are in the system and how easy it is to recover from them.
5. **Satisfaction:** How satisfied users are to use the system, how much the users like the system.

4.4 Usability Evaluation Methods

The usability evaluating methods can be used for collecting data, analyzing it, and sometimes also for producing suggestions that help enhancing the user interface. Usability evaluating methods are commonly divided into two distinct groups based on whether the end user of the product or service takes part in the process. The two evaluating method groups are called inspection methods (user not taking part) and user testing (user taking part). (Ovaska, Aula & Majaranta 2005, 5-6.)

Most usability evaluating methods are not universally applicable but only suitable for some particular application, hence the correct method needs to be chosen on a case-by-case basis, depending on the type of data wanted to be collected and what resources are available (Ovaska, Aula & Majaranta 2005, 5-6). For example, if the chosen method necessitates using equipment that is difficult to operate outside of laboratory, e.g. when the researcher wants to follow where the user's eye focus is or how the user's stress level varies, it might be impossible to observe the user in his

or her authentic surroundings. Also, in this case, the number of tested users cannot be very large unless available resources also are immense. Appendix 2 introduces a number of different usability evaluation methods accompanied with information about the need for user presence and the data collection venue.

TABLE 2. Data collection methods for different applications; adapted from Preece, Rogers & Sharp (2015, 270) and Ovaska et al. (2005, 7).

Method	Good for	Type of data	Benefits	Problems
Survey questionnaire	Answering distinct questions	Quantitative and qualitative Does not directly provide information about the user interface but the user's opinions and interpretations	Reaches many respondents with a small amount of resources	Questionnaire design is challenging Response percentage can be low Responses can imply that the questions have not been understood in the intended way
Interviews	Preliminary study and analysis of the user / subject	Mostly qualitative	Interviewer can "open" the questions Contact to the user can be established	Interviewer could lead too much
Focus groups	Surveying multiple points of view	Mostly qualitative	Brings forth opinions that are for and against	Dominating persons can make completing situations hard
Field observation	Familiarization with the user's actions in authentic surroundings	Qualitative data, pictures, written material	Observing activities gives data that cannot be collected with other methods	Consumes considerable amount of time and can produce a massive amount of data
Laboratory observation	Finding design errors from product that is under development	Qualitative data, quantitative log data	Observing activities produces data that cannot be collected with other methods	Recording video could be needed and analyzing video is time consuming

Irrespective of how usability is evaluated, the basis for usability comes from the end user that wants to accomplish something with the product or service. Knowing and understanding the end users requires data collection. (Ovaska et al. 2005, 3-6.) Suitable data collection methods for different situations are presented in table 2.

4.4.1 Usability Testing

Usability testing is a method of user testing that is conducted to study the usability of a product or system, primarily to be able to improve the usability. Hence, the goal of usability testing is to identify and locate possible problems that real users face as they are performing real tasks. Usability testing can be – and should be – applied to all types of products, not only computer software. (Dumas & Redish 1999, 22-28.)

In a classical usability test, the researcher has carefully determined and selected tasks that are likely to reveal possible usability problems with the tested product or service. Several people from the targeted user group, although one at a time, are asked to perform these predetermined tasks in a laboratory-like, controlled setting. Completing the tasks is observed and both performance and comments, i.e. what the participants do and say, are recorded by the researcher. Also opinions of the tested product or service are asked from the participants. Recording all of this data gives answers to questions such as how long does it take to complete a specific task and how many wrong choices did the participants do. The data is then used to recommend solutions to fix the problems. (Dumas & Redish 1999, 23-160.)

Participants for usability testing can be recruited from the customers of the product or internally from the pool of employees of the organization. However, Nielsen Norman Group (2016) suggests that 30 years' experience with usability studies conclusively shows it is advisable to try not to use employees as participants as this will likely lead to misleading or skewed data. Reasons for this stem from the fact that in this case the

research does not observe authentic behavior from real users. Three examples of factors that can cause errors in the research data are:

1. employees can have more information about the product than average user,
2. employees might have higher motivation to use the product, and
3. employees might know people involved in the research.

Of course, the situation is completely different when the employees actually are the real users and target audience of the product or service – e.g. when testing an application that is developed for the use of the organization's employees. Even in this case, people that are involved with the development should be, if possible, screened out of testing to minimize bias in the data. (Nielsen Norman Group 2016.)

4.4.2 Usability Inspection

It is not always possible or feasible to have the end users take part in the usability evaluation process – e.g. sometimes user testing can be too slow or resource intensive. There are several inspection methods to that enable designing and evaluating usability of electronic interfaces without conducting user testing. These are usually conducted by usability experts – and therefore called expert evaluations – although using an expert is not obligatory. (Ovaska et al. 2005, 111-114.)

As an example of possible inspection method, Tozzagnini (2014) has provided a relatively long, categorized list of 77 principles that should all be followed when designing effective graphical user interfaces in software products and services. The list includes categories such as aesthetics or efficiency of the user, and each of the category then lists a set of principles. Here are three examples of Tozzagnini's principles:

- If the user cannot find it, it does not exist
- Ensure that users never lose their work
- Error messages should actually help

Whilst Tozzagnini has provided a long list of design principles to follow, Nielsen (Nielsen Norman Group 1995a) has performed a factor analysis of 249 usability problems and derived a set of ten general principles that have the maximum explanatory power. He calls these principles “heuristics” as they are not exact and specific rules but a set of loosely defined guidelines. The ten heuristics are presented in table 3.

TABLE 3. Nielsen’s ten usability heuristics for user interface design (Nielsen Norman Group 1995a).

Heuristic	Explanation
1. Visibility of System Status	The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.
2. Match Between System and the Real World	The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order
3. User Control and Freedom	Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.
4. Consistency and Standards	Users should not have to wonder whether different words, situations, or actions mean the same thing.
5. Error Prevention	Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.
6. Recognition Rather Than Recall	Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.
7. Flexibility and Efficiency of Use	Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.
8. Aesthetic and Minimalistic Design	Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.
9. Help Users Recognize, Diagnose, and Recover from Errors	Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.
10. Help and Documentation	Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

According to Nielsen (Nielsen Norman Group, 1994), these ten heuristics can capture a very large proportion of problems observed in the user interfaces, and that also non-experts of usability testing can find large amount of usability problems utilizing the method.

Heuristic evaluation is a usability inspection method where usability problems in user interface design are discovered by having a small number of evaluators examine the interface and compare its compliance against heuristics. Single evaluators have in Nielsen's case studies found only approximately 35% of the usability problems in the user interfaces. It is therefore useful to use more than one evaluator as different individuals tend to find different problems and hence there is an efficiency increase in the evaluation process. The rise in efficiency of finding more problems evens out drastically after five evaluators, as can be seen in figure 9. (Nielsen Norman Group 1995b.)

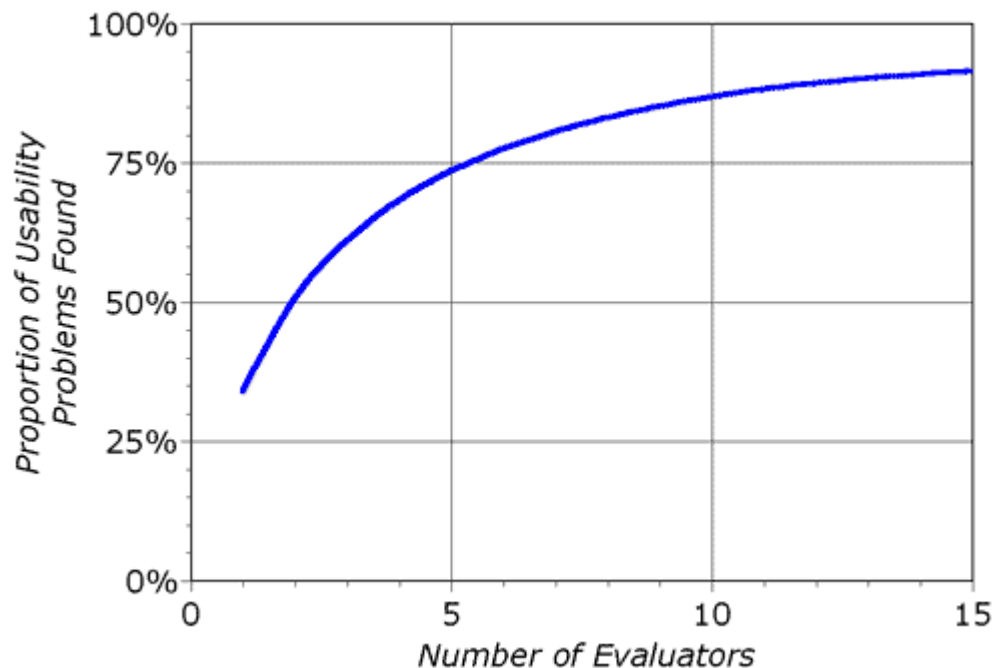


FIGURE 9. Proportion of usability problems found versus number of evaluators (Nielsen Norman Group 1995b).

The effectiveness of finding usability problems also varies largely depending on whether the evaluator is a novice of usability research with just the basic knowledge, an expert of usability, or a so called “double expert” (an expert of usability and also an expert on the domain of the evaluated service). On average, the double experts find the most usability problems (60%), followed by the usability experts (41%), and the novices find the least (22%), when compared to the total number of detected usability problems within a system. (Ovaska, et al. 2005, 302-303.)

4.5 Usability Evaluation versus Scientific Research

It is essential to distinguish the differences in motives, aims, and approaches of usability research and scientific research. When compared to conventional scientific research, e.g. experimental research, usability evaluation methods lack the aim to produce generalizable observations, to test hypotheses, or to create new theories for the scientific community. The results of usability evaluation are not validated through statistical analysis methods and the experiment setup is usually not fully reproducible. Therefore, the results of usability evaluation are not scientifically valid. (Ovaska et al. 2005, 13.)

Instead of producing scientifically valid results, the aim of usability evaluation is to produce results that are pragmatic: they should be possible to be used in developing the product or service (Ovaska et al. 2005, 13). Then, and only then, are the research and its results of value to the organization striving to improve the usability of their product or service.

5 COLLABORATION IN VIRTUAL TEAMS AND NETWORKS

In the modern work environment, employees often need to work effectively in teams even though they might be separated by time and distance. The possibility to work and collaborate in virtual teams across different physical locations has emerged in the recent 15 years as a result of rapid advances in information technology. (West 2012, 225-226.) A virtual team means a group of geographically dispersed individuals that are working together utilizing online technology to complete projects (Smith 2014, 2).

5.1 Tools of Electronic Collaboration

Tools of electronic collaboration are known as groupware. These tools require group members to share their work, collaborate, and cooperate. (Janson, Austin & Hynes 2014, 135.) Virtual teams can use groupware for both asynchronous and synchronous collaboration (Smith 2014, 3-4).

Asynchronous collaboration means that the team members work independently of each other, and complete tasks at their own pace. Examples of online communication tools that are used for asynchronous collaboration include email and discussion forums. Synchronous collaboration means that the team members are working as a group at the same time. One example of synchronous collaboration tools is webconferencing, where the members use realtime video chat to exchange information. (Smith 2014, 3-5.)

5.2 Benefits and Disadvantages

Benefits made possible by virtual collaboration include savings of time (e.g. not needing to travel to work or meeting), money (e.g. travel costs, costs related to office space), and effort (e.g. not needing to organize safety permits for visits). Virtual teams can be formed more easily than traditional teams and its members can be chosen based on their skills and abilities, not location. Work is not bound by time or place, hence giving

organizations and employees flexibility. (West 2012, 227-228.) When the employees do need to travel, the travel time can also be used productively (Shah 2014, 12).

Virtual collaboration also brings a number of possible disadvantages. To the teams these can include e.g. conflicts, communication problems, feelings of isolation, and poor decision making. For the organization, utilizing virtual collaboration can cause e.g. expenses because of the costs of collaboration technology, difficulties to supervise the work of the teams, and increased risks to security of data. (West 2012, 227-228.)

5.3 The Role of Trust in Electronic Collaboration

Collaborating effectively necessitates that team members trust each other. Building trust in virtual environments and distributed groups can be problematic as it lacks the possibility for members to monitor each other and exchange social information in a way they could in face-to-face situation. Without trust, negative effects such as productivity losses, unwillingness to work in the team, and individual's work satisfaction decrease can occur and reduce team effectiveness. Good news in this regard is that a study conducted on the topic of development of trust suggests that teams working in virtual environment will develop similar level of trust than those working face-to-face, although building trust will take a longer time. (Wilson, Straus & McEvily 2006, 16-30.) Trust building can also be accelerated by arranging virtual or face-to-face team meetings when starting virtual collaboration with a new team (Brahm & Kunze 2012, 608).

6 RESEARCH DESIGN AND METHODOLOGY

This chapter explains in detail the overall research design and methods used in this thesis.

6.1 Research Design

Saunders, Lewis and Thornhill (2012, 126-128) state that research design is a layered collection of elements that can be presented as a metaphorical “Research Onion”, as presented in figure 10.

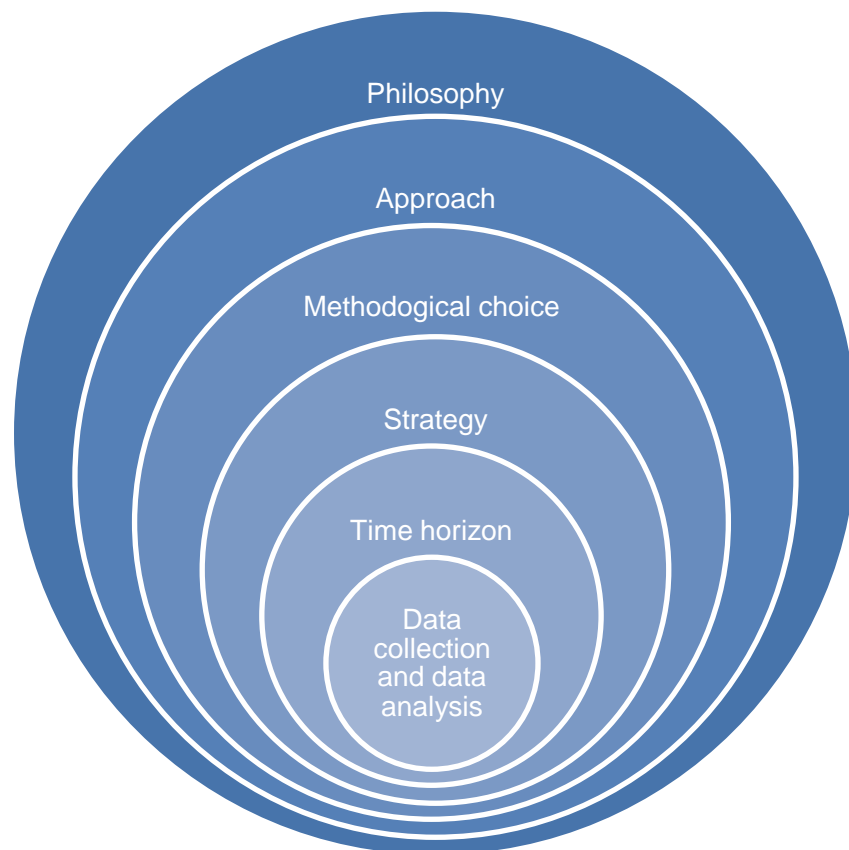


FIGURE 10. The layers of the “Research Onion” adapted from Saunders et al. (2012, 160).

The layers of the “Research Onion” include all the elements that structure the research, starting from research philosophy on the outer layer and ending to data collection and data analysis in the innermost layer (Saunders et al. 2012, 126-128).

6.1.1 Research Philosophy

According to Saunders et al. (2012, 129), no research philosophy is better than another. The choice of appropriate research philosophy depends on the research question(s) that one is seeking to answer.

In this thesis, the chosen research philosophy is pragmatism, as the results are only relevant if they support action – more specifically results that support development of the online service in hand.

6.1.2 Research Approach

Approach binds theory and observations in the research in a specific way that predefine what kind of conclusions can be made, i.e. how reasoning is done in the particular research (Saunders et al. 2012, 143-144).

TABLE 4. Three research approaches (Saunders et al. 2012, 144).

	Deduction	Induction	Abduction
Logic	In a deductive inference, when the premises are true, the conclusion must also be true	In an inductive inference, known premises are used to generate untested conclusions	In an abductive inference, known premises are used to generate testable conclusions
Generalisability	Generalising from the general to the specific	Generalising from the specific to the general	Generalising from the interactions between the specific and the general
Use of Data	Data collection is used to evaluate propositions or hypotheses related to an existing theory	Data collection is used to explore a phenomenon, identify themes and patterns and create a conceptual framework	Data collection is used to explore a phenomenon, identify themes and patterns, locate these in a conceptual framework and test this through subsequent data collection and so forth
Theory	Theory falsification or verification	Theory generation and building	Theory generation or modification; incorporating existing theory where appropriate, to build new theory or modify existing theory

Three approaches presented by Saunders et al. (2012, 143-148) are deduction, induction, and abduction. Characteristics of these approaches can be found in table 4.

In this research, deductive approach is used. Theory is the starting point for all research activities and results are also compared to the same theory. Although deductive approach in scientific research generally demands theory falsification or verification, it is not a goal in this research. Instead, theory is regarded undisputed and used for generating suggestions in the data analysis part of research.

6.1.3 Research Method

The choice of research method basically boils down to the question of whether to use qualitative, quantitative or a mix of both research methods. Quantitative research uses variables that are measured in a numerical form and usually using large sample size, then analyzed using statistical tools to represent result in ordered and meaningful way. Qualitative research, on the other hand, measures and analyzes non-numerical data such as e.g. words or images, usually using a rather small sample size, and the focus is on interpretations, stories, visual portrayals and similar expressive descriptions. In many cases, it could be necessary for the researcher to combine both research methods to answer the research questions. (Saunders et al. 2012, 161; Zikmund et al. 2010, 134-135.)

This research is conducted using mixed methods, where both quantitative and qualitative methods are combined into the research.

6.1.4 Research Strategy

Research strategy means the plan of how the researcher aims to answer his or her research questions. Research strategies are linked to the research methods: some strategies are principally used for quantitative methods, some for qualitative methods and some for both. For example,

survey is mainly a strategy for quantitative research, whereas ethnography is mainly a strategy for qualitative research. (Saunders et al. 2012, 173-179.)

This research uses survey strategy – more precisely online survey questionnaire – as it allows data collection from a sizeable population in a cost-effective way.

6.1.5 Time Horizon of the Research

Time horizon means whether the research only captures the situation at a single specific time or is it more of a representation of a longer time period. Cross-sectional studies capture, “take a snapshot”, of the situation during one particular time. Longitudinal studies then capture situation during a certain time period, like a diary, and can track change or development in a way that cross-sectional studies cannot. (Saunders et al. 2012, 190-191.)

This research is conducted as cross-sectional study. The interest is in how things are at the moment.

6.1.6 Data Collection and Data Analysis

The first choice of data collection is whether to collect primary or secondary data. Primary data means data that the researcher specifically collects through chosen collection methods for the purpose of the particular research in hand. Collection methods include e.g. interview, survey, and focus group. Secondary data, on the other hand, is data that has been previously collected for another purpose but can be used as a source of information for the research. Sources of secondary data include e.g. professional journals, state agency produced reports, and organization’s internal databases. (Saunders et al. 2012, 304-408.)

The second choice of data collection is choosing appropriate sampling method that enables answering the research question(s). This means choosing whether to try and collect data from full set of cases inside the

the frame of the research, i.e. the entire population, or to limit the data collection to a selected group within the population, i.e. representative sample. Sometimes, when the population is small enough, it is possible to collect and analyse data from every case member. In most research, however, this is impossible due to large size of population and restrictions of resources (time, money or access). (Saunders et al. 2012, 258-260.)

Lastly, choice has to be made on how to analyze the collected data. This step includes editing and coding the raw data that was produced in the research and finally analyzing the produced results. Editing means the “process of checking and adjusting data for omissions, consistency, and legibility”. In practice, this can mean e.g. removing obviously erroneous data or recompiling the data in a way that analysis software can use it. Coding means “assigning a numerical score or other character symbol to previously edited data”. In practice, coding e.g. enables the transfer of data from questionnaires or interview forms to a computer for statistical analysis or allows creating themes that can be used in classification of qualitative data. (Zikmund et al. 2010, 461-475.)

The data collection and analysis methods used in this study are presented in chapter seven of the thesis.

6.2 Ethical Matters in Research

Finnish Advisory Board on Research Integrity (2009) has laid down three ethical principles that should be followed whilst conducting any research in Finland. These three principles are:

1. respecting the autonomy of research subjects,
2. avoiding harm, and
3. protecting privacy and data.

The first principle states that the participation to research should be voluntary and with consent of the participant. Research subjects can give consent orally, in writing, or in another way that can be interpreted as

giving consent. E.g. responding to a survey is seen as giving consent to be studied. Subjects have the right to withdraw from the study at any stage – although the information they have given up to that point can be used in the study. (Finnish Advisory Board on Research Integrity 2009.)

The second principle states that research can possibly cause harm through the procedures of collecting and storing the data, and as a consequence of publishing the studies. Systematic care must be practiced in handling and storing confidential information to avoid financial and social harm to the respondent. (Finnish Advisory Board on Research Integrity 2009.)

The third principle necessitates that the privacy of the participants to the study and data security must be protected. The participants must be granted anonymity in the final research report if they so choose (Mäkinen 2006, 114). Data protection must also be carefully planned so that the respondents' privacy is not at risk because of careless data storage. The confidentiality of the research data relies on the processing, use, and storage methods of the data. (Finnish Advisory Board on Research Integrity 2009.)

In this particular research, all participants acknowledge the topic and volunteer to take a part in the study by answering to the survey. All ethics guidelines regarding the autonomy of the research subjects is followed.

All study results have been anonymized to ensure that individuals cannot be identified, thus minimizing risk of harm caused to the respondents. All persons interviewed in conjunction with the usability research wished to remain anonymous in all possible reports, hence the persons are not identified by their names in this thesis.

The research data, which is stored in both electronic and paper form, is stored safely and outsider access to the data is blocked. All data is stored in a way that it cannot be accessed without the presence of the author of the thesis.

7 SURVEY DESIGN AND IMPLEMENTATION

This chapter presents details about the data collection method chosen for research as well as information on how it was implemented in practice.

The survey was conducted as a self-administered online questionnaire utilizing Digium Enterprise software. The MEAE had already previously purchased the software license so there were no additional costs caused by the usage of the software.

Online questionnaire was chosen as the data collection method for this part of research because it was both cost-effective and allowed collection of data from all, geographically dispersed, participants. Table 2 and appendix 2, which present usability evaluation and data collection methods, support the decision: only online questionnaire has the correct attributes for data collection in this particular research. Online questionnaire also provided the possibility to collect primary data through census survey, i.e. collecting information from all participants of the piloting deployment. As all participants can contribute equally important findings to support the development of the service, it is best to try to collect all of this available information.

7.1 Questionnaire Design

The questionnaire included questions grouped in four different categories:

1. Background information,
2. usability,
3. utility, and
4. general feedback.

In background information category, the participants answered to multiple choice questions about e.g. their age, computer literacy, and usage of the MEFNS. The aim of this category is to collect background data about the respondents themselves.

In usability category, the questionnaire included questions about the usability of MEFNS that were designed utilizing Nielsen's usability attributes (information on how the questions correspond with Nielsen's usability attributes can be found from appendix 3) and combined with additional information requirements from the MEAE. Questions included statements about usability that were answered on a five point Likert scale (four points for disagree completely – agree completely, and fifth point for “cannot answer” option) and open-ended questions where respondents could give additional information. The aim of this category was to find out how satisfied the respondents were with different parts of usability of the MEFNS and what are the deficiencies that should be identified and corrected.

In utility category, the questionnaire included questions about the utility of MEFNS from both the individual's perspective and from the perspective of online collaboration, as well as users' satisfaction level on the benefits provided by the MEFNS. Questions included statements about utility that were answered on a five point Likert scale, the same as in previous category, and open-ended questions where respondents could give additional information. The aim of this category was to find out how well the MEFNS toolset fulfills the users' needs and what could be improved.

The last category, general feedback, collected open-ended responses of any other part of MEFNS functionality or design that were not previously asked but the respondents would like to comment on. It also provided an opportunity to give feedback to the developers of MEFNS.

The time needed to fill in the questionnaire was designed to be 20 minutes or less. To increase motivation to answer the questionnaire, thirty designer aprons worth more than €50 each were offered to be drawn between the respondents.

7.2 Implementation

Implementation of research is divided into four main sections, carried out in April – June 2015, that are presented in figure 11.

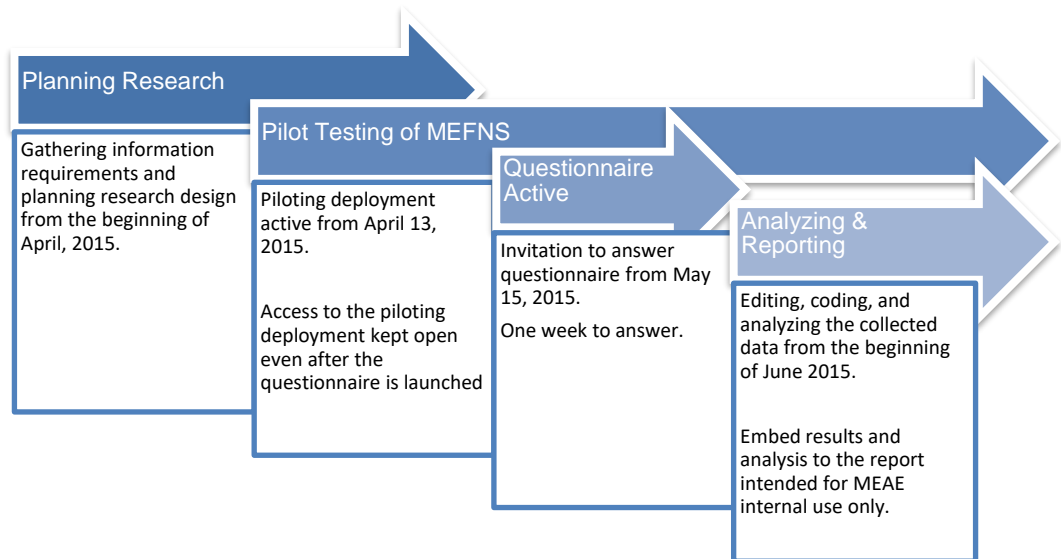


FIGURE 11. Survey implementation process.

Gathering information requirements for research started in the beginning of April, 2015. During this phase, the author had meetings with several stakeholders of the MEFNS development team and discussed the areas of interest, available resources, and other relevant matters to research. After this, the author designed the collection plan supported by theory presented in the thesis, prepared the online questionnaire form and cover letter, and supported the pilot testing as a point-of-contact for troubleshooting and collecting error data from the participants.

Before and in the beginning of the pilot testing of MEFNS, the leaders of each piloting group were given a training session in the usage and features of the service. The leaders then trained their own group members and activated the members to use the service. Pilot testing was launched from April 13, 2015 and was officially active for one month. However, the members of the piloting groups sustained access to the MEFNS also after

the official piloting period so they could continue working in the platform if needed.

Survey questionnaire cover letter and invitation to answer the questionnaire was sent to the participants' emails approximately one month later, on May 15, 2015. Participants had had this time to test the functionality of the pilot version of the MEFNS in their work duties. The participants had one week to answer the questionnaire.

In the beginning of June, 2015, after the deadline to answer the questionnaire, the results were processed and analyzed. A MEAE internal report of the findings was compiled and material also saved for the use of the thesis.

8 RESULTS

This chapter presents a compilation of the results from the survey. The results are divided into the same four topic groups as the survey: background information, usability, utility, and general feedback.

An invitation to answer the survey questionnaire was sent to all members of the five groups that had had access to the MEFNS during the piloting period, a total of 65 people. Survey collected a total of 19 responses, hence answer percentage was approximately 29 percent.

It is important to notice that the questionnaire was originally sent out and responded to in Finnish, and both questions and answers are translated into English for the purposes of the thesis. Questions and answers presented in this chapter are therefore not in their original form. The original structure and questions of the questionnaire can be found in appendix 1. The questionnaire, including results, have been translated into English using great attention to detail and making sure the meaning has not changed, however it is nearly impossible to definitively eliminate a possibility of error.

8.1 Background Information

This sub-chapter presents background information that gives an overall understanding about the respondents.

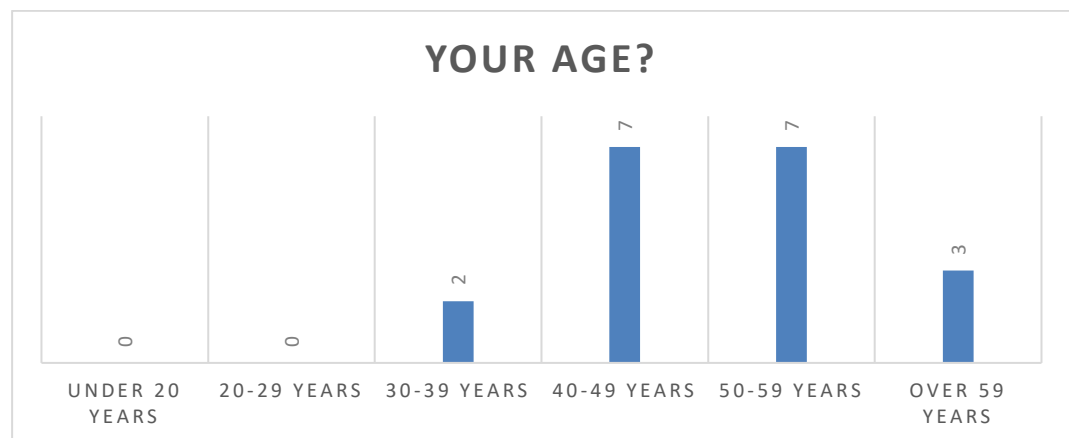


FIGURE 12. Respondents' age distribution.

Most of the respondents, nearly 74 percent, are between 40-59 years of age and none of them is under 30 years of age, as illustrated in figure 12.

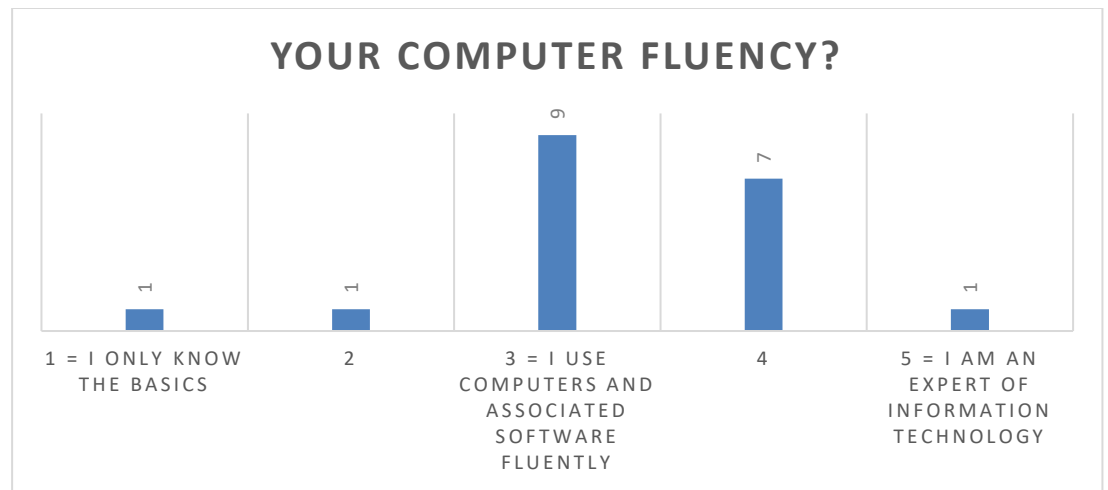


FIGURE 13. Respondents’ self-assessed computer fluency level.

When asked about the respondents’ computer literacy level, the responses could be entered on a scale from one to five (1 = I know only the basics, 3 = I use computers and associated software fluently, 5 = I am an expert of information technology). Most of the respondents assessed their level of computer literacy to be fluent or better, as illustrated in figure 13.

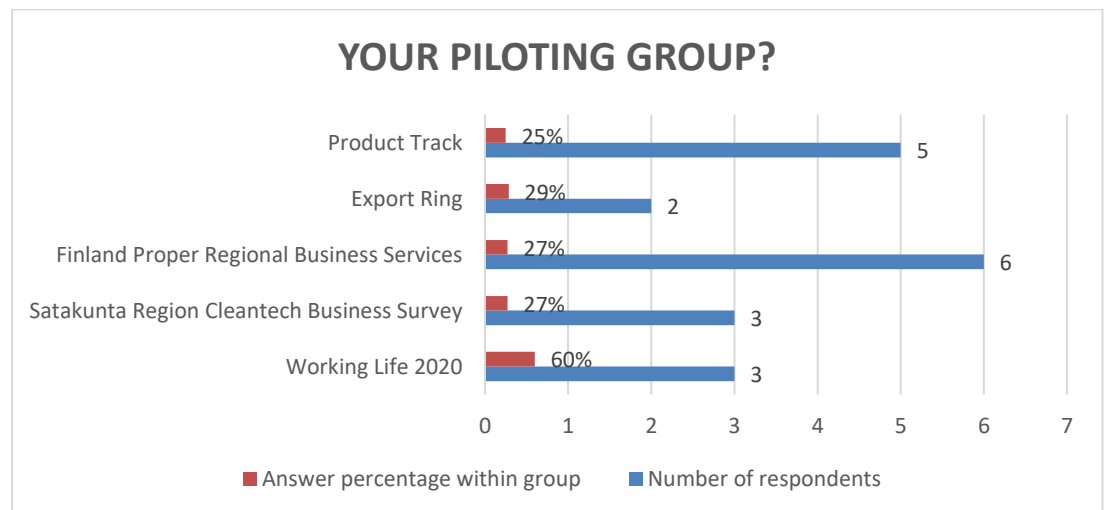


FIGURE 14. Respondents of the survey questionnaire divided into test groups.

The number of survey questionnaire respondents per group, as shown in figure 14, ranged between two to six. Answer percentage per group, which

shows how many percent of the total number of testers within the group have answered to the survey, ranged from 25 to 29 percent – except for the Working Life 2020 group where answer percentage was 60.

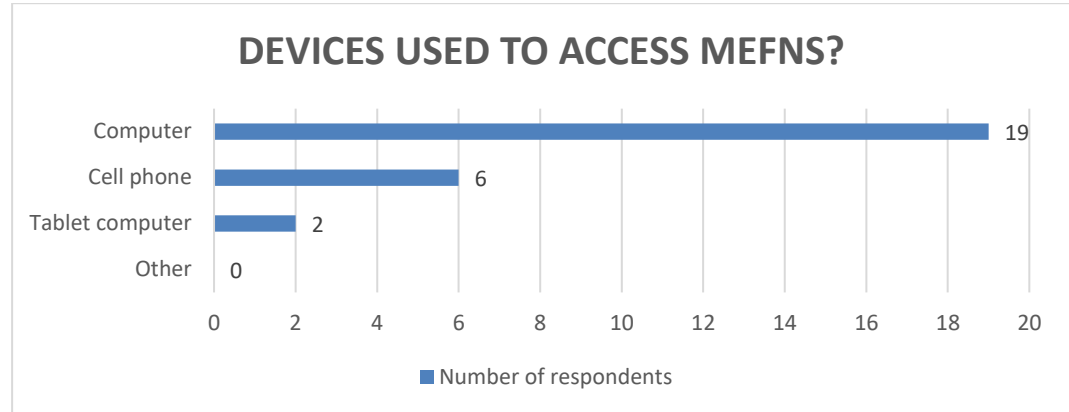


FIGURE 15. Devices that have been used to access MEFNS.

All of the respondents have used the MEFNS with a computer, slightly less than one third with a mobile phone, and two on a tablet computer, as can be seen from figure 15.

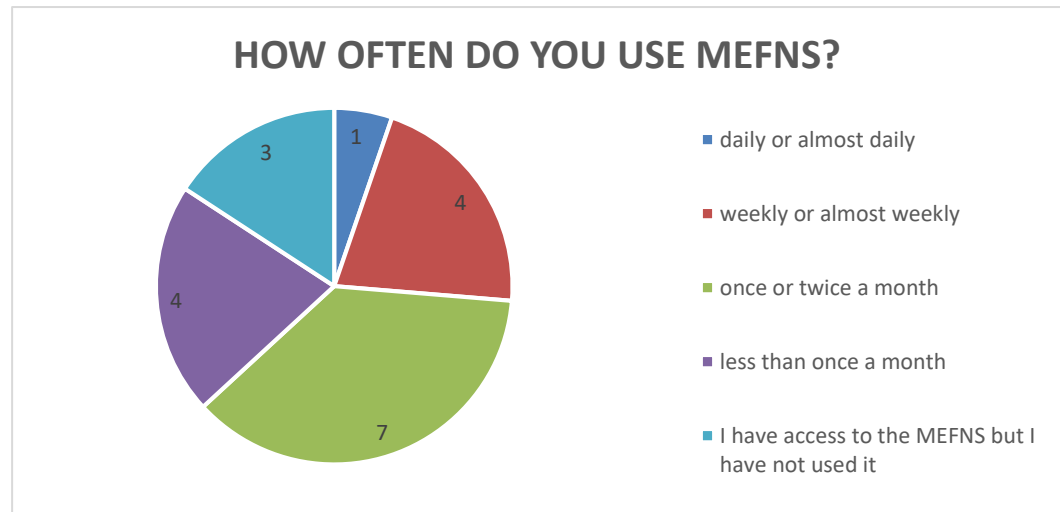


FIGURE 16. Usage frequency distribution of MEFNS.

There is a large spread in the distribution of usage frequency. Only one person used the MEFNS on a daily or almost daily basis, four weekly or almost weekly, and a total of 14 persons (which is more than 70 percent of the respondents) used the service once or twice a month or less, as can be seen from figure 16.

8.2 Usability

This sub-chapter presents the results from the usability part of the questionnaire.

The results are presented in three stages. First, table 5 displays the mean scores from usability part of the questionnaire. This table can be used to identify which areas of usability are the best and which need improvement. Second, a compilation of results from the Likert-scale and open-ended questions are presented. Lastly, a selection of answers collected in the open-ended questions part are presented.

TABLE 5. Color coded mean table of the scores within the usability part of the questionnaire. Scale between 1-4 (1 = I disagree completely, 4 = I agree completely).

	N=19
NAVIGATION	2,97
Moving inside MEFNS is logical and clear	3,00
Functionalities of MEFNS are easy to learn	3,06
The most important functions of MEFNS can be easily found	3,00
Moving between MEFNS and MEF is fluent	2,82
ERGONOMICS	3,10
Text font is easy to read	3,59
Text size is appropriate	3,65
Terms used in MEFNS are understandable and consistent	3,18
Colors used in MEFNS ease identifying different bodies and parts	3,25
I can easily distinguish in which part of MEFNS I am	2,71
Functionalities of MEFNS operate at a sufficient speed	3,00
Search functionality works well	2,93
Working inside MEFNS is fast and efficient	2,41
Setting up and administrating a network is easy	3,21
FEEDBACK & ERRORS	2,46
I receive clear feedback on function success	2,42
I do not experience error situations in MEFNS	2,50
EXPERIENCED ERRORS	2,69
Error messages are clear and easily understandable	2,83
Reporting forward about error situations is easy	2,57
FINDING INFORMATION	3,02
I can find needed information easily	2,69
Calendar features are sufficient for my use	3,00

Using documents is easy	3,20
Document administration features are sufficient for my use	3,13
Discussion forum features are sufficient for my use	3,38
I can easily see what has been discussed in the network since my last visit	3,08
I can find help and manuals easily when needed	2,69

Good grades from usability category: Text font gets the best grade in usability. Colors used in the MEFNS also ease the use of the section. Basic functionality of the discussion forum is generally assessed to be sufficient, however there is still room for improvement in functions such as answering to discussion forum threads. Most of the respondents assess MEFNS functionality to be logical to use and easy to learn, as well as fast enough in its operation. Creating a new network is especially easy.

Things that work OK: MEFNS pilot version functionality (calendar, documents, and discussion forum) already serves the needs of the users at a satisfactory level. Adding files to the documents section is easy but administration of files is more cumbersome – e.g. updating files to a newer version requires some familiarization of the system.

Things that need improvement the most: The worst grades, on average, are given to efficiency of work and feedback of action success. Some of the respondents think the MEFNS use logic is outdated and that moving between the MEFNS and MEF workspace is tedious. Finding MEFNS within the MEF workspace is currently hard. The need to use bank credentials for logging into the MEF is criticized. Help section is insufficient.

Following is a selection of comments collected from the open-ended questions in the usability category. They include improvement suggestions and findings that can be used to enhance usability of the MEFNS:

How could moving within MEFNS be improved?

- Location of the MEFNS inside MEF could be higher up so it would be easier to access.

- Location of the button used for moving in and out of MEFNS is not logical.
- The use logic could be completely different. Now it is outdated.

What in the MEFNS should be changed so that its structure would be more clear?

- Targeting messages for specific persons must be enabled inside the discussion forums. At the moment, it cannot be identified to whom the answers in the forums are directed to.
- In some windows the text is only partly visible.

How could the MEFNS functionality be improved so that access to information would be better and more easy?

- Calendar has to have week numbers.
- Word and PowerPoint files inside the documents folder cannot be edited directly. This should be improved.
- Adding attachments is not intuitive and files cannot be added to the bulletin part of the network page.
- Links do not open into a new window and hence when one closes the site of the opened link, one also closes MEFNS.
- Links cannot be added to the calendar.
- Chat functionality would make conversations easier.

If you have encountered errors, what type of errors?

- Logging into the MEFNS has not been effortless even for the persons that are working inside the MEAE Group. If logging into the system is not easy, it is going to be challenging to motivate people to use the system.

What are the situations when you have been unsure whether the function was successful?

- It is not always clear whether the functions have succeeded or not.

- When leaving a comment.
- When inviting new members to the network.

8.3 Utility

This sub-chapter presents the results from the utility part of the questionnaire. The results are presented, identically as in the usability sub-chapter, in three stages.

Table 6 displays the mean scores MEFNS received from utility part of the questionnaire.

TABLE 6. Color coded mean table of the scores within the utility part of the questionnaire. Scale between 1-4 (1 = I disagree completely, 4 = I agree completely).

	N=19
WORKING AS AN INDIVIDUAL	2,58
I get my work done more easily than before	2,29
I get my work done faster than before	2,21
Information that I need in my work is found more easily	2,87
Saving and sharing information that I need in my work is more easy	2,93
WORKING IN A VIRTUAL TEAM	3,18
MEFNS promotes well collaboration between team members	3,06
MEFNS makes setting and executing common goals easier	2,86
MEFNS makes communicating between team members easier	3,13
MEFNS promotes flexibility in the working methods according to work requirements	3,00
MEFNS helps to learn new knowledge	3,25
MEFNS helps to transfer needed information to team members	3,56
MEFNS enables using mostly electronic channels in team work	3,31
BENEFITS	2,65
I am satisfied with the current level of operation of MEFNS	2,57
MEFNS is pleasant to use	2,56
I would recommend using MEFNS to my colleagues	2,81

Good grades in utility category go to learning and transferring knowledge. Centralized file and calendar sharing in an information secure environment, according to the respondents, makes knowledge more easily

available. Also saving and sharing information needed in the work duties are regarded easier than before.

The worst grades in MEFNS utility category go to effectiveness of work. Lack of routine initially slows working in the MEFNS down. Multiple respondents indicate that there are challenges to motivate people to use the service because logging in is seen as cumbersome. Some of the users need to do more work because all colleagues do not visit MEFNS regularly.

Following is a selection of comments from the open-ended questions:

What complicates work routines and information management inside the MEFNS?

- Logging into MEF is cumbersome.
- My work is very mobile and the service should also work in mobile devices as I don't have much time to stay in the office.
- Lack of routine slows down working within the MEFNS.

How does the MEFNS support collaboration and communication within the team?

- Possibility to discuss supports collaboration and communication.
- Calendar!

What in the MEFNS complicates collaboration and communication within the team?

- The system is slow in producing information as it is not constantly open and monitored.
- Not meeting face-to-face.

Is it needed to use other communication / file transfer services in addition to the MEFNS?

- Lync and video calls are still in use.
- Email is still needed.
- Calendar

What additional features would be needed in the MEFNS to make working as effective as possible?

- Chat feature would make collaboration and working on documents more easy.
- Already reported errors in the system need to be fixed as soon as possible. We in group x do not dare to ask the team members to use the MEFNS again before the functionality has been fixed.

8.4 General Feedback

This sub-chapter presents the general feedback acquired through the questionnaire survey. Generally speaking MEFNS is regarded as a good platform although it obviously still needs more development. Activating people and enterprises to use the service is currently seen as very problematic. Some of the respondents found that it was too early to give feedback because the service had not been in use a sufficient amount of times.

9 DISCUSSION AND RECOMMENDATIONS

This chapter provides analysis of what the survey results presented in the previous chapter mean, discusses the reliability and validity of the study, and gives recommendations based on the analysis.

The analysis aims to answer the research problem and questions laid down in the beginning of the thesis, and is divided accordingly. There are, however, two general observations that need to be mentioned first.

Firstly, based on the survey questionnaire results, more than 70 percent of the respondents had used the MEFNS 1-2 times per month or less. As the pilot testing period was active slightly over a month before the questionnaire was initiated, this equals that most of the users that answered the questionnaire had only used the MEFNS a total of 1-2 times, on average. The reason for a fairly low usage rate is likely a result of multiple factors, including but not limited to:

- Several respondents implied that it was very hard to activate the group members to log in to the MEFNS and utilize the service in their work.
- Several respondents also stated that logging into MEF with bank credentials was seen cumbersome.
- One group leader indicated that he or she would not dare to ask the group to use the MEFNS before previously reported errors in the user interface are fixed.

Irrespective of the reasons behind the low usage rate, the result is that the respondents have most likely not been able to acquire a profound level of experience on working within the networks of the MEFNS. Therefore, the amount and informational depth of data that could be collected in this particular research is also limited. This should not have a large impact on the validity of respondents' findings that were collected as data, especially on the identified usability errors, but mostly on the amount of data that could be collected.

Secondly, one respondent's indication about the service's outdated design seems very alarming. Although the observation is only based on one respondent's experience, it suggests that there could already be services available that are more sophisticated and easy to use. In this case, the developers need to identify whether it is feasible to develop the current version of MEFNS or are there alternatives available that offer a more modern use logic to begin with.

9.1 Answers to the Research Problem and Questions

The main research problem concerns the usefulness of the MEFNS, which is a combination of its usability and utility.

How useful is the My Enterprise Finland Networking Section in its intended use as an online collaboration tool?

Unfortunately, the experienced usefulness level of the pilot version of the MEFNS boils down to be quite unsatisfactory. This is due to the fact that there is much room for improvements in both usability and utility aspects of the service. The low level of usefulness is also likely reflected in the modest usage rate of the service – most respondents tried the service once or twice but decided not to try using it more extensively in their work duties.

The first research question concerns the level of usability of the MEFNS, which answers how well do the tools currently available in the MEFNS function according to the users' experience.

What is the level of usability of the Networking Section?

Overall, the usability of MEFNS requires a manifold of improvements (which is quite natural for software that is in its pilot testing phase). The situation is not terrible by any means, as the MEFNS pilot development users rate usability decent for e.g. text font and size, as well as color usage and discussion forum features. Even so, from developmental point

of view – and while utilizing Nielsen’s heuristics as guiding precept for the research – it is not essential at this stage to concentrate on what is positive in MEFNS’s usability. In this paradigm, the aim is to point out the areas that need improvement the most so they can be corrected during the first iteration of development process.

Based on the collected data there are multiple findings that fail the heuristic evaluation, presented in table 7.

TABLE 7. Identified failures and their corresponding heuristic categories.

Heuristic	Failure
Visibility of System Status	When a function succeeds to operate it is not always clear to the user.
User Control and Freedom	Moving into and out from the networks within the MEFNS is not very fluent. There are some missing functionalities that the users would like to have that would ease the usability of the MEFNS.
Error Prevention	Users encounter a number of different errors that are confusing and for which help documentation is not being provided or easily findable.
Recognition Rather Than Recall	
Help Users Recognize, Diagnose, and Recover from Errors	
Help and Documentation	
Flexibility and Efficiency of Use	Finding information inside the network is not particularly easy.

Correcting the failures will improve the usability of MEFNS. Following is a list of recommendations for consideration and action:

- Correct the errors identified and listed during testing in a prioritized order relative to their severity and probability.
- Make sure that the error messages for errors that cannot seem be reasonably avoided are very clear and informative.

- Make sure that the user always knows whether the operated function succeeds or not. Use labels, message boxes, or other suitable means to communicate and deliver information about function success.
- Enable a search functionality that can be operated within the MEFNS networks.
- Enable responding and answering to a particular message in the discussion forums by allowing quoting the message. Ideally the quoting could be done by using a specific button that allows the user to choose which message he or she wants to quote.
- Determine a place for the MEFNS inside the MEF that makes it readily available and easier to access than before.
- Make sure that moving in and out of MEFNS is fluent and there are easily identifiable visual cues that tell the user what their current location is.
- Add week numbers to the calendar display and enable calendar markings to have embedded content and links.
- Force links that are not used for internal navigation to open in new window.

The second research question concerns the level of utility of the MEFNS, which generally answers what is the balance between the tools currently available in the MEFNS and what tools the users regard as needed.

What is the level of utility of the Networking Section?

The respondents' opinion about the utility of the MEFNS is twofold. On the bright side, the MEFNS is regarded as an instrument that enables online collaboration and especially transfer of knowledge fairly well. The downside is that its utility is regarded quite poor on the individual level – working is slower and harder than without utilizing the MEFNS and the service is not very pleasant to use.

The main issues in the utility of the MEFNS are as follows:

- Logging into the MEF is regarded so laborious and difficult that it lowers the utility of the service altogether. When people do not use the service its benefits cannot be utilized.
- Discussions can only be performed asynchronously. This causes shortcomings in the groups' ability to transfer information in real-time.
- Files cannot be viewed or edited directly in the documents section but need to be downloaded first.

Following are the recommendations to improve the utility of the MEFNS:

- Add means for synchronous communication that allows the users to discuss real-time. Chat feature would be beneficial but option to perform calls, with or without video, would be even better.
- Examine the possibility to add functionality to preview all common file types inside the MEFNS. This allows the users to instantly see the contents instead of needing to download the files.
- Examine the possibility to edit files directly within browser. A possibility to group edit the files simultaneously and real-time would be even better.
- Educate and inform the user base about the other available means of identifying oneself at the secure login, such as mobile certificate i.e. Mobilivarmenne.

The third research question concerns the current functionalities within MEFNS that are the most useful.

What are the current tools within the Networking Section that best support inter-organizational collaboration?

According to the results, the two most useful tools are the documents and the discussion forum.

The documents section is seen as a great tool in storing and sharing documents of confidential nature. Still, as already stated above, the editing and viewing of documents is not particularly convenient.

Discussion forum is regarded useful for asynchronous communication between the group. Basic functionality of the forum still needs improvement.

The fourth research question concerns the functionalities of MEFNS that are missing and needed for effective electronic collaboration.

What are the tools missing from the Networking Section that would be needed for effective inter-organizational collaboration?

Based on the results, there is only one major shortcoming that can be identified immediately: lack of opportunity for synchronous communication. A chat option and other means of synchronous communication would be beneficial to enable faster transfer of information and try to fill the void of face-to-face contact.

9.2 Reliability and Validity

Research reliability determines how replicable and repeatable the results or observations are, and how accurately the total population is represented in the study. The reliability of this study has not been scientifically tested during research because it is not logically or statistically possible to indicate whether the results represent the opinions of the total population without conducting more studies that would (or would not) give similar results. The descriptive statistics calculated based on the collected data and the answers to the open ended questions hence only apply to the questionnaire respondents. Scientific reliability of this study remains undetermined, whereas, from the point of view of usability evaluation, there is no indication that the areas identified to require improvement would not be sound and representative of the views of the total population.

Research validity determines does the study achieve to measure what it intended measure and are the results truthful. In this study, there is a possibility for non-response bias that could have skewed the mean scores collected in the usability and utility categories. The possible bias does not, however, affect the quality of the data that describes errors in the previously mentioned categories. The results clearly give answers to the presented research problem and questions, and are in line with other research results conducted by the author but not presented in this thesis. It can thus be stated that the research is valid.

9.3 Conclusion

The aim of this study was to provide MEAE actionable information about the usefulness of the MEFNS that can be further used to assist decision making on the development process of the service. The study achieves the aim and is able to provide several focus areas for improvement, including correcting the MEFNS failures in seven of Nielsen's ten heuristic categories and adding needed features such as means for synchronous communication. Correcting the factors that deteriorate the usefulness of MEFNS, as well as improving the areas that are already regarded to be quite usable, will undoubtedly have a positive effect on the service.

Although the study is successful in providing information, it is unlikely to provide helpful information at an optimal level because of shortcomings in the data collection method. The choice of utilizing survey questionnaire data collection in this study is based on available resources and the effort to cause minimal distraction towards the testers. From the data collection perspective, there are methods available that necessitate utilizing significantly more resources – and will cause more inconvenience towards the testers – but will also provide a larger volume of data that is also richer in its contents.

This study is not the end of the research activities needed to support the development of MEFNS but merely a scratch at the surface of all that is to

come. Recommendations on where the research activities should go from here are provided in the next sub-chapter.

9.4 Recommendations for Future Research

MEFNS presents a host of possible options for future research. It is a novel tool for electronic collaboration that needs, and allows, continuous development activities from both the technological side and the users' point of view. The full potential of MEFNS needs to be enabled through creating changes to the organization culture of the public-sector service providers that include the use of MEFNS as an integral part of their work. Creative and effective ways of utilizing MEFNS must be perceived to enhance realization of the economic benefits made possible by the technology itself.

Following are the author's five recommendations for future research that would help further develop and utilize the capabilities of the MEFNS.

Recommendation 1: *Conduct a usability expert evaluation*

First of all, it would be beneficial to conduct a usability expert evaluation on the MEFNS to locate the usability problems that need to be corrected instantly. This would give an objective view on the problems that are present, what should be done to correct them, and possibly a professional opinion on how feasible it is overall to start developing the MEFNS on this platform.

Recommendation 2: *Conduct a usability test*

In this study, the possibilities to utilize testers in a controlled way was rather limited because the test groups used the MEFNS to carry out a part of their work duties and their performance was mainly not observed on-site. Usability testing with users who do not have pressure to achieve concrete results with their work would be beneficial in finding usability problems in an effective way. The author thus recommends that, during

the next iterations of the development process, a usability test with users that are recruited explicitly to perform preconceived tasks should be conducted.

Recommendation 3: Conduct testing with full spectrum of end users

This study only included a narrow sample of the complete user base for which the MEFNS is targeted. The author recommends future usability testing and other research to be conducted, if possible, with a full spectrum of end users, including persons below 30 years of age and persons who are not a part of MEAE organization.

Recommendation 4: Study how to effectively utilize MEFNS

It would be beneficial to conduct research on how to effectively utilize MEFNS functionality from the customer service perspective. This includes e.g. creating guidelines on when and how to encourage the clients to use the MEFNS, examples on how customer service can be effectively conducted through MEFNS, and how to overcome possible trust issues and maximize the efficiency of working in virtual team.

Recommendation 5: Study how to effectively manage change in service model

Lastly, from the viewpoint of the MEAE Group – and in relation to shifting from the traditional service model towards utilizing primarily digital channels – research on how to effectively manage change within the organizations would be beneficial. Multiple respondents indicated that activating people to use the service is a highly challenging task. However, utilizing digital channels such as the MEFNS is essential in the new public service model. This change needs to be initiated, enforced, and supported by leadership within the organizations and will affect thousands of employees inside the MEAE Group. It seems that currently there are plenty of opportunities for research and action in this field.

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APPENDICES

APPENDIX 1. Original structure and questions of the questionnaire

VERKOSTOT-TUTKIMUS

YHTEISÖLLISYYS-TYÖKALUN PILOTOINTIVAIHE

KYSELYN RAKENNE JA KYSYMYKSET

Oma Yritys-Suomi –työtilan verkostot-osion pilotointivaiheen tutkimuksen kyselylomake jakaantuu neljään osaan. Ensimmäisessä osassa kysytään vastaajan taustatietoja, toisessa käytettävyyteen liittyviä tietoja, kolmannessa palvelun hyödyllisyyteen liittyviä tietoja ja viimeisessä vastaaja voi jättää vapaasti palautetta koko osiosta.

1. TAUSTATIETO

Taustatietoja kysymällä saadaan muodostettua kokonaiskuva vastaajista. Kysymykset monivalintana.

1. Vastaajan ikä
2. Pilottiryhmä
3. Rooli organisaatiossa
4. Tietoteknisen osaamisen taso
5. Päätelaiteet, joilla käyttää
6. Verkostot-osion käytön määrä (kuinka monesti on käyttänyt)

2. KÄYTETTÄVYYS

Käytettävyyttä arvioidaan mm. heuristiikan noudattamiseen liittyvillä kysymyksillä.

Kysymykset ovat sekä Likert-asteikolla (esim. täysin eri mieltä – täysin samaa mieltä, 5-portainen asteikko) vastattavia väittämiä, että avoimia kysymyksiä.

2.1. Navigointi

Väittämät:

1. Osiossa liikkuminen on loogista ja selkeää
2. Osion toiminnallisuudet on helppo oppia
3. Osion tärkeimmät toiminnot löytyvät helposti
4. Liikkuminen osion ja OYS-työtilan välillä on sujuvaa

Avoimet kysymykset:

1. Miten verkostot-osion sisällä liikkumista voisi helpottaa?

2.2. Ergonomia

Väittämät:

1. Tekstifonttia on helppo lukea
2. Teksti on sopivan kokoista
3. Osioissa käytettävät termit ovat ymmärrettäviä ja johdonmukaisia
4. Osion värit helpottavat kokonaisuuksien erottamista
5. Näen helposti missä verkoston osiossa olen
6. Verkoston toiminnot toimivat tarpeeksi nopeasti
7. Haku-toiminnallisuudet toimivat hyvin
8. Työskentely verkostossa on tehokasta ja nopeaa
9. Verkoston perustaminen ja hallinnointi on helppoa

Avoimet kysymykset:

1. Mitä verkostot-osiossa pitäisi muuttaa, että sen rakenne olisi selkeämpi?
2. Mitkä osion toiminnot ovat erityisen selkeitä käyttää?

2.3. Palaute ja virhetilanteet

Väittämät:

1. Saan selkeän palautteen tekemiäni toimintojen onnistumisesta
2. Verkostot-osiossa ei tule eteen virhetilanteita
3. Virheilmoitukset ovat selkeitä ja helposti ymmärrettäviä
4. Virheistä eteenpäin raportointi on helppoa

Avoimet kysymykset:

1. Millaisissa yhteyksissä on ollut epäselvää, onko tekemäsi toiminto onnistunut?

Jos olet kohdannut virheitä,

1. Millaisia virheitä olet kohdannut eniten?
2. Miten vakavana koet kohdatut virheet?

2.4. Tiedon löytyminen

Väittämät:

1. Löydän tarvitsemani tiedon tai asiakirjat helposti
2. Asiakirjojen käyttö on helppoa
3. Kalenterin ominaisuudet ovat riittävät käyttööni
4. Dokumenttien hallinnan ominaisuudet ovat riittävät käyttööni
5. Keskustelun ominaisuudet ovat riittävät käyttööni
6. Näen helposti mistä verkostoissa on keskusteltu edellisen vierailuni jälkeen
7. Löydän osion käyttöohjeet tarvittaessa nopeasti

Avoimet kysymykset:

1. Miten verkostojen toiminnallisuuksia voisi parantaa, jotta tieto olisi paremmin ja helpommin käytettävissä?

3. HYÖDYLLISYYS

Hyödyllisyyteen liittyvät kysymykset selvittävät miten hyödyllinen verkostot-osio on käytännössä. Kysymykset ovat sekä Likert-asteikolla (esim. täysin eri mieltä – täysin samaa mieltä, 5-portainen asteikko) vastattavia väittämiä, että avoimia kysymyksiä.

3.1 Henkilökohtainen työskentely

Väittämät:

1. Saan tehtyä työtehtäväni helpommin
2. Saan tehtyä työtehtäväni nopeammin

3. Työssä tarvitsemani tieto löytyy helpommin
4. Työssä tarvitsemani tiedon tallentaminen on helpompaa

Avoimet kysymykset:

1. Miten verkostot-osio parantaa työssä tarvitsemasi tiedon hallintaa?
2. Mikä verkostot-osiossa vaikeuttaa työskentelyrutiineita ja tiedon hallintaa?

3.2 Verkostomainen työskentely

Väittämät:

Verkostot-osio...

1. Tukee hyvin yhteistyötä toimijoiden kesken
2. Helpottaa yhteisten tavoitteiden asettamista ja toimeenpanoa
3. Helpottaa viestintää toimijoiden kesken
4. Parantaa tilanteen mukaista joustavuutta työskentelytavoissa
5. Auttaa oppimaan uutta tietoa
6. Auttaa siirtämään tarpeellista tietoa muiden käyttöön
7. Mahdollistaa verkoston työskentelyn suurimmaksi osaksi sähköisesti

Avoimet kysymykset:

1. Miten verkostot-osio tukee yhteistyötä ja toimijoiden välistä viestintää?
2. Onko verkostot-osion lisäksi tarve käyttää muita viestintä-/tiedonsiirtoratkaisuja? Mitä?
3. Mikä verkostot-osiossa vaikeuttaa toimijoiden välistä yhteistyötä ja viestintää?
4. Mitä ominaisuuksia verkostot-osiossa tarvittaisiin, jotta verkoston työskentely olisi mahdollisimman tehokasta?

3.3 Hyödyt

Väittämät:

1. Olen tyytyväinen verkostot-osion toimivuuteen
2. Verkostot-osiota on miellyttävä käyttää
3. Suositteaisin verkostot-osion käyttöä kollegalleni

Avoimet kysymykset:

1. Mitkä ovat verkostot-osion parhaat hyödyt?
2. Mitkä ovat verkostot-osion suurimmat heikkoudet?

4. YLEINEN PALAUTE JA YHTEYSTIEDOT

Yleisessä palautteessa neuvoja voi antaa palautetta yhteisöllisyys-työkalusta kokonaisuutena. Tähän osioon voi tulla yllättävää ja tärkeää palautetta aiheista, joista ei ole erillistä kysymystä. Kysymys on avoin.

1. Yleinen palaute ja terveiset verkostot-osion kehittäjille.
2. Yhteystiedot, jonne kiitoslahja kyselyyn vastaamisesta toimitetaan:
 - Nimi
 - Postitusosoite

APPENDIX 2. List of usability evaluation methods

Usability evaluation methods listed with their general attributes. Marking x indicates the attribute is commonly standing, (x) that it is occasionally standing. Marking “some” users implies that the method does not have a defined number of users. (Ovaska et al. 2005, 8.)

Methods	End users present				Data collection environment		
	No	Users are observed	Number of users at a time	Total number of users needed	Laboratory or researcher's location	Field observation in authentic settings	Remotely, using telephone or Internet
Expert evaluation	x				x		
Automatic inspection	x				x		
Automatic log analysis				tens	x	x	x
Ethnography		x	1 or many	depends on association		x	(x)
Focus groups			6-8		x		
Interview			1	some		x	x
Eye tracking			1	3-n	x		
Cognitive walkthrough	x				x		
Usability testing		x	1	3-n	x		(x)
Questionnaire research				tens			x
Modeling and simulating methods	x				x		
Pluralistic walkthrough		(x)	2-3		x		
Contextual inquiry		x	1	3-9		x	
Activity theory		x	1-n			x	
Thinking aloud		x	1	some	x	(x)	

APPENDIX 3. Questionnaire questions vs. Nielsen's usability attributes

Questionnaire Likert-scale questions color coded with Nielsen's usability attributes they are primarily and secondarily intended to measure.

NAVIGATION		
Moving inside MEFNS is logical and clear		
Functionalities of MEFNS are easy to learn		
The most important functions of MEFNS can be easily found		
Moving between MEFNS and MEF is fluent		
ERGONOMICS		
Text font is easy to read		
Text size is appropriate		
Terms used in MEFNS are understandable and consistent		
Colors used in MEFNS ease identifying different bodies and parts		
I can easily distinguish in which part of MEFNS I am		
Functionalities of MEFNS operate at a sufficient speed		
Search functionality works well		
Working inside MEFNS is fast and efficient		
Setting up and administering a network is easy		
FEEDBACK & ERRORS		
I receive clear feedback on function success		
I do not experience error situations in MEFNS		
EXPERIENCED ERRORS		
Error messages are clear and easily understandable		
Reporting forward about error situations is easy		
FINDING INFORMATION		
I can find needed information easily		
Calendar features are sufficient for my use		
Using documents is easy		
Document administration features are sufficient for my use		
Discussion forum features are sufficient for my use		
I can easily see what has been discussed in the network since my last visit		
I can find help and manuals easily when needed		
	Learnability How easy the system is to learn so that the user can rapidly start getting some work done with the system.	
	Efficiency How efficient the system is to use once learned.	
	Memorability How easy the system is to remember so that a casual user is able to return and use the system after some period of not using it.	
	Errors How many errors there are in the system and how easy it is to recover from them.	
	Satisfaction How satisfied users are to use the system, how much the users like the system.	
	Utility How useful the system's functionality is in its intended use.	
WORKING AS AN INDIVIDUAL		
I get my work done more easily than before		
I get my work done faster than before		
Information that I need in my work is found more easily		
Saving and sharing information that I need in my work is more easy		
WORKING IN A VIRTUAL TEAM		
MEFNS promotes well collaboration between team members		
MEFNS makes setting and executing common goals easier		
MEFNS makes communicating between team members easier		
MEFNS promotes flexibility in the working methods according to work requirements		
MEFNS helps to learn new knowledge		
MEFNS helps to transfer needed information to team members		
MEFNS enables using mostly electronic channels in team work		
BENEFITS		
I am satisfied with the current level of operation of MEFNS		
MEFNS is pleasant to use		
I would recommend using MEFNS to my colleagues		