

UTRECHT UNIVERSITY
Department of Information and Computing Sciences
Human Computer Interaction
12 July 2021



Nicole van den Dries 5639050

USABILITY EVALUATION OF AN ERP SYSTEM

First Supervisor

Prof. Dr. Albert Salah

Second Supervisor

Dr. Christine Bauer

External Supervisor

Drs. ing. Erik van de Ven

Abstract

Enterprise resource planning systems are complex systems that are used to manage business processes in real time. The goal of implementing an ERP system is to increase the efficiency of business processes. However, low usability can decrease the efficiency of the employees working with the system. There are many different methods to evaluate the usability of systems. The goal of this study is to find what type of Usability Evaluation Methods (UEMs) are suitable for evaluating ERP systems in a company setting. As a use case AFAS Focus is used to conduct the UEMs. A literature review was conducted to find what type of UEMs exist and what kind of feedback they provide. Based on the literature review, three methods were chosen to perform for this study. To obtain qualitative data, user tests were performed. Six people participated in the user tests. To obtain quantitative data, the system usability scale and WalkMe were used. WalkMe is a platform where, among other things, button clicks of the users can be tracked. To structure the qualitative data from the user test, statements from the participants were coded. The number of references per code gave insight in what the participants find important in the ERP system. WalkMe allowed to track the behaviour of all users, giving insight in what navigation paths the users choose and how often functionalities are used. The main results from the usability evaluation show that users would prefer to be able to customise the views in the system, accountants and clients have different needs in an ERP system, and that users navigate through the system in a way they are familiar with, not using the quickest route. To conclude, the used usability evaluation methods are valuable tools to find usability problems in the systems and using a tool such as WalkMe can automate a part of the usability evaluation process. Not only making the system more efficient to work with, but also making the evaluation process more efficient.

List of Abbreviations and Terms

Effectiveness	The accuracy and completeness with which the user is able to complete tasks
Efficiency	The expanded resources in relation to the effectiveness when it comes to completing the users goals
ERP	Enterprise Resource Planning
Error rate	The amount of mistakes made during a user test.
Error recovery	How well or quick the user is able to recover a mistake made during a user test.
Learnability	How easily a user is able to learn to work with a system
Memorability	How well the user is able to use the system proficiently after a long period of not working with the system.
OEM	Ontological Enterprise Model
SUS	System Usability Scale
Task completion time	The time it takes to complete a given task during a user test.
UEM	Usability Evaluation Method
UI	User interface
UML	Unified Modeling Language
Usability	"The 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" (Jokela, Iivari, Matero, & Karukka, 2003, p.54).
Usability problem	Anything in the system that the causes the user to be very confused or things the user of the system does not expect to happen at a certain moment.
UX	User experience

Table of Contents

List of Figures	6
List of Tables	8
1 Introduction	9
1.1 Definitions	9
1.2 ERP systems	10
1.3 Research Questions	13
1.4 Organisation of the Thesis	15
2 Literature Review	16
2.1 Software Usability	16
2.2 Usability Evaluation Methods	18
2.2.1 User Testing	19
2.2.2 Usability Inspection Methods	22
2.2.3 Inquiry Methods	23
2.3 Usability Guidelines for ERP Systems	25
2.3.1 Navigation	25
2.3.2 Learnability	25
2.3.3 Error Messages	26
2.3.4 Documentation	26
2.3.5 Balance between all aspects	27
3 Case Study: The Focus ERP System of AFAS Software	29
3.1 Architecture of Focus	29
3.2 Existing solutions for usability testing of Focus	31
4 Methodology	34
4.1 Participants	35
4.2 Tasks During the User Test	35
4.3 The System Usability Scale	36
4.4 Coding the Recordings	36
4.5 System Log Analysis	37
4.6 Log Analysis and Surveys Using WalkMe	37
4.7 Materials	39
4.8 Protocol	39

4.8.1	Pilot Study	40
4.9	Results Analysis	40
5	Results	42
5.1	Coding	42
5.2	System Usability Score	45
5.3	WalkMe	46
6	Discussion	49
6.1	User Tests	49
6.2	System Usability Scale	50
6.3	WalkMe	51
6.4	Limitations	51
7	Conclusion	53
7.1	Future Work	54
	References	56
A	Creating a sales invoice	61
B	Protocol	67
B.1	Calculation of the SUS scores	71
C	Results	72

List of Figures

1	Home screen of AFAS Focus including the navigation menu (test environment).	11
2	Home screen of SAP Business One.	12
3	Home screen of Visma Mamut One.	12
4	Home screen of Exact Online.	13
5	Flowchart of the iterative usability testing process.	15
6	Graph showing that each additional user provides fewer new usability problems.	18
7	A comparison of the adjective ratings, acceptability scores, and school grading scales in relation to the average SUS score (Bangor et al., 2009).	24
8	Spider chart showing an example of different Pareto optimalities.	27
9	Focus software generation approach.	29
10	Model to application.	30
11	Model of a sales invoice in the sales work field.	30
12	Navigation menu showing the work fields.	31
13	Navigation menu showing the work fields and their objects.	31
14	Four different types of participants for the user tests.	35
15	Save button for sales invoice.	38
16	Number of references per code per category.	42
17	Number of references per code from the Suggestion code.	43
18	Visualisation of the amount of times a navigation path to creating a new sales invoice was used from June 1 2021 until June 30 2021.	46
19	Amount of interaction with the buttons: Go to Help, Modify, and Cancel in the week of 28 June - 4 July.	47
20	Funnel for creating a sales invoice.	48
21	UML Activity diagram of creating and sending a sales invoice in Focus.	61
22	UML Activity diagram detail of 'enter information' in Figure 21.	62
23	Home screen of Focus (demo environment).	63
24	Spotlight function of Focus (demo environment).	63
25	Home screen of Focus with navigation menu on the left side (demo environment).	63
26	Sales invoice page of Focus (demo environment).	64

27	New sales invoice page of Focus (demo environment).	64
28	Adding a client to a sales invoice (demo environment).	64
29	Adding a product to a sales invoice (demo environment).	65
30	Additional options to a product (demo environment).	65
31	Different ways to save and send a sales invoice (demo environment).	65
32	A saved sales invoice (demo environment).	66
33	A sent sales invoice with PDF preview (demo environment).	66

List of Tables

1	Four different ERP products and their different modules.	11
2	10 Usability Heuristics by Nielsen and Usability Heuristics for ERP systems by Singh & Wesson.	22
3	Values for the example of Pareto optimality.	28
4	Overview of the codes, their description, and an example of a statement made by a participant.	44
5	SUS scores of the participants.	45
6	Average completion between steps of the funnel in Figure 20.	48
7	Dutch translation of the SUS.	68
8	Dutch translation of the SUS altered.	69
9	Original SUS.	71

1. Introduction

Enterprise resource planning (ERP) systems are complex systems that are used to manage business processes in real time. ERP systems can include business processes in areas such as: financial accounting, human resources, supply chain management, order processing, and manufacturing. The goal of implementing an ERP system is to increase the efficiency of these processes by automating processes and having all data in one central database. However, if the users find the system too difficult to work with or cannot find the functionalities they need, ERP systems can even decrease the efficiency of the business processes (Parks, 2012).

ERP systems are typically designed to increase the efficiency of the customer's business processes, without keeping the end users in mind (Parks, 2012). The customers of ERP systems are often not the end users of the system (Arnowitz, Heidelberg, Gray, Arent, & Dorsch, 2005). Customers are CEOs or managers who decide which product suits their company best and has the lowest price. The employees who will work with the system on a day-to-day basis are the end users of the system. Forgetting to include the end user while designing a system can lead to usability and acceptance problems when implemented in the company. Evaluating the usability of the system after the implementation can help to find usability problems as well, which can be changed in the system in later updates (Arnowitz et al., 2005).

1.1 Definitions

When evaluating usability, it is important to know what definition of usability is used as there are many formal definitions. A much used definition is the ISO standard 9241-11 (Jokela et al., 2003). The ISO standard definition of usability states: "the 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" (Jokela et al., 2003, p.54). This definition shows that usability contains many different attributes that all need to be evaluated to determine what the quality of the usability of a system is. For each attribute of this definition there are several existing evaluation methods. All methods chosen should not only be able to evaluate the usability well, they should also suit the system, the situation, and environment in which the evaluation takes place.

In order to evaluate the usability of systems, usability evaluation methods (UEMs) can be used. Depending on the usability evaluation method used, the type of data produced can

differ greatly. The time, effort, and other resources required to invest can vary greatly as well. Therefore UEMs should be chosen to fit the goal of the study.

When exploring a subject, interviews producing qualitative data can be very valuable. During an interview, the interviewee can give more insight in what they would expect from a system and what they would like or dislike. This does take a lot of time, but the data is very valuable. When evaluating how satisfied users are in general with a system, a questionnaire that produces quantitative data can be used. Answers to a questionnaire can be easily converted into numbers which can show an average score of satisfaction. This is a way to quickly collect data from many people. However, there is no way of knowing the reason why the users are satisfied with a system or not.

Other aspects related to the usability of ERP systems are learnability (Umble, Haft, & Umble, 2003), navigation (Wong, Veneziano, & Mahmud, 2016), feedback (Topi, Lucas, & Babaian, 2005), and documentation (Scott, 2008). Learnability is an attribute that occurs in many different definitions of usability (Dubey & Rana, 2010). Learnability indicates how easily a user can learn to work proficiently with the system (Nielsen, 1993). Navigation relates to how easily a user can find certain functionalities, not only by making the interface easy to work with, also by making sure the functionalities are located where the user would expect them (Singh & Wesson, 2009). Error messages are another important aspect in ERP systems. Error messages should be understandable for the user, so they can recover their mistakes quickly or know who to contact to fix the error (Topi et al., 2005). Documentation of a system is an important aspect for usability as well. When a user has some questions about a functionality, the answers should be easy to find in the documentation. When documentation is perceived as useful and easy to use, users are often more satisfied with the system itself (Scott, 2008).

1.2 ERP systems

ERP systems can be used by many different types of companies. However, not all companies have many different business processes or only focus on one type of process, such as sales or manufacturing. To make ERP systems suitable for each company, ERP systems are often divided into different modules. This allows the customer to purchase only the modules they need or when needed all processes can be managed from one application. Working with one system and database for many different processes can make working with it easier and more efficient as all modules have the same look and feel (AFAS, 2021).

Table 1. Four different ERP products and their different modules.

Products	Modules
AFAS Focus	Sales ¹ , Purchasing ¹ , Taxes, Financial, Payments, Fixed assets
Exact Online (Exact, 2019)	Accounting, Wholesale, Manufacturing, Accountancy, Time & Billing, Project Management
SAP Business One (SAP, 2020)	Financial management, Sales and customer management, Purchasing and inventory control, Analytics and reporting, Industry Solutions
Visma Mamut One (Visma, 2016)	Financials, Sales Management, CRM, HR, E-commerce, Purchasing, Management Reports, Time Management

Table 1 shows four different ERP products and the different modules they contain. These four ERP system are developed by large ERP software companies and are used by many different companies. This selection is only a very small fraction of all existing ERP systems. The products in Table 1 contain mostly the same types of modules, however, all companies give them slightly different names or have two modules where other companies have combined these. For example, SAP Business One has a module Sales and customer management where Visma Mamut One has two modules, one named Sales Management and one named CRM (Customer Relationship Management).

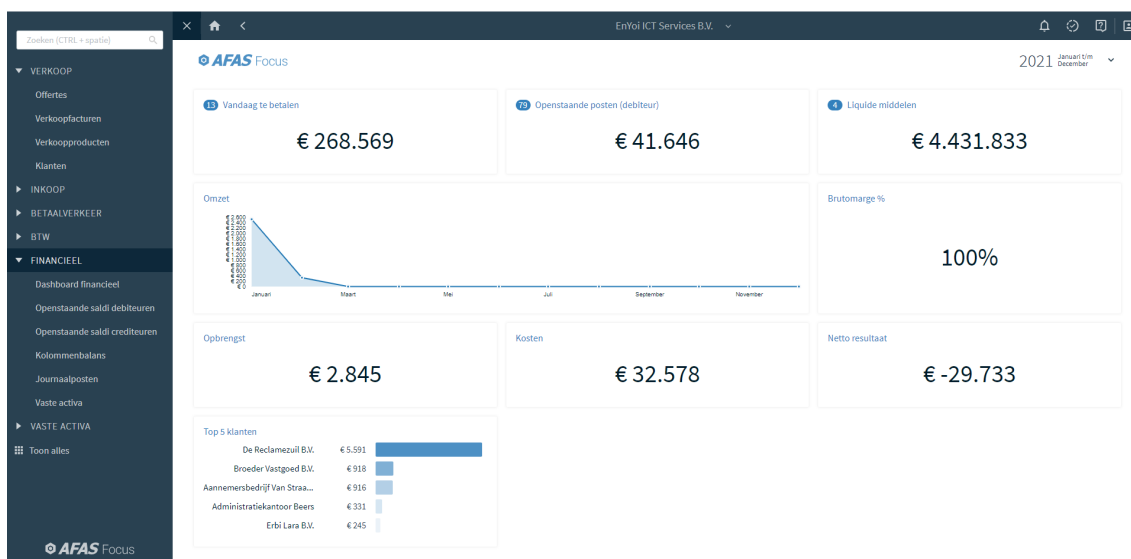


Figure 1. Home screen of AFAS Focus including the navigation menu (test environment).

Figure 1 shows the home screen of AFAS Focus, an ERP cloud application. The navigation menu shows the different modules and underlying functionalities the application contains. The home screen contains Key Performance Indicators (KPIs), which allow the user to quickly see all values and statistics they find important. AFAS Focus will be used

¹These functionalities are still being developed, thus very limited at this point.

in the use case in this thesis and will be discussed in more detail in Chapter 3.

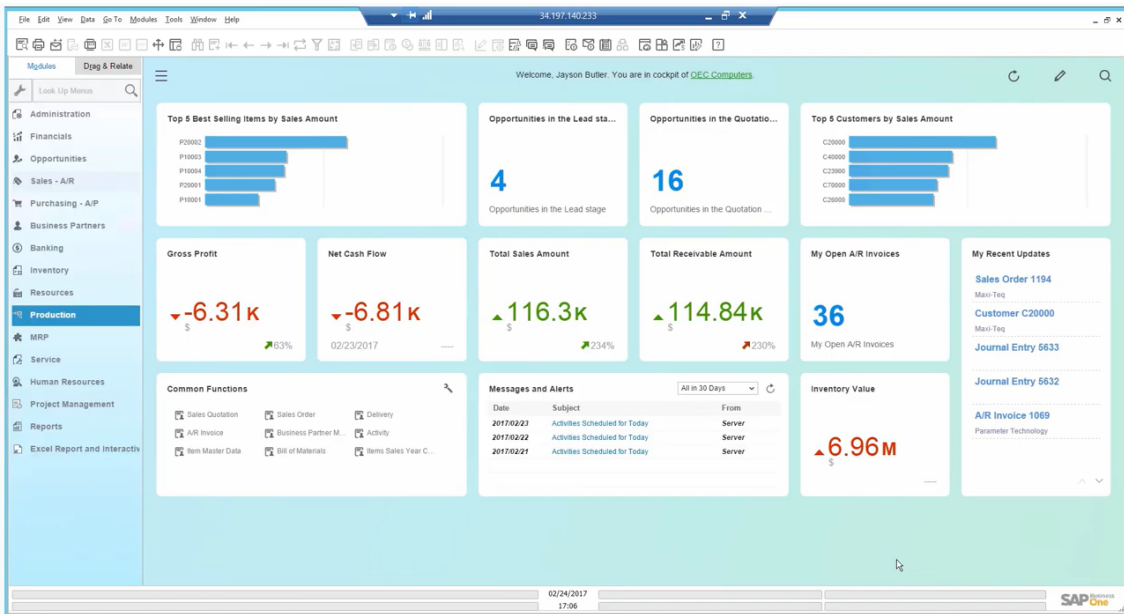


Figure 2. Home screen of SAP Business One (SAP, 2020).

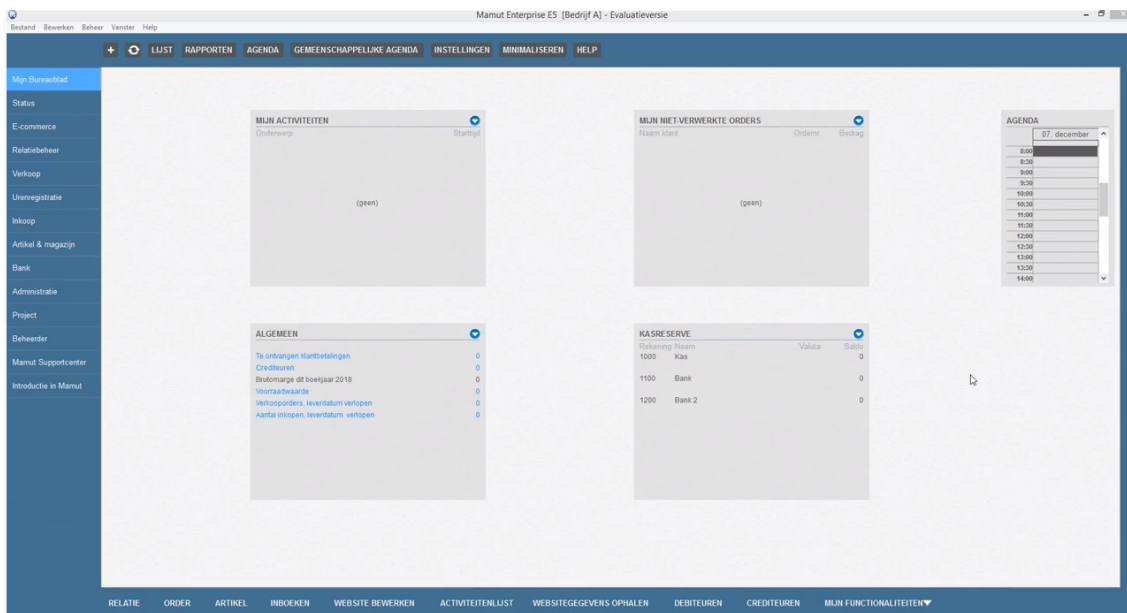


Figure 3. Home screen of Visma Mamut One (Visma, 2016).

Figures 2, 3, and 4 show the home screen of SAP Business One, Visma Mamut One, and Exact Online. At a glance all systems look quite similar: the home screens all contain KPIs or statistics and the navigation menu shows all different modules or functionalities that can be accessed. The systems by SAP and Visma are desktop applications, their home screens contain more buttons than the systems by AFAS and Exact. The ERP systems by AFAS and Exact are both cloud applications that can be accessed via a browser, these applications have a more simplified user interface (UI) like most websites have. Exact Online differs from the three other user interfaces regarding the navigation menu, as Ex-

act Online has a horizontal navigation menu at the top of the page and the other three interfaces contain a vertical navigation menu on the left side of the screen. The SAP and Visma applications have a large amount of items in the top layer of the navigation bar. The AFAS and Exact applications have one menu item per module and all underlying functionalities of the modules can be found when the module is selected in the menu.

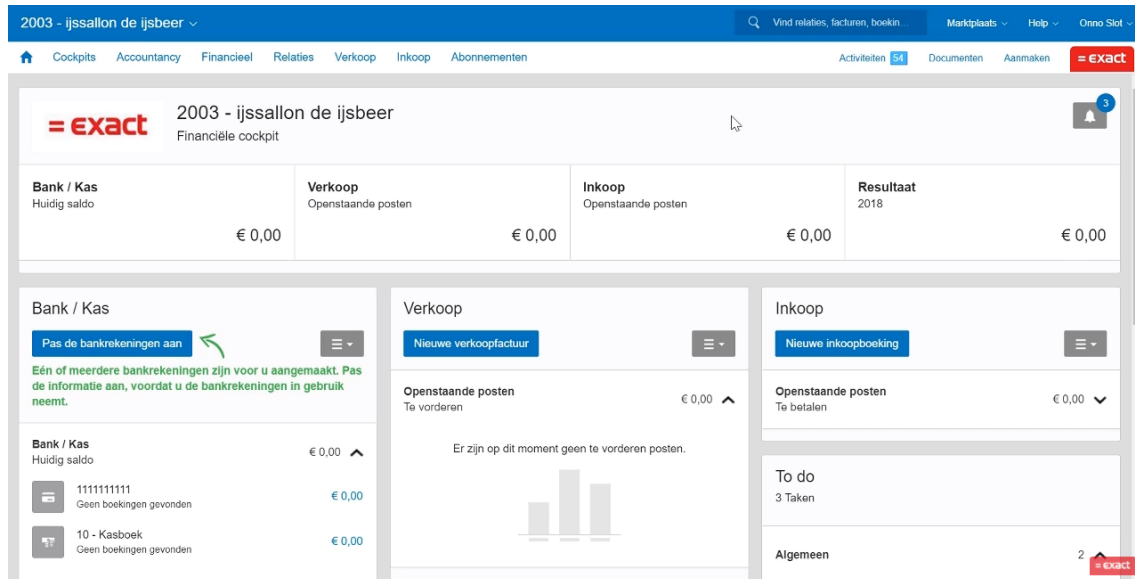


Figure 4. Home screen of Exact Online (Exact, 2019).

1.3 Research Questions

A lot of usability evaluations for ERP systems and other complex systems are conducted during the design phase. Usability evaluations in the design phase are very important. However, continuous usability evaluation is important to make sure updates in a system do not negatively affect the usability for the end users of the system. In company settings, it is important that the usability test can be performed within a limited time to keep up with frequent software updates. Keeping track of how the current version of the system is used can also give insight in what functionalities or parts of the interface might have to be evaluated again. This leads to the following research questions.

RQ1: Which software usability evaluation methods can be used to perform usability tests in a company setting where the said software is updated regularly?

RQ1a: What types of usability evaluation methods have been used successfully in prior usability studies of ERP systems?

RQ1b: What evaluation and visualisation approaches can be used to measure improvements in software usability?

RQ2: Which user evaluation dimensions are more important for an ERP software, and what are the minimum requirements for each of these dimensions?

RQ2a: Can the existing system logs be used to successfully identify usability problems in ERP systems?

RQ2b: If needed according to RQ2a, what additional information can be added to the system logs to successfully identify usability problems?

RQ3: As a use-case, what are the best practices for evaluating AFAS Focus ERP system?

RQ3a: How do we measure the usability dimensions in AFAS Focus?

RQ3b: What kind of data is produced and not produced during the existing usability test of AFAS Focus?

RQ3c: How can data collection and testing be improved for AFAS Focus?

RQ4: How can the usability of AFAS Focus be improved?

The purpose of RQ1 is to identify which usability methods exist and if they are suitable to use on an ERP system and in a company setting. The sub questions help break down the main research question. For sub questions RQ1a and RQ1b, a literature study is needed to identify existing UEMs and which have been successfully used in usability studies for ERP systems and which evaluation and visualisation techniques are used to measure general software usability. For RQ2, the evaluation dimensions or aspects of ERP systems need to be identified and their importance related to the other dimensions. Additionally to the dimensions, analysing the system logs might provide more information about the usability of the system. Sub questions RQ2a and RQ2b are focused on how system logs can help find usability issues. RQ3 focuses on the use-case of AFAS Focus. The purpose of RQ3a is to identify how the different dimensions can be measured in AFAS Focus. RQ3b has to give insight into what data is produced during the existing usability tests and what data is missing or could be produced. The goal of RQ3c is to find if and how the existing data collection and testing procedures can be improved for AFAS Focus. Lastly, the purpose of RQ4 is to recommend changes to Focus based on the results of the usability tests that have been performed during this research.

In order to answer the research questions an iterative process for the usability testing is needed. Figure 5 shows a diagram of this process. Before the usability testing can start

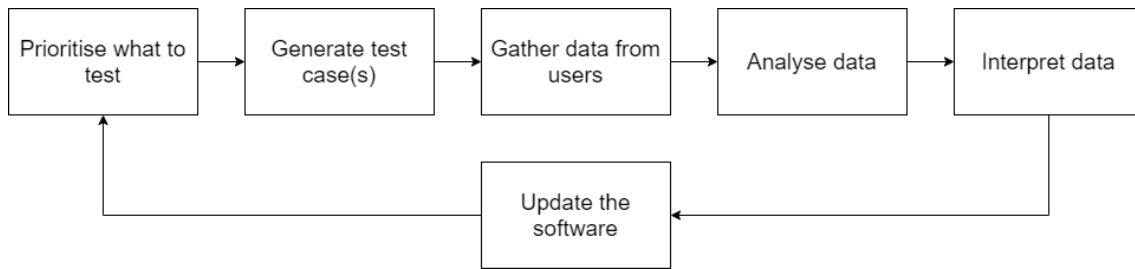


Figure 5. Flowchart of the iterative usability testing process.

is important to prioritise what to test. When a new functionality is released or when a functionality has changed, it is important to test its effect on the usability. Then test cases need to be set up to be able to consistently test these changes in the software. Thirdly, the usability test with these test cases need to be performed to gather data. Then this data will be analysed. Lastly, interpretation of the analysed data takes place to decide what (parts of) functionalities are good and which need to be improved.

1.4 Organisation of the Thesis

To be able to answer the research questions, first a literature study will be done to gather information about usability in ERP systems and what usability evaluation method exist. Chapter 3 will explain how AFAS Focus works and how its usability is tested. In Chapter 4 the method used to evaluate Focus will be explained. In Chapter 5 the results of the study will be discussed. Chapter 6 will contain the discussion and limitations. At last, Chapter 7 will contain the conclusion and possible future work.

2. Literature Review

2.1 Software Usability

Usability is an important aspect for the success of software or a website (Nielsen, 2012). When the usability of a website is low and users are not able to find the information they expect to be present in a system or cannot find the information where they expect it to be, they will leave. Regarding software that should increase the productivity of users, bad usability will decrease the productivity as users will spend too much time looking for the right information or functionalities instead of getting their work done (Nielsen, 1993).

Usability has been defined many times, each time comprised of somewhat different attributes. In a study by Dubey and Rana (2010), 37 formal definitions with a total of 152 attributes of usability were analysed. This led to a frequency table with 22 attributes and a category 'others' for 24 attributes that only occurred once. The six most occurring attributes are learnability, satisfaction, flexibility, efficiency, effectiveness, and memorability. There is not one definition that contains all these attributes. When evaluating the usability of a system, it is important to use a definition of usability that contains the attributes most important for that type of system.

A well known definition of usability is the definition from Nielsen (1993). This definition contains the following attributes: learnability, efficiency, memorability, few errors, and satisfaction.

The attribute learnability is about how easy it is for the end user to learn how to work with the system. Clear navigation or a well documented help page could improve this for example. However, the mental model of the end user should be kept in mind when designing for good learnability. Each user creates a mental model throughout their life while working with different systems. This mental model influences how quickly a new system can be learnt. A new system, that has very good usability in theory, can still be difficult to learn for an end user when it deviates from their mental model (Van Der Veer & del Carmen Puerta Melguizo, 2002).

Once the user has learned to work with the system, it is important that they can work efficiently with their system. Efficiency is about how quickly certain tasks can be performed by the user. Good learnability also contributes to the efficiency. If a user is able to quickly learn to work with a system, efficiency can be achieved quicker.

Memorability refers to how quickly a user is able to go back to working proficiently with the system after a long period of not working with the system.

Few errors is not solely about the amount of errors a user makes, the severity of the errors and how well the user is able to recover from these errors are included in this attribute as well. Finally, satisfaction refers to how much users enjoy working with the system.

Another well known definition is the ISO standard definition of usability: "the 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" (Jokela et al., 2003, p.54).

In the ISO standard definition, effectiveness is the accuracy and completeness with which the user is able to complete tasks (Jokela et al., 2003). Effectiveness is closely related to the few errors attribute used in Nielsen's definition.

The efficiency is the expended resources in relation to the effectiveness when it comes to completing the user's goals (Jokela et al., 2003). Meaning how much effort and time is spent reaching effectiveness.

The context of use refers to the characteristics of the users, tasks and also to the organisational and physical environment (Jokela et al., 2003). The characteristics of the users can range from the type of domain knowledge they have, their age or limitations they might have such as (colour) blindness or other physical disabilities. The organisational and physical environment relate to where the system is used, for example in an office on a desktop or at an external location on a mobile device.

The definitions from Nielsen and the ISO standard are both widely used. However, they do differ in what attributes they are comprised of and even the meaning of attributes with the same name are not completely similar. Nielsen's definition of usability does contain more attributes than the ISO standard definition, but the ISO definition includes the context in which a product is used. Especially when studying usability in complex systems, it is important to include the context in which the system is used. The usability is dependent on the type of tasks the user has to perform and in what kind of environment the system is used (Xu & Topi, 2017). Additionally, the type of device the user uses should be taken into account.

2.2 Usability Evaluation Methods

To be able to tell to what extent the usability of a system can be increased, the usability needs to be evaluated first. A system can be evaluated by both experts and end users. Expert usability evaluations are a very time efficient and cost-effective way to find a large amount of usability problems (Nielsen, 1994b). Expert evaluations can be used throughout the whole design process without having to recruit many participants, which will result in more resources for user testing with end users towards the end of the design process. However, this can lead to a design that is good in theory, but not what end users find pleasant to work with (Van Der Veer & del Carmen Puerta Melguizo, 2002). Usability tests using end users will most likely reveal smaller usability problems (Yen & Bakken, 2009). As the end users are much more familiar with the context the product is used in than experts, they will be able to find usability problems related to the context. A combination of expert and end user usability evaluation should be able to reveal the majority of usability problems.

Research by Nielsen and Landauer (1993) has shown that user tests with only five different participants can already point out 80% of the usability problems. Figure 6 shows that each new participant will provide fewer new insights on usability problems in a system. This means that using only five participants per usability test can help find the majority of the usability issues while using limited resources for recruiting participants.

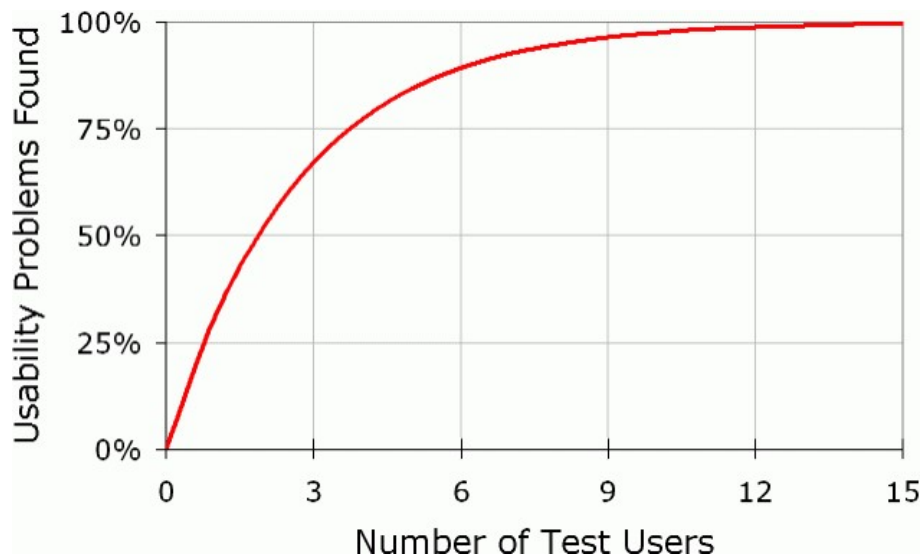


Figure 6. Graph showing that each additional user provides less new usability problems (Nielsen, 2000).

Usability evaluation methods can contain subjective and objective usability measures. Subjective measures help find the users' preferences and what they think of a product. Objective measures determine the users' capability to work with the system. Subjective

and objective measures can also be seen as the users' preferences and performance, respectively (Nielsen & Levy, 1994). The type of data that can be collected during user tests can be quantitative or qualitative. Quantitative data is often used to test hypotheses and can be used to calculate the power of a research. Qualitative data can describe new phenomena or explain why certain aspects are good or bad in an interface (Blandford, Furniss, & Makri, 2016). Often studies combine both qualitative and quantitative data. Qualitative data can help explain the quantitative data.

Fernandez, Insfran, and Abrahão (2011) have categorised usability evaluation methods (UEMs) for the web in the following five categories: user testing, inspection methods, inquiry methods, analytical modelling, and simulation methods. The first three categories require end users or experts to use a system or voice their opinions or wishes about a system. Analytical modelling and simulation methods are more theoretical approaches to model or predict any usability problems.

2.2.1 User Testing

User testing requires participants from the target group to perform certain tasks using the system. This is often done in a controlled lab environment, but remote user testing is possible as well. Especially during the Covid-19 pandemic, remote user testing is very valuable. During user tests, both subjective and objective data can be collected. Subjective data can be collected, for example, using the thinking out loud method. This method requires the participant to say everything they think about or see when performing a task. This can give information about what they are looking for, what they miss in a system or how they would expect the system to work if it is not working as expected. While collecting subjective data during a user test, it is important that the moderator of the user test avoids any probing and leading questions (Molich et al., 2020).

Hertzum (2016) has stated that a user test is not an interview. This statement means that a user test should be used to evaluate the user's behaviour while using the system. Some conversation during the user test can help to make sure the participant stays within the scope of the research and to take away any unclarities to the participant. Objective data consists of a large range of measures, such as error rate or the time it takes to complete a certain task. Eye tracking can also be used to collect data about where the participant is looking in the system or how long they look at certain objects.

Measuring error rate is important to find how many errors are made and where in the system. This is not only important to be able to improve the productivity of the user. A high error rate of users can lead to a lower satisfaction when working with the system

(Nielsen & Levy, 1994). Additional to error rate, it is important to know how easily and quickly a user can recover the error in their task (Nielsen, 2012).

Task completion time can tell much about the efficiency of the system. When a user is able to complete tasks within the system quickly and without any errors, they are able to work efficiently with it. However, not all people work quickly when using a computer. Sonderegger, Schmutz, and Sauer (2016) have found that efficiency is lower for older adults (52-79 years old) than for younger adults (19-29 year old). The effectiveness between age groups did not differ, meaning there was no difference in the amount of error they made while performing the tasks. This shows that task completion time is also dependent on the user's age and how well they are able to operate a computer.

When user tests are performed remotely they can easily be recorded without it being obtrusive for the user as they already have their webcam and microphone on to communicate with the moderator of the user test. These recordings can be used to code the user's behaviour or suggestions (Blandford et al., 2016). The annotations from different user tests can give a quick overview of what aspects of the system can be improved or should stay as they are. The grounded theory approach is often used when systematic coding of data takes place during a study (Blandford et al., 2016). Three different types of coding can help create a theory or themes from the data: open coding, axial coding, and selective coding (Williams & Moser, 2019). During the open coding phase, codes are being created while going through the data. During this phase, the data is explored to find what kind of concepts, behaviours, and other remarkable things are being said or done. During the axial coding phase, the researcher begins to look at relationships between the codes created in the open coding phase (Muller & Kogan, 2010). These can be categories of concepts or grouping behaviours by valence. During the selective coding phase the most important axial codes are selected. In usability research these codes can give insight in what parts of an system might need improving and which parts should stay as they are.

Eye tracking can be used to evaluate the user's visual attention to different elements in an interface (Wang et al., 2019). For websites eye tracking is often used to find if the navigation of the website is good, a heat map of the gaze can show where people look to search certain elements (Wulff, 2007). The use of eye tracking in usability testing of complex systems, such as a maritime navigation system, has shown to help identify usability problems in the interface (Hareide & Ostnes, 2018). The quantitative data collected during an eye tracking study can be used to support qualitative data that has been collected using other UEMs (Hareide & Ostnes, 2018). Eye tracking is not only used to track where the user is looking, the time between fixations, saccades, can give insight in the complexity of an interface. Saccades that go back to what a user has already read or fixated on before can

be an indication of confusion, especially when this happens often or lasts for a long time (Poole & Ball, 2006). Eye tracking does require more time to set up than a regular user test. The eye tracker needs to be calibrated for each user and the user should move as little as possible to make sure the collected data is reliable. Another downside of eye tracking is that it can be less reliable when the participant has droopy eyelids, wears glasses, or contact lenses (Nyström, Andersson, Holmqvist, & Van De Weijer, 2013). When the target group of a system is diverse, the user tests should also be suitable to different kinds of people. As ERP software is used by all types of people, eye tracking might cause a part of the target group to be excluded from the usability testing.

To make user testing less time consuming and expensive, usability testing can also be automated by tracking the user's behaviour in the system (Au, Baker, Warren, & Dobbie, 2008). Analysing the logs of a user's action can show what kind of action sequences the user performs and how the user navigates through the system (Au et al., 2008). Logs of both user tests and real time use can be analysed to find usability issues (Ferre, Villalba, Julio, & Zhu, 2017). Some easy to log actions such as current page and keystrokes might not be very easy to interpret. Other actions that might be much more valuable such as task completion might be more difficult to directly log (Ivory & Hearst, 2001). Automated usability testing using the system logs might be very useful when comparing different interfaces, for example during A/B-testing. However, qualitative data is missing when using this approach (Ivory & Hearst, 2001). Tiedtke, Märtin, and Gerth (2002) have developed an approach for automated usability testing using systems logs, the AWUSA - Automated Website Usability Analyzer, which is focused on websites. However, the goals of the approach can also be useful for complex systems. The goals of the AWUSA approach are to: find and visualise users' paths on the website, find and visualise deviations between intended tasks and actual usage, find and visualise locations/events where tasks are cancelled prematurely, find and visualise areas and situations with poor usability, provide plausible reasons for detected usability problems, find new goals/tasks of users while touring the website, and classification of different user groups and their mapping to the various tasks/goals (Tiedtke et al., 2002). Especially finding the users' paths, finding deviations, and finding areas and situations with poor usability can be very valuable for complex systems such as ERP software. Knowing how the user navigates through the system can give insight whether or not the user navigates through system efficiently and as intended by the designers. When a user performs tasks differently than expected the deviations with the intended process can show where exactly the interface or functionality should be changed.

Table 2. 10 Usability Heuristics by Nielsen and Usability Heuristics for ERP systems by Singh & Wesson.

10 Usability Heuristics (Nielsen, 1994a)	Usability Heuristics for ERP system (Singh & Wesson, 2009)
Visibility of system status	Navigation and Access to information
Match between system and the real world	
User control and freedom	Presentation of Screen and Output
Consistency and standards	
Error prevention	Appropriateness of Task Support
Recognition rather than recall	
Flexibility and efficiency of use	Degree of ease to learn how to use the system effectively
Aesthetic and minimalist design	
Help users recognise, diagnose and recover	Ease of customising the system to ensure alignment between the system, the user, and business process
Help and documentation	

2.2.2 Usability Inspection Methods

Usability inspection methods are methods that require someone, often an expert, to evaluate an interface (Nielsen, 1994b). These methods can be used throughout the whole design process as they require little time and resources. There are many different types of inspection methods. Well known inspection methods being: heuristic evaluation and cognitive walkthrough.

Singh and Wesson (2009) have identified usability evaluation criteria for ERP systems. The criteria are navigation, presentation, task support, learnability, and customisation. A set of heuristics was created based on these criteria. During a case study on an ERP system the heuristics showed to be very useful for identifying problems related to navigation such as being able to find certain information and functionalities quickly and efficiently. However, when compared to Nielsen's (1994a) 10 Usability Heuristics, usability problems related to error recovery and prevention were found. This research shows that using only one of these heuristics to evaluate a system could cause missing one or more very important usability problems. Another shortcoming of using heuristic evaluation is that the usability expert might not have sufficient knowledge about the domain of the system which could lead to major usability problems to be left undiscovered. For example, functionalities being placed in the system where an end user would not expect them. Additional to this, a usability expert might have a different mental model when it comes to these kind of systems than the end users, which too could lead to undiscovered usability problems, such as the systems navigation being so different than other ERP systems that

end users are not able to navigate proficiently through the system.

During a cognitive walkthrough, the evaluator has to go through a system and perform specific tasks. The evaluator performs the tasks from the perspective of the user (Polson, Lewis, Rieman, & Wharton, 1992). This approach is focused on understanding the learnability of a system. Cognitive walkthroughs are often used for walk-up-and-use systems, such as ATMs or train ticket machines. These systems are difficult to develop as users have to be able to understand the system immediately without any prior knowledge (Polson et al., 1992). For complex systems, a cognitive walkthrough can be used to go through possible problem solving strategies a user might have.

2.2.3 Inquiry Methods

Inquiry methods are used to collect subjective information from the user, such as interviews, focus groups, and questionnaires (Fernandez et al., 2011). Interviews and focus groups allow for more flexibility in retrieving information (Helander, 2014). Follow up questions can be asked when an answer of a participant is not completely clear or when talking about a problem. Participants can be asked to provide a solution as well, giving the researcher more insight in what users would want to see. Both interviews and focus groups can produce a large amount of valuable information using a relatively small amount of participants, however, a lot of time and resources are often needed for this approach. During interviews there is also a chance that the interviewer unintentionally steers the interviewee towards certain answers or that the interviewee does not want to sound too negative and is not completely honest. When interviewed about the usability of a product it could lead to not all usability problems being discovered.

Questionnaires can be used to gather information from a large group of users, however the information is less detailed than from interviews. Questionnaires often take little time to fill in and participants are more likely to be honest as they are often anonymous. Having many participants filling in a questionnaire can show how many people experience certain usability problems. This can give insight in which problems are important and which will affect less people. Many usability related questionnaires have been developed and validated. Three well known questionnaires related to software usability are the User Engagement Scale (UES), the System Usability Scale (SUS) (Brooke, 1996) (O'Brien, Cairns, & Hall, 2018), and the NASA task load index (NASA-TLX) (Hart & Staveland, 1988). The UES is able to measure the user's engagement with a system using either the full length questionnaire comprised of 30 questions or a short form version containing 12 questions. The long and short form UES should be answered using a 5-point Likert scale.

The SUS contains 10 general questions about the usability of a system that can be answered using a 5-point Likert scale (Brooke, 1996). The system usability scale can be used to measure the user's perceived usability (Lewis & Sauro, 2017). Compared to five other usability questionnaires the SUS has been proven to be very accurate for evaluating website usability, when a sample size of 12 or more participants is used (Tullis & Stetson, 2004). The SUS has been developed in English, however, the questionnaire can be difficult to understand for non-native English speakers (Finstad, 2006). This has led to many different translations of the SUS, such as a Portuguese (Martins, Rosa, Queirós, Silva, & Rocha, 2015), Slovene (Blažica & Lewis, 2015), Turkish (Demirkol & Şeneler, 2018), and an Arabic version (AlGhannam, Albustan, Al-Hassan, & Albustan, 2018). All translations have been validated by being translated from and back to English by different translators. A Dutch version of the SUS can be found on the website of UserSense (UserSense, 2020), a company that does user tests for other companies. The SUS will result in a score from 0 to 100. Figure 7 gives insight in what a good SUS score is and how it can be compared to different scoring types (Bangor, Kortum, & Miller, 2009).

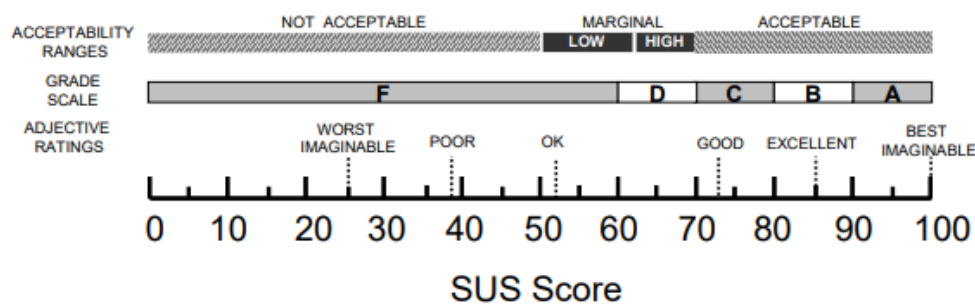


Figure 7. A comparison of the adjective ratings, acceptability scores, and school grading scales in relation to the average SUS score (Bangor et al., 2009).

The NASA-TLX measures the task load of a user and the type of task load the user experiences (Hart & Staveland, 1988). The NASA-TLX consists of six different kinds of task load: mental demand, physical demand, temporal demand, performance, effort, and frustration. By using these different dimensions the NASA-TLX can give insight what aspect of a task is the most demanding for users. Only a high mental task load would be acceptable for complex systems such as ERP systems, however, frustration or physical task load should be avoided as these factors can be an indicator of a bad interface.

When using a questionnaire to evaluate the usability of a system it is important to use a validated questionnaire, as this will result in reliable results. However, the results will only be reliable when the questionnaire is used precisely as intended and conducted within the domain they are developed for (O'Brien et al., 2018).

2.3 Usability Guidelines for ERP Systems

Many different studies show different guidelines or find different aspects that are important to keep in mind when you want to design an ERP system that is successful and usable. A review of several ERP usability studies by Parks (2012) shows that the most important aspects of an ERP system are: satisfaction, ease of use, usefulness, and acceptance. These aspects are mainly based on the user's perspective of the systems usability. Singh and Wesson (2009) have identified five criteria for ERP usability: navigation, learnability, task support, presentation (input and output), and customisation. In contrast to the general aspects regarding usability found by Parks (2012), the criteria by Singh and Wesson (2009) are different aspects of usability that can be evaluated separately.

2.3.1 Navigation

Navigation within an ERP system has been identified as one of the main usability problems in ERP systems (Wong et al., 2016). Navigation is strongly related to disorientation, engagement, and performance while using a website (Webster & Ahuja, 2006). While websites can not always be compared directly to complex systems, disorientation within a system is never desirable. By using a breadcrumb trail the user always knows where they are located in the system (Rogers & Chaparro, 2003). A breadcrumb trail can show the systems structure by showing a path that can lead to the page the user is currently using. Research by Webster and Ahuja (2006) has shown that following design guidelines is not always beneficial for the usability, making sure the user understands the structure of a website can help them navigate better than a menu that follows all guidelines. Matthews (2008) has suggested that navigation in ERP systems should be intuitive and simplified to the level end users have experienced using web navigation. Designing a system that corresponds with the user's mental model can make the user's navigation through the system easier.

2.3.2 Learnability

A study by Umble et al. (2003) shows that the lack of training of the end users is one of the reasons the implementation of an ERP system can fail. However, the usability of the system is not mentioned as a way to make implementation of a system more successful. Even though training is important for being able to work with a complex system, it should be designed in a way it is easy to learn.

Research by Grossman, Fitzmaurice, and Attar (2009) resulted in guidelines for the learn-

ability of software in general. The key aspects to keep in mind when designing to facilitate high learnability are: task flow, awareness, locating, understanding, and transitions. Task flow relates to the users' understanding of how they should perform a task. When documentation is needed to execute the task, they should know what queries to use. A user's awareness of what functionalities are present in the system is important as well, the interface should be designed in a way that functionalities can be found easily, for example shortcuts are presented to the user when performing a task without using an existing shortcut. Documentation for locating functionalities should not be static, but it should be related to what the user interface looks like at the moment. Understanding how to use complex functionalities is important and can be supported by using demonstrations, for example using multimedia content in the documentation that demonstrates how a certain task is executed. At last the user's transition to start using more complex functionalities, that allow for optimal usage of the system, should be encouraged, by gradually exposing the user to more advanced functionalities (Grossman et al., 2009). Transition would not be a desirable aspect for an ERP system. All functionalities should initially be present. Basic training for the users of an ERP system should make sure they know of all functionalities and how to work with them. The other aspects mentioned by Grossman et al. (2009) might be useful for the users to quickly become proficient at working with the system.

2.3.3 Error Messages

Another important aspect to increase the usability of ERP systems is to have clear error messages or feedback when something has gone wrong. Generic error messages do not help the user and will only cause the user to spend a lot of time figuring out what has caused the error message (Topi et al., 2005). Unclear error messages do not only influence the time spent performing a task, they also cause the end user to be frustrated (Ceaparu, Lazar, Bessiere, Robinson, & Shneiderman, 2004). The language used for error messages should be understandable for the user, technical information often confuses and frustrates the user more (Ceaparu et al., 2004).

2.3.4 Documentation

Perceived usefulness and usability of the documentation also plays a large role in the acceptance of ERP software. A positive attitude towards the documentation often leads to a higher satisfaction of the system itself (Scott, 2008). However, a large problem is that users prefer asking help from another person than reading the help (Scott, 2008; Rettig, 1991). The documentation might also still be difficult to understand for end users, as the

writers of the documentation are often the developers of the product and not actual writers (Rettig, 1991). Having dedicated writers for the documentation that have not been active in the development of the product might help improve the usability of the documentation.

2.3.5 Balance between all aspects

All aspects discussed above are important for the usability of ERP systems. However, it is important to find the right balance between these aspects. Increasing one of these aspects might have a negative influence on another aspects, which should be avoided. During the improvement of the system there will be a point where Pareto optimality will be reached and no improvements can be made without making something else worse (Pardalos, Migdalas, & Pitsoulis, 2008). Figure 8 shows an example of how three different versions of a product, with different scores for the aspects of usability, all have reached Pareto optimality when they are the starting point. For example version B scores higher on 'Ease of use' than version A, but on 'Error messages' version B scores lower than version A. This shows that the better ease of use has compromised the quality of the error messages.

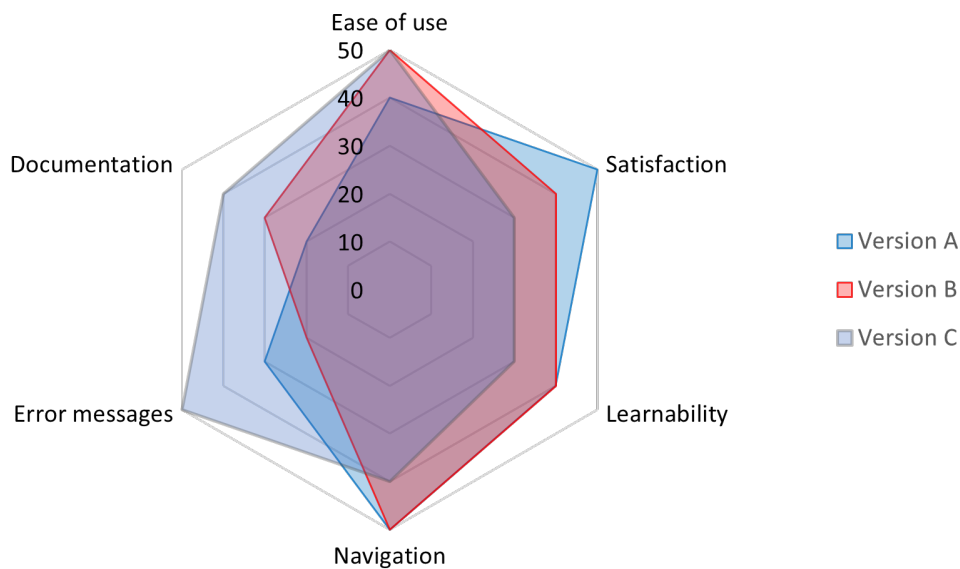


Figure 8. Spider chart showing an example of different Pareto optimalities.

As all the aspects influence other aspects of usability, it is important to be able to measure the effect of each aspect separately. Only by keeping track of each of these aspects separately, a Pareto optimality can be achieved. Only changes that do not negatively influence other aspects can be implemented. However, there might be cases where a certain aspect is too important not to improve, even though it compromises the quality of another aspect. For example, making the navigation much more clear and intuitive for the user,

which leads to the user having to click one or two time more than before. This might compromises the ease of use slightly, but it can lead to the users being able to work much more quickly and efficient than before.

Table 3. Values for the example of Pareto optimality.

Aspects of usability	Version A	Version B	Version C
Ease of use	40	50	50
Satisfaction	50	40	30
Learnability	40	40	30
Navigation	50	50	40
Error messages	30	20	50
Documentation	20	30	40

3. Case Study: The Focus ERP System of AFAS Software

3.1 Architecture of Focus

Focus is an ERP cloud application that can be customised for each organisation. Ontological enterprise models (OEMs) created by enterprise modellers describe enterprises as they are in real-life, using the enterprise’s terminology. The OEM prescribes a customised application for the enterprise (Van Der Schuur et al., 2017). Figure 9 shows the interaction between the OEM, the application, and the enterprise modeller. Focus is a web-based application, which makes it accessible from any device such as a laptop, tablet, or smartphone.

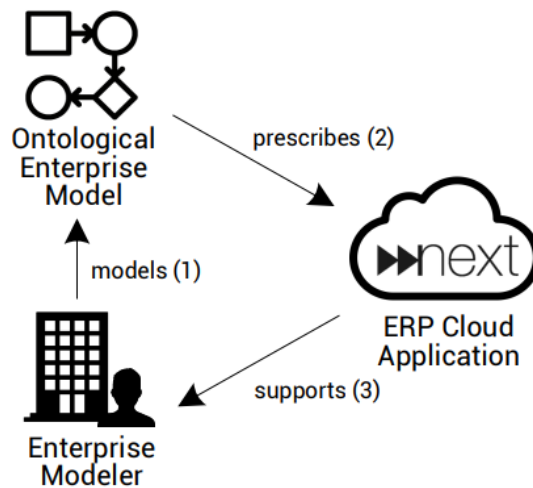


Figure 9. Focus software generation approach (Van Der Schuur et al., 2017).

Figure 10 shows that the model of Focus is passed through a code generator which results in an application. Each company has their own environment of the application to ensure they can work with their own data. The model is divided in work fields. Each work field has different objects that need to be modelled. For the work field sales the objects include a sales invoice, sales products, and customers.

Figure 11 shows how a sales invoice in the work field sales is modelled. A sales invoice has a party, which is the customer. A sales invoice can only exist for one customer, a custom can have several different sales invoices. The customer can either be a person or an organisation. A sales invoice can contain one or more products and products can be

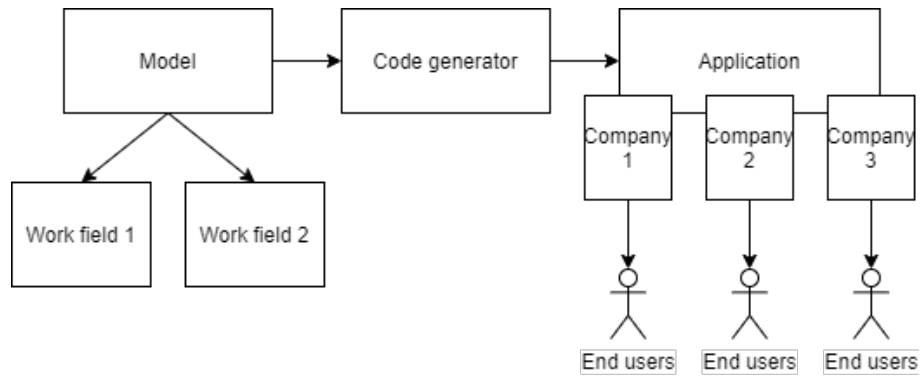


Figure 10. Model to application.

present in more than one sales invoices. A product can either be a good or a service.

In general, a work field is displayed in the navigation menu as a menu item (see Figure 12), when the user clicks on a menu item a sub menu will appear containing the objects within the work field (see Figure 13).

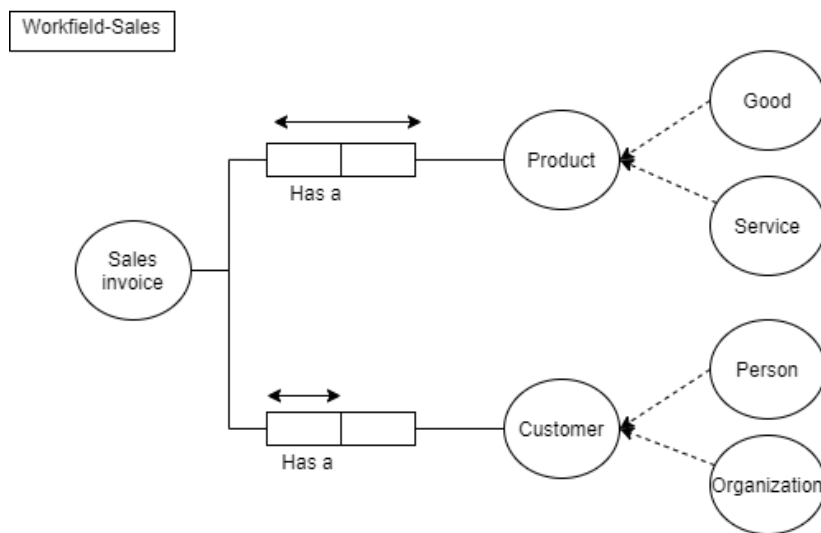


Figure 11. Model of a sales invoice in the sales work field.

Appendix A contains a UML activity diagram (Figure 21) of how a sales invoice is created. The screenshots (Figures 23 - 33) below the diagram show what the system looks like during the different steps of the diagram. The diagram shows two different ways to navigate to the page where a new sales invoice can be created, one using the spotlight function and one using the navigation menu. The spotlight function can be used to directly navigate to every functionality or certain records such as clients. When the client has arrived on the new sales invoice page they can enter the needed information and choose several options: save, save and send, and cancel. When a user has forgotten fill in a field or has entered an invalid value they will get an error message saying not all fields

are filled in correctly. When everything is entered correctly the user can save and send the sales invoice or click send and then send the invoice on the next page.

Currently Focus is still in development, which means that not all functionalities most ERP systems have are implemented. It will gradually be expanded. New functionalities and designs are often implemented in the system within a couple of weeks. UX tests for these new designs should be set up and performed quickly to make sure no large usability problems are present in a new version of the software.

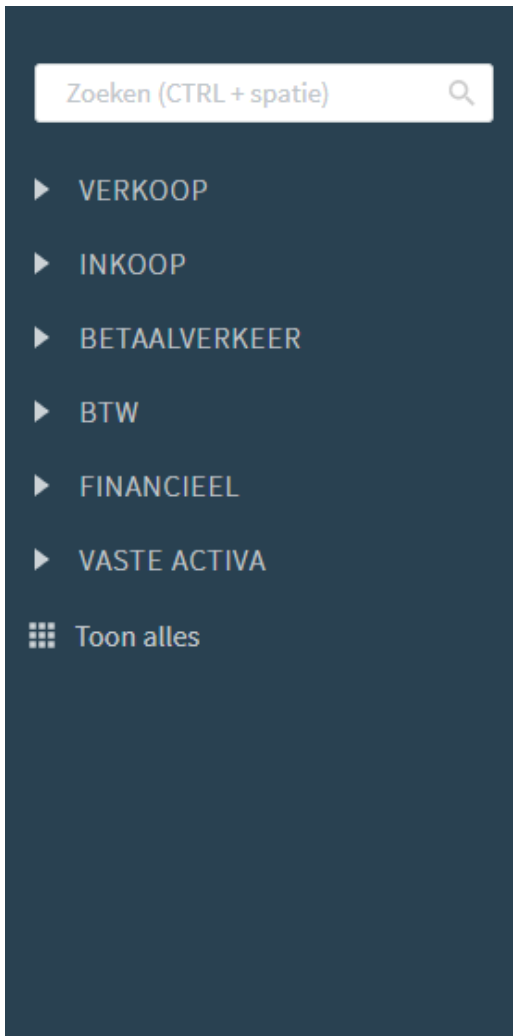


Figure 12. Navigation menu showing the work fields.

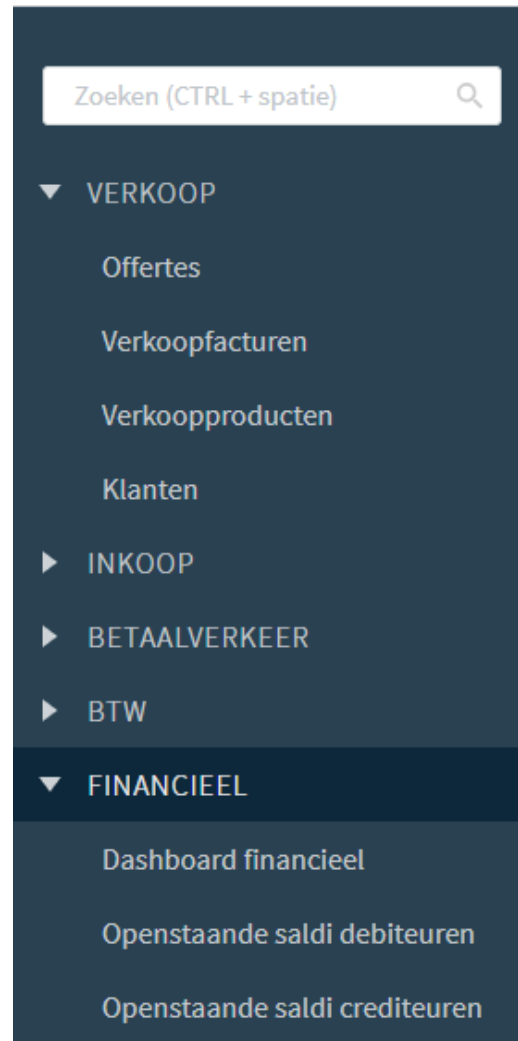


Figure 13. Navigation menu showing the work fields and their objects.

3.2 Existing solutions for usability testing of Focus

The usability of Focus is evaluated by letting clients perform tasks while thinking out loud. The tasks they perform during the user test depend on what they use Focus or another ERP system for. Participants will not be asked to perform a task they never do

during their work. Both existing clients of Focus and future clients perform the user tests. This allows to find more in depth usability problems from clients who are using the system daily and how intuitive the system is to use for future clients. The user is asked additional questions about what they think of the product and what they would improve and how. As the evaluations are currently done remotely, both the user and their screen are recorded. Designers and developers of Focus can watch the videos of the user test and comment on what should be changed in the product based on the user's remarks and behaviour. In general, five users will perform the same task during the usability tests. Research by Nielsen and Landauer (1993) has shown that five usability tests are sufficient to find most usability problems. It is important to know if certain problems are experienced by more users or by only one. Usability problems experienced by more people will be prioritised. However, in case only one person struggles with a certain task, this is still analysed and changed if the developers and/or the designers think it will be valuable to improve.

The user tests are based on new functionalities and changes in the UI. When a new functionality is released, participants will be asked to perform a task using this functionality. Changes in the UI are tested in a similar way, functionalities where the changes in the UI are present will be tested. Creating personas to help design the user test has been done in the past. However, it took a lot of time and it did not help create better user tests. Eye tracking has also been used in the past. However, no comprehensive analysis was performed on the data making it difficult to interpret the data. New things are constantly tried for the user tests. What works stays and what did not work well will not be used again. However, it is difficult to precisely see what has been tried and why is not being used anymore. While automating processes is important to AFAS, the approach to usability testing contains very little automation.

At the moment of writing this thesis, Focus has three accounting firms as customers and around 50 end users. Both employees of the accounting firms and their clients are the end users of Focus. Due to the small amount of users the support department is able to handle the contact with the end users through a teams chat per accountancy firm. The users are able to contact the support team when they run into problems when using the software. The support team is in close contact with the developers and designers to make sure bugs and other unclarities in the software can be addressed quickly.

Going through the messages from a period of roughly one and a half month, showed that most questions are related to bugs in the application. Besides these questions, two remarkable problems showed up. First, people do not use the documentation and directly ask someone when they cannot find the solution for their problem. As the developers do know where it can be found in the documentation they often answer the question with

the corresponding article, however, it would be preferable if the users would search the documentation first. The second problem is that users who receive an error message do not know what it is about. The error message only shows that something is wrong, however, it does not show what is wrong with the system. In some cases the system does not give an error message at all.

To automate tracking the users behaviour and getting feedback more quickly, WalkMe (WalkMe, 2002) is being implemented in Focus. WalkMe can be used to guide a user through a process, this application is called a Smart Walk Thru. Another function of WalkMe is to implement surveys in the system, this means that a pop up can appear asking the user to fill in a survey or that there will be a button linking to the survey that is always accessible. Besides using the Smart Walk Thrus to guide users, the use of them can be analysed. For each step the amount of users can be viewed. A large decrease of users for a certain step can indicate either a functional error in the Smart Walk Thru or a usability issue. WalkMe collects data about the real use of Focus, this might lead to finding more or different usability problems than during user tests with a limited amount of participants. The possibilities for Focus are still being explored and will be added during this research.

4. Methodology

ISO standard (9241-11) definition of usability (Jokela et al., 2003) will be used to determine which usability evaluation methods will be used to evaluate the usability of AFAS Focus. The effectiveness, efficiency and satisfaction will be evaluated. By performing the usability evaluations remotely the user is able to perform the user test in the same environment they usually work in.

To be able to evaluate the usability of Focus based on the ISO standard (9241-11) the effectiveness, efficiency and satisfaction of the user need to be evaluated in the context they work in (Jokela et al., 2003).

To evaluate the effectiveness it is important to know how accurate a user is able to perform a task and if they can complete this task. This can be done by looking at the error rate and the error recovery time during a task. For efficiency it is important to look at how much effort it takes the user to perform a task, navigate to a certain functionality or how much help they need. Satisfaction is very subjective and is best to be measured using a validated questionnaire and by looking at the overall attitude of the user toward the system. The following chapter describes a method to evaluate these attributes of usability. Mainly qualitative data will be collected and the collected quantitative data will be used to support the qualitative data. All user tests will be performed in the same context, at home or in an office while using a computer. As the device does not change either, for example to a tablet or smartphone, the context will not be included in the evaluation of the usability of Focus.

Between subject design will be used for the user tests for new users. For each new iteration of the software new participants will be recruited to make sure each time the participant has never seen the software before and there will be no chance of a learning effect. Current users of Focus will also be involved in the user testing. As the current user base of Focus is very limited, between subject design might not be completely possible. Insights from more users is preferable, but it might not be possible to recruit new people for each iteration of the user test.

4.1 Participants

The participants of the user test are users of the current system and possible future users. The possible future users are users of the Small Business product from AFAS. Within both groups, the users can be divided into two groups, the accountants and clients. The accountants work at an accountancy firm, which has small businesses as clients. These clients can either be administrative employees of a small business or the entrepreneurs themselves. Accountants use ERP system for all the tasks they have to perform. For clients the ERP system only helps them perform a small part of their tasks. As the accountants and clients use the system differently it is important to get feedback from both the accountants and clients. Figure 14 shows the four different types of participants.

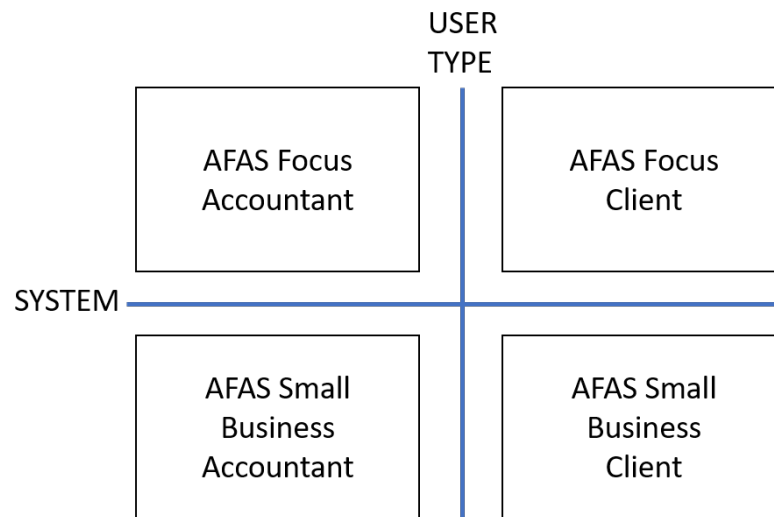


Figure 14. Four different types of participants for the user tests.

4.2 Tasks During the User Test

At the beginning of the user test the participant will be asked for what purpose they use an ERP system and what functionalities they use. This information can be used to determine the type of tasks they will perform during the user test.

The participants will be asked to perform tasks they are familiar with in different ERP systems. The first option will be creating and sending a sales invoice. The second option will be creating a memorandum booking. If this feature is not finished in time the task can be changed to creating a purchasing invoice. In case a participant does not exactly know what to do or where to find the functionality, they will not receive much guidance. The first guidance will be reminding the user that the documentation might be helpful. Currently the documentation is used very little by the users. Contact with the users through

the teams chat show that users tend to ask questions to a person quite quickly. Giving this more attention during the user test might give insight in why the documentation is not consulted much.

After the participants have performed the given tasks they will be asked a couple of questions. The first question will be regarding what they find most important in ERP systems. This will help find which usability aspects the users find most important in ERP systems. Thus telling what aspects should be prioritised during testing. Finally, the participants will be asked what they thought about working with AFAS Focus in general and if they enjoy this way of working.

4.3 The System Usability Scale

To measure what the users think of the usability of Focus the participants have been asked to fill in the System Usability Scale. As the English version could be difficult to understand for non-native English speakers (Finstad, 2006) and there was no guarantee all participants understood English. A Dutch version of the SUS was used by UserSense (2020), a start up that performs user test for other companies. Their Dutch translation of the SUS has been used after the user test was performed. The SUS has been used to support the qualitative data collected during the user test. The Dutch and English version of the SUS can be found in Appendix B.

4.4 Coding the Recordings

To create structured data from the recordings of the users tests, NVivo (NVivo, 2021) was used during the coding. The codes were created in a structured manner, loosely based on the Grounded Theory (Blandford et al., 2016) as described in Section 2.2.1, but with some differences: the open coding and axial coding were done simultaneously and these two steps were repeated for the first three transcripts. All codes created after these three transcript were selected during the selective coding step.

During the first iteration of the user tests the coding took more time, as all the open codes were created during this phase. During the open coding process the main focus was on the participants' opinions about the product and their exceptional behaviours if there were any. After each transcript the codes were revised and any codes, that could be combined, renamed, or would be better to split in two codes, were altered.

To increase the efficiency of the coding process, the recordings were edited to only include relevant parts of the user tests. Relevant parts meaning, the parts where the product is discussed and the opinion of the users is clearly expressed. Not relevant parts were the introduction, ending, and all conversation in between that was not related to the user test. In case a participant elaborately explained their statements that were clear without the additional explanation, the explanation was edited out as well.

The edited videos of the user tests were transcribed in NVivo by hand for the first iteration. For the second iteration, the transcription option in MS Word was used to transcribe the user test. Even though the transcription tool in MS Word is not perfect, it did make the transcription process much more efficient.

4.5 System Log Analysis

Analysing system logs can be useful to get insight in the general behaviour of all users. As the system logs have initially been set up to find bugs in the system, not all user behaviour is tracked, such as the precise button that is pressed. This makes the analysis of navigation paths very difficult. As the implementation of WalkMe has started and this system can also be used to track certain events this will be used to analyse navigation path of the users instead of using the existing system logs.

4.6 Log Analysis and Surveys Using WalkMe

During the time of writing this thesis, WalkMe (WalkMe, 2002) was being implemented and could be included to collect data about the users' behaviour. WalkMe allows to survey the users and track their behaviour within the system. A survey about the user's satisfaction was the first survey that had been launched using WalkMe. The information that was being collected by this survey could be used to find any functionalities or other parts of the software that are considered to be bad by the users. This information can help guide what should be tested during the user tests to clarify what part causes problems.

WalkMe also has a functionality that is able to create Tracked Events. This allows to see what buttons are pressed or which type of navigation is used. Before WalkMe is able to track these events they have to be defined. What type of events will be tracked will be depended on the literature and changes in the UX design. The literature shows that navigation is an important aspect of usability in ERP system. Knowing which navigation path the users take can give insight if all different possibilities are needed or if only one option is enough. When a UX designer has added a new feature to the interface it can be

valuable to create a Tracked Event to see if or how often the users use this new feature.

The UML diagrams in Figures 21 and 22 show different ways to navigate to the functionality and different ways to perform certain tasks. These different paths can be analysed using Tracked Events in WalkMe. Figure 21 shows three different types to save a sales invoice. The save button is the main button and the 'save & send' and the 'save & new' are sub options that can be found when the user clicks on the arrow next to the save button (see Figure 15). Having insight in what option users use the most can help the design decisions for the future. If one of the sub options is used more often than the main button, it might be useful to choose to change the main button to the most used option. However, it is important to keep the mental model of the users in mind. When the button does not look like what they expect it to look like it might cause more confusion. Evaluating such changes first during a user test might be preferable.

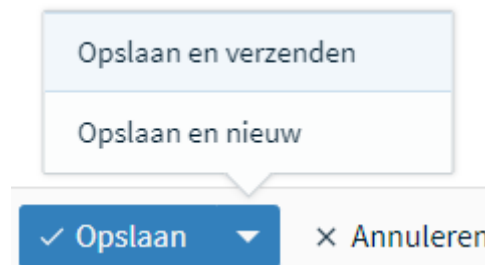


Figure 15. Save button for sales invoice.

The initial events that would be interesting to track were the different options the user can use to execute tasks such as the save button in Figure 15. The list below shows the events that were initially chosen to track.

Initial Tracked Events:

- Sales invoice: save button
- Sales invoice: save and send button
- Sales invoice: save and new button
- Sales invoice: cancel button
- Sales invoice: new via search help
- Sales invoice: new via view
- Sales invoice: new via favourites menu

Due the way the save button is implemented it was not possible to track these options. To get more insight into how much buttons that are not related to a certain functionality are used the following buttons were tracked: Go to Help, Modify (all modify buttons in the system), and Cancel (all cancel buttons in the system).

These tracked event were also used to create funnels. Funnels are a sequence of tracked events that can give insight in how long users take to perform a certain task and how many users finish all tasks that are present in a funnel. For example, a funnel can be created for making a sales invoice. Tracked events of the mandatory tasks can be added to the funnel to see how many users that open a new sales invoice finish creating a sales invoice. The time between each step is saved. This can give insight in which steps take longest to perform.

Surveys from WalkMe are already used to evaluate the satisfaction of the users. If the survey gets over 10 responses, the answers will be analysed as well and compared to the results of the user tests. Comparing these answers to the results of the user test can give insight in if these surveys can already help identify most usability problems

4.7 Materials

To perform this study several tools were needed. First, to be able to perform the user tests, Zoom (Zoom, 2021) was used to communicate with the user and a test environment of Focus was used to perform the tasks. This environment contained dummy data and ran on the moderator's computer and the screen was shared via Zoom. Camtasia (TechSmith, 2017) was used to record and edit the user tests. Microsoft Forms was used to fill in the SUS after the user test (Forms, 2020). To annotate the recordings of the user test NVivo was used (NVivo, 2021). The data was analysed using MS Excel.

4.8 Protocol

When the recording of the user test starts, the participants will first be told that the user test is part of a master's thesis and they will be asked if they consent to their anonymised data being used for research and that they can always decide they do not want their data to be used anymore. The protocol contains questions, a task for the participant to perform, and the SUS at the end. The questions at the beginning of the user test will be to get an idea of what the participant uses an ERP system for, this way the task can be adapted to fit the participants knowledge. Then the participant will perform a task using Focus. After the participant has performed the task, they will be asked what they thought of the functionality they used and Focus in case they are a new user. The next question will be about what the participant finds important in an ERP system and what they find important in the functionalities they use and if there is anything missing from the whole system or the functionalities they are using. At last the SUS will be mailed to them to fill in after the user test.

4.8.1 Pilot Study

Before starting the user tests a small pilot study was performed to test if all parts of the user test were executable. This included testing if there would not be any technical issues regarding the recording. The most important aspect of the user tests that should be changed in the protocol is the way questions are asked. The questions should be personalised for each participant, especially for participant that are already using the product. For current user it important to keep in mind that they might not only have remarks about the specific functionality that is being tested. They might also have some comments about another functionality that they have had trouble with. Making sure to ask what the exact problem is, is important to find as many usability problems as possible during one user test. However, it is also important to make sure the user test will not last too long. 30 minutes was long enough to go through the functionality, ask additional questions about the functionality, and have the participant comment on some other problems they ran into. Even though no pilot study has been done with an inexperienced user, personalising the questions will be important for these participants as well. Knowing how the participant uses their current ERP system will help to make them perform a task they know. Not only by asking what type of functionalities they use, but also content wise what kind of products or services they sell or buy. The final protocol for the user test can be found in Appendix B.

4.9 Results Analysis

Every four weeks a new update is released, this allows for several iterations of usability tests. For each version the same data will be collected. This way different versions of the software can be compared to each other.

To find what functionalities or parts of the interface can be improved the frequency of codes related to certain aspects of the system can be visualised. These visualisations can for example show the attitude towards a certain functionality, by showing the amount of positive, neutral, and negative reactions. If the codes also contain different aspects of usability, they can also be analysed to see what the attitude towards the system is related to these aspects.

The answers to the questions about what aspects of an ERP system the participants find important will be used to create a graph showing the importance of each aspect mentioned related to the other aspects. This should help to prioritise the testing of certain aspects, such as navigation or error messages.

The scores of the SUS will be used to see if there is a general change in the participant's attitude towards Focus over a longer period, as the SUS cannot give any information about what specific part of a functionality or the UI has caused a high or low perceived usability.

The data from the different iterations can be compared by looking if there is a change in attitude towards a certain functionality or if there is a change in error rate or error recovery time.

The data from WalkMe can be analysed within their own back end called Insights. Some data such as the survey data can be exported into a csv file. This way the quantitative data from the surveys can be analysed in Python or Excel. Tracked events can be used to create an overlay on the UML activity diagram to visualise how often each option in the software is used. Funnel data from WalkMe can be analysed using Insight when comparing different user groups or time frames for one funnel. When different funnels need to be compared the data from both funnels needs to be exported and has to be compared using Excel or Python.

5. Results

During the data collection phase six user tests have been performed during two iterations. The pilot study is included in the first iteration as no changes were made to the protocol after the pilot and it was done using the same version of the software. During the first iteration version 1.16 of Focus (AFASHelp, 2021a) was tested and during the second iteration version 1.17 (AFASHelp, 2021b) was tested. Differences between the two versions were minimal for the functionalities that were tested during user tests. Due to the minor differences between the two versions the results will be discussed in one section, where possible the two iterations will be discussed separately. All user tests had a duration of roughly 30 minutes, except for the user test with participant C1, this user test lasted for 90 minutes. The recording of the user test with participant C4 missed the audio of the participant. Directly after the user test notes have been written down based on the video and the audio of the moderator.

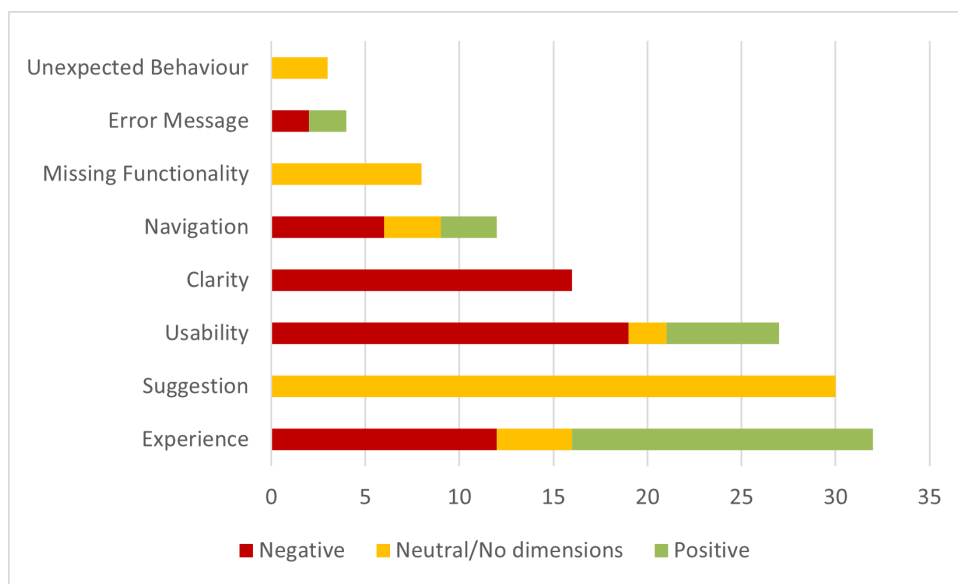


Figure 16. Number of references per code per category.

5.1 Coding

During the first iteration open coding was used to create the initial codes. These codes were created while going through the transcripts. New codes were added when needed and a couple of codes were altered to fit a more general problem. After revising the codes, the main changes that were made, were the names and subcategories of the codes. Some codes were positive and others negative. When looking at the amount of references per code, the different notations were not able to give a quick overview if the software is

perceived as good or bad. Adding more subcategories of negative, neutral, and positive to a neutral code allowed to have a better overview of the general attitude towards the system. This was not done for the codes Missing Functionality, Navigation, and Suggestion. When a participant stated a functionality was missing, it was not a positive statement. It was often a functionality they would need to do their work well. Navigation initially had the subcategories 'Tab and Hotkeys' and 'Looking for Button', these subcategories did not fit the structure of the other codes and were taken out. During the second iteration, the code Navigation did get the subcategories positive, neutral, and negative. The transcripts of the first iteration have been revised and the references for the Navigation code have been redistributed over the subcategories. Suggestions, similar as the missing functionality codes, were not particularly positive or negative.

Figure 16 shows the number of references per code and per subcategory. Table 4 contains all codes and their definition. For each code an example of a statement is included to get more insight in what kind of statements the participants share during the user tests.

A large amount of the statements were about the participants' experiences with and attitude towards the system. Half of these statements were positive. The code Usability contains more negative comments than positive comments. The code Clarity stands out as it contains only negative comments. This might be due to the participants only speaking up when something is not completely clear to them and not when they understand what they have to do or fill in. The least comments were made about any unexpected behaviour, meaning the system is generally aligned with the users expectations of the system.

Appendix C contains all the original references that were coded during the coding process.

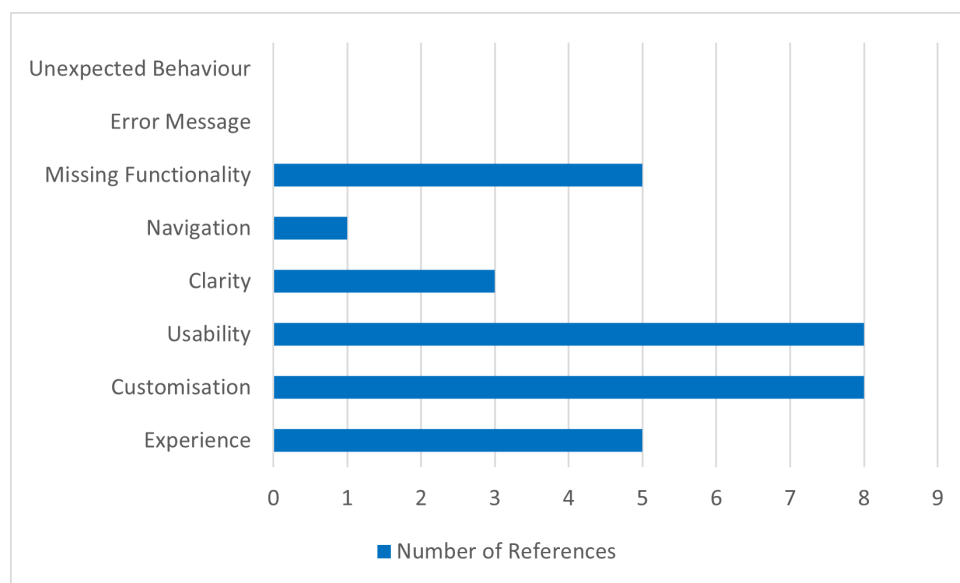


Figure 17. Number of references per code from the Suggestion code.

Table 4. Overview of the codes, their description, and an example of a statement made by a participant.

Code	Description	Quote
Unexpected Behaviour	Statements of the participant when they did not expect a certain event to happen.	(In new sales invoice) "Oh it's an amount, I would have expected a tax code." (Participant B2)
Error Message	Statements made about the error messages if they showed up during the user test.	(In memorandum booking) "Oh the number is red, it must be because it is negative. The error message does not tell me what is wrong about it. I would have expected a more targeted message." (Participant C1).
Missing Functionality	Statement about functionalities the participant would like to see in the software.	"In products, but it's probably more order management, being able to see which products sell well and which don't." (Participant C4).
Navigation	Statement related to navigation through the system or within a functionality.	(Looking for memorandum bookings) "I would expect it in General, in Profit it's called Journal, that is what I am looking for." (Participant B3).
Clarity	Statements about the clarity of functionalities or descriptions.	(In memorandum booking) "Booked on, what is booked on? Is it a bank account number?" (Participant C1).
Usability	Statement about how well the participant can work with the system and what would obstruct them from doing their work.	(New sales invoice) "I think you would have to get used to it, in Profit you can fill in everything in one line, that is much more user friendly. This way is more cumbersome" (participant B2).
Suggestion	All suggestions the participants had while going through the system.	"On the dashboard it would be nice to be able to customise the revenue, for example to see it per week instead of per month." (Participant C4).
Experience	Statement about how the participant feels about the system or a specific element.	"I would have to get used to it, but when you know how to use it, it will make sense." (Participant B3).

To get more insight in what type of suggestions the participants gave during the user test, the references have been distributed over the existing codes and a new code 'Customisation' has been added. Customisation was added as there were many statements regarding customisation that were not suitable for the codes Missing Functionality or Usability. Figure 17 shows the amount of references each code has.

5.2 System Usability Score

After revising the SUS scores and the questions, the question about the frequency of use has been taken out and replaced with the question: 'This product allows me to perform all the tasks I need to do'. The new version can be found in Appendix B. The frequency of use is completely dependent on the type of company and how the user works. Some users use the system every day or every time there is something to put into the system. Other users do everything on a set day during the week or month. A more important question to ask is if the users are able to perform all tasks they need to do. The SUS contains an even amount of positively and negatively formulated questions. To make sure the questionnaire stays balanced, the altered question is also formulated positively. For the next iteration the scores will be calculated in the same way as the original and validated SUS. However, as one of the questions has changed the scores will not be as reliable as the scores of the validated SUS and won't be completely comparable to the scores of the first iteration. How the SUS scores are calculated can be found in Appendix B.

Table 5. SUS scores of the participants.

Iteration	SUS score	User type	First time user	Participant ID
1	47.5	Accountant	No	A1
1	60	Client	Yes	B2
1	80	Client	Yes	B3
2	37.5	Accountant	Yes	C1
2	62.5	Client	No	C3
2	77.5	Client	Yes	C4

Table 5 shows the SUS scores for all participants. As the two questionnaires are not completely similar the scores cannot be compared. However, when looking at the scores of the accountants and the scores of the clients, a trend can be seen. The accountants give the system a much lower score than the clients. A quote about a booking screen from participant C1, an accountant, gives more insight in why accountants might give a lower score. *"Look, accountants are going to find this very annoying. For clients it might work well to not have all information in one line when booking something. For accountants it would be a reason to choose another product, because I want to be able to book the taxes on the line, instead of clicking the more button. I am forced to use the mouse, which takes too much time."*

The form with the SUS also contained an open question whether the participant had any comments to improve or change the system. However, all participants left the field empty or stated that everything was shared during the user test.

5.3 WalkMe

The WalkMe tracked events and funnels created were analysed for the month of June. During this month 49 individual users used the system. A filter was applied to filter out the AFAS employees and test server to make sure only the behaviour of the accountants and clients is analysed.

To gain more insight in which options the users use to navigate towards functionalities the three different navigation paths to creating a new sales invoice have been captured using Tracked Events in WalkMe. In Figure 18 the thickness of the blue line indicates the amount of interactions that have taken place with each navigation path. It shows that most users take the longest path by navigating to the sales invoice view and clicking the 'new' button there. When the search bar was introduced to participant C1, their reaction was in line with this behaviour: *"No I would prefer to have the favourites menu open constantly. I like to know where I click and where I am in the system."*

21 individual users had 195 interactions with the 'new' button in the view for sales invoices. Three individual users interacted 11 times with the '+' symbol in the favourites menu to navigate to creating a new sales invoice. At last, seven individual users used the search help 12 times to navigate to the functionality.

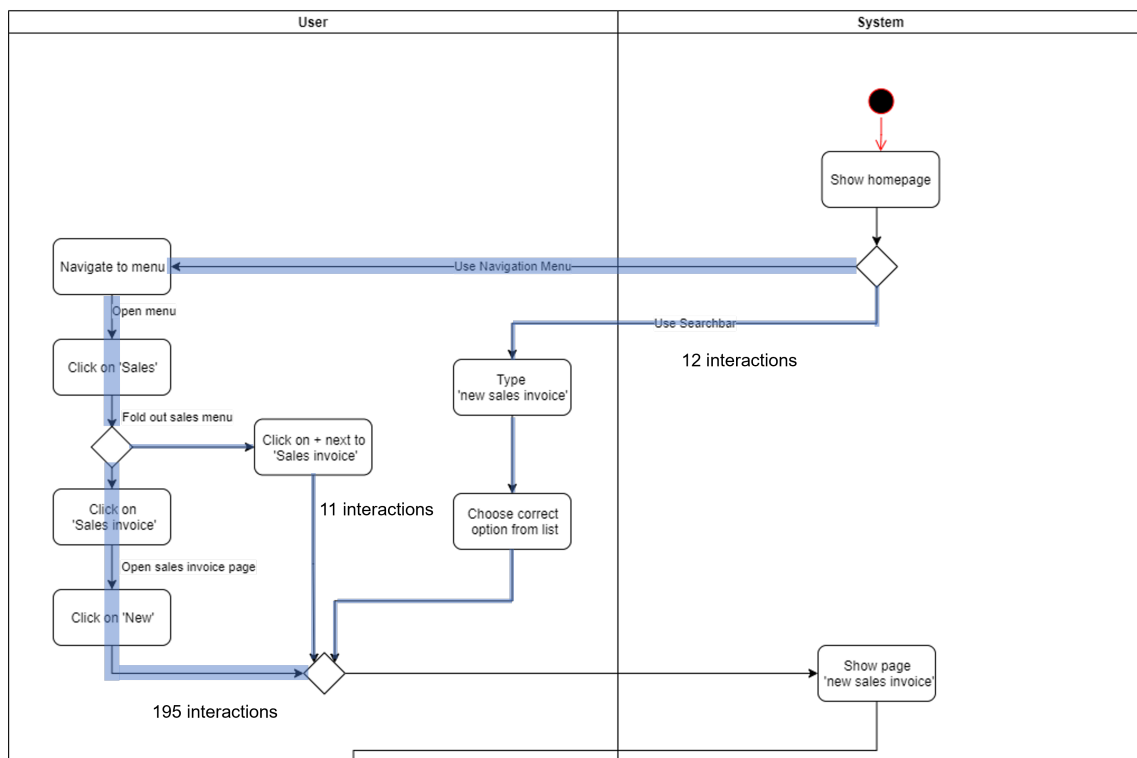


Figure 18. Visualisation of the amount of times a navigation path to creating a new sales invoice was used from June 1 2021 until June 30 2021.

To give an example of how tracked events can be analysed using WalkMe Insights, three tracked events in the week of June 28 until 4 July are shown in Figure 19. The three tracked events are 'Go to Help', the 'Modify' button, and the 'Cancel' button. The Help button can be reached from each page in the system. The Modify and Cancel button are available in several different functionalities. These tracked events track all of the possible Modify or Cancel buttons and are not limited to one functionality. The graph shows that the help button is used a lot more than the other two buttons. During the day with the most interactions, the help button is used 48 times, the Modify button 11 times and the Cancel button five times. The graph shows that the interaction with the buttons is much lower during the weekend.

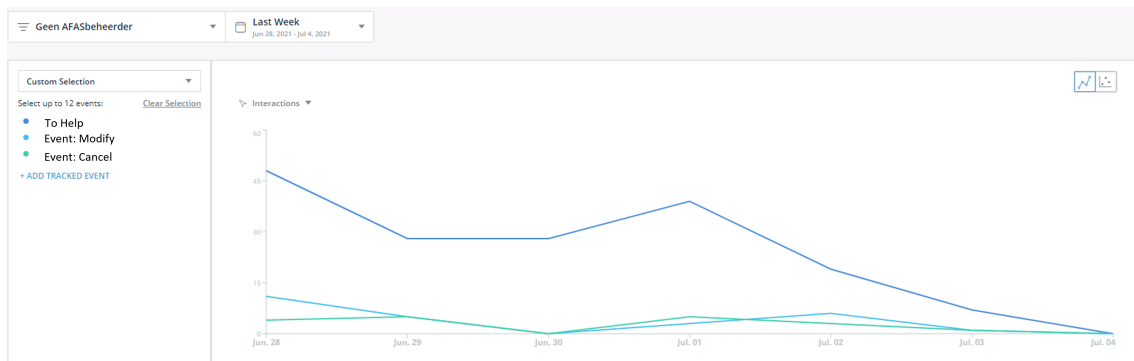


Figure 19. Amount of interaction with the buttons: Go to Help, Modify, and Cancel in the week of 28 June - 4 July.

Not all elements are interesting to track individually. Funnels can give more insight in how long users take to complete a task and which steps in the funnel take longest. A funnel for creating a sales invoice was created to find what part of creating a sales invoice takes the longest to complete. In Figure 20 the steps are named A up to D. Step A is viewing the page where a new sales invoice can be created. Step B is clicking on the field where the client has to be filled in. Step C is clicking on the field where the product has to be filled in. Step D is clicking on any of the save options. The time between each step is measured, during this time the user can perform other tasks such as changing the payment settings or adding more information about the product. These steps have been chosen as they have to be performed to create a sales invoice, other options are optional or can be default settings so the user does not have to fill them in each time. Figure 22 in Appendix A shows all the possible options the user can choose to execute a step. For example, when adding a client to the sales invoice, the user can choose an existing client or create a new client. Choosing an existing client will most like take much less time than creating a new one. The tracked event in the funnel is only the moment that the user clicks on the field 'client', meaning there is no distinction made between choosing an existing client or creating a new one.

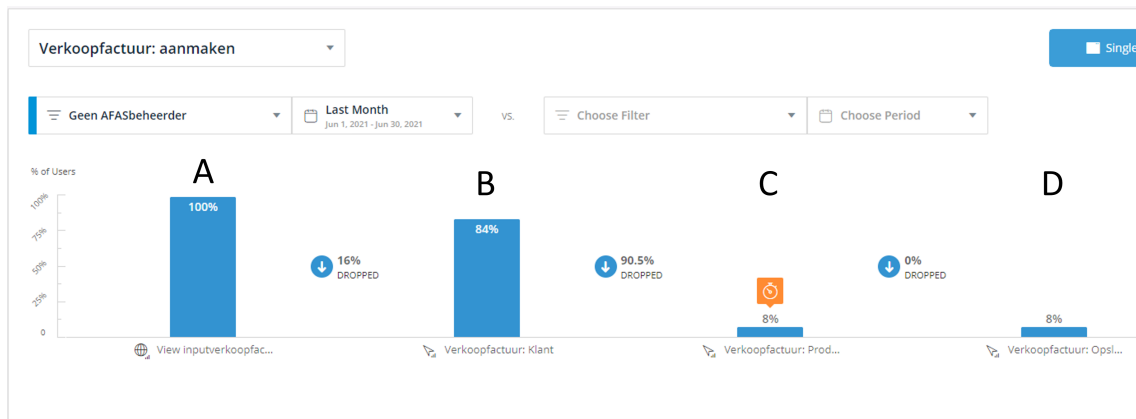


Figure 20. Funnel for creating a sales invoice.

Figure 20 shows the results of the funnel for June. Table 6 shows the average time between the steps and total completion time of the funnel. 25 users opened the page where a new sales invoice can be created. 84% of these users (21 users) clicked on the client field. On average it took the users 12 seconds to click on this field after opening the page. Step C shows a large drop in users. Only 8% of the initial users (2 users) clicked on the product field this step took 3 minutes and 27 seconds on average. The orange stopwatch icon indicates that the time between B and C is the longest compared to the other steps. All users that clicked on the product field have also saved the sales invoice, this took 2 minutes and 30 second on average. Between the two steps the users are able to click on different field and buttons on the sales invoice page.

Table 6. Average completion between steps of the funnel in Figure 20.

Time frame	A-B	B-C	C-D	Total time
June	12s	3m 27s	2m 30s	6m 10s

6. Discussion

For this research several Usability Evaluation Methods (UEMs) have been used to test the usability of AFAS Focus and to find if different ways of evaluating usability can help find more usability problems. The main UEM, user testing was performed using six participants. According to Nielsen and Landauer (1993) this sample size should be large enough to find 90% of the usability problems. The limited amount should still be kept in mind when interpreting the result as there were different types of users within the group of six participants.

The System Usability Scale was filled in by only the participants of the user tests. As the SUS is only accurate with a sample size of 12 or more, the scores cannot be used to score the usability of the system (Tullis & Stetson, 2004). For the second iteration of user tests one question of the SUS was altered to fit the use of ERP system better, therefore the scores of the two iterations cannot be combined or compared. The WalkMe tracked events were able to track the actual behaviour of all active users giving a new insight in the use of the system.

Regarding the ISO standard definition of usability (Jokela et al., 2003), effectiveness was not measured during the user tests and could only be tested in a limited way using WalkMe. Efficiency was measured during the user tests. Comments about how well people are able to work with certain functionalities and if they would be able to work quickly with them can indicate the efficiency of the system. Satisfaction is also measured during the user test by looking for comments about the users general attitude towards a functionality.

6.1 User Tests

The user tests have generated many comments about the system, both positive and negative. A large number of comments were about Clarity, Usability, and Experience. The Clarity comments were all negative, meaning that the software can be improved to be more understandable for the users. The Usability code also contained a lot of references, mostly negative. Many of these comments were about how certain ways of working will not work for them and that they cannot see all the information in one screen they would like to see. In hindsight, renaming the code Usability to 'ease of use' might have been better, as all other codes are related to usability as well.

After redistributing the references in the Suggestion code it became clear that many users would like to be able to customise the pages or views more than what is possible in Focus. These results are in line with the findings of Singh and Wesson (2009), where customisation is one of the five usability criteria for ERP system.

Several participants also stated that they would like to have more information in certain views or booking screens. Often they would like to see the description they gave to a booking in the view containing all bookings. This matches the first usability heuristic for ERP systems by Singh and Wesson (2009): Navigation and Access to information. Meaning the users want to be able to navigate to and access the desired information efficiently. Adding more or different information to a view can help the user navigate to the desired booking quickly and without any unnecessary clicks.

During the user tests with first time users and users who are familiar with different ERP system, it was clear they were comparing Focus to the systems they know. Often the system they know is most user friendly in their eyes, showing that the users mental model of an ERP system can be important regarding the perceived usability of a system. These findings are in line with research by Van Der Veer and del Carmen Puerta Melguizo (2002), that shows that mental models influence how easily a user can learn to work with a system.

6.2 System Usability Scale

The results from the SUS cannot be analysed separately as the sample size is too small and one question was changed for the second iteration. On the other hand, the scores are in line with the comments the participants made during the user tests. The clients are in general quite content with the system, whether it was their first time seeing the system or not. Accountants were less enthusiastic about Focus, it was too limited and it would cost them too much time to fill in the booking screen compared to what they are used to when using Profit. The literature did not show different needs between different types of ERP system users.

The scores from both the original SUS and the altered SUS were in line with the results from the user test. Meaning the SUS can be used to get a general idea of what the users think of the system. When using the SUS as a separate UEM, a question to elaborate on the choices made, can give more insight in the scores. As a questionnaire can be shared with all users, for example using WalkMe, the sample size will most likely be larger than in this research.

6.3 WalkMe

WalkMe allowed to track the actual users' behaviour. When looking at the navigation path to creating a new sales invoice it was clear that user do not take the quickest or shortest route. They take the route that is most familiar to them and allows them to know where they are in the system. This is in line with the first heuristic of Nielsen's 10 Usability heuristics: 'visibility of system status' (Nielsen, 2012).

An additional benefit of using WalkMe, is that it is very scalable. When the amount of users grows, it will still take the same amount of time to create any of the tracked events, funnels, or surveys. Especially surveys become more reliable with a higher amount of respondents.

Finally, WalkMe Insights is made to easily see the behaviour of the user over a certain period. It allows to look back to how the system was used during prior versions or a certain time ago. For example, when the design or location of a certain button has changed, the usage between the two versions can be compared. Insights makes the analysis of the results very easy, but when a more in depth analysis is desired, there is a possibility to export the data to a CSV file. Which can be imported into a desired data analysis tool.

6.4 Limitations

The small amount of participants made it difficult to generalise the usability problems the participants have found during the user test. There were different factors why the amount of participants ended up being lower than initially planned. Firstly, finding potential participants that have never seen the system before was quite difficult as this was done by searching the incidents sent in for the AFAS Small Business product. A very small amount of incidents seemed to indicate that the user was suitable for the user test related to sales invoices or memorandum bookings. After contacting these people less than half were interested or showed up to the user test. The small amount of users together with the cancelled release of a version of the software also lead to letting go of analysing the different iterations separately.

Due to constraints in WalkMe, funnels cannot be used to analyse all steps within a functionality. The option to create funnels in WalkMe is more focused on companies that want to know the conversion rate on their website. Five steps in one funnel is presumably enough to get insight in a website's conversion rate. However, the limit of five steps per funnel is too low to analyse the use of a functionality and forced us to chose between steps

in a functionality. This means that the time between two steps might be the time a user takes to complete three steps. Another limitation to the funnels is that there is no possibility to add optional steps. Having optional steps could give more insight in how often these steps are taken and if taking these steps has an influence on the total completion time. Besides constraints in WalkMe, the system also caused limitations when creating Tracked Events in WalkMe. The function of the dynamic buttons, such as in Figure 15, change to the last option that has been used. Yet, the attributes where the Tracked Events are based on do not change. The tracked event is based on the location of the button, not the function of the button, meaning it cannot be tracked properly.

7. Conclusion

This research aimed to find what type of Usability Evaluation Methods are suitable for evaluating ERP systems in a company setting. Both qualitative and quantitative methods have been selected to explore how the use of these methods can be improved or how they can help gather more feedback. The information collected while performing these methods, resulted in an overview of what aspects of usability are important to the user and how the software can be improved.

To answer research question RQ1, a literature review was conducted. Many different UEMs were identified. Three different methods were chosen to be able to gather both qualitative and quantitative data. An automated approach to usability testing was chosen as well.

The coding process resulted in a list of codes, containing statements made by the participants of the user tests. The number of times a code is used, can indicate the importance of that aspect in the software. This information can be used to prioritise the implementation of certain functionalities. To answer research question RQ2, the results showed that customisation, ease of use, and clarity are very important aspect of usability for ERP systems.

The existing usability evaluation for Focus does not contain any automated steps. Using WalkMe Tracked Events and Funnels is a good step towards automating the usability evaluation, wherever possible. Using WalkMe also allows to get insight in the actual behaviour of the user during their work day. Tracking events gives insight in how often functionalities are used and what navigation paths are used. Using an automated transcription tool to transcribe the recordings of the user test can also make the process of reporting the results from the user tests to the designers and developers more efficient. This answers research question RQ3, on what methods work well to evaluate the usability of AFAS Focus.

Finally, to answer research question RQ4, the user tests have resulted in many suggestions on how the usability of Focus can be improved. First and foremost, Focus should make sure they can provide a system that works well for both accountants and clients. There should be a possibility for accountants to be able to book items without using their mouse, to make sure they can keep working as quickly as they can in Profit. Secondly, customisation in many different ways was desired by many of the participants. Third, the descriptions of several fields were not clear to the participants, investigating what terms

are clearer to the user can help take away confusion.

7.1 Future Work

This study has identified that there is large gap between the needs of accountants and clients. While some aspects that could improve the system for accountants have been identified. More research into the accountant's needs, can help with designing a better system for accountants.

WalkMe contains many more applications to help the user in the system or to help gather more information about the user's opinion and behaviour. More research on how these functionalities can increase the usability or help the usability evaluation of Focus can be very valuable. When using Walk Thrus in WalkMe, it would also be valuable to include these in the user tests. This way the usability of the Walk Thrus can be evaluated as well. To automate the user testing process more, it could also be interesting to investigate if it is possible to create a separate user group for the participants of the user tests. This would allow for the analysis of the user tests in WalkMe as well.

In case more detailed data about how users go through a functionality is desired, more research is needed to find if there are platforms or tools that are developed for the usability evaluation of websites. Funnels in WalkMe are a good first step to see if more detailed data is desired, but this functionality is not made for the analysis of a functionality.

Acknowledgements

I would like to thank everyone who has provided me with feedback and has supported me while writing my thesis. Firstly, I want to thank my academic supervisor Albert Salah for the valuable feedback and guidance during the whole process. Secondly, I want to thank my supervisor at AFAS Software, Erik van de Ven. Thank you for giving feedback, always taking the time to explain how Focus works, and your great drawings to take away any ambiguity. I would also like to thank Christine Bauer, my second academic supervisor for picking up the task as second supervisor very last minute. Moreover, I would like to thank Hugo Wijntjes and Casper Lange from AFAS Software, for their guidance regarding the user tests and WalkMe. Next, I would like to thank my family and friends for supporting me. A special thanks to my sister Frances and housemate Dieke for proofreading my thesis. Thanks to my friends Anneleen, Bart, and Tim for the mental support during our weekly calls :) Finally, I want to thank all the participants for taking the time to participate in the user test.

References

- AFAS. (2021). *Erp software van afas grip op al je bedrijfsprocessen*. <https://www.afas.nl/software/erp>.
- AFASHelp. (2021a). *Releasenotes focus 1.16 afas help center*. <https://help.afas.nl/help/NL/FOCUS/117073.html>.
- AFASHelp. (2021b). *Releasenotes focus 1.17 afas help center*. <https://help.afas.nl/help/NL/FOCUS/117463.htm>.
- AlGhannam, B. A., Albustan, S. A., Al-Hassan, A. A., & Albustan, L. A. (2018). Towards a standard arabic system usability scale: Psychometric evaluation using communication disorder app. *International Journal of Human-Computer Interaction*, 34(9), 799–804.
- Arnowitz, J., Heidelberg, M., Gray, D., Arent, M., & Dorsch, N. (2005). The stakeholder forest: designing an expenses application for the enterprise. In *Chi'05 extended abstracts on human factors in computing systems* (pp. 941–956).
- Au, F. T., Baker, S., Warren, I., & Dobbie, G. (2008). Automated usability testing framework. In *Proceedings of the ninth conference on australasian user interface-volume 76* (pp. 55–64).
- Bangor, A., Kortum, P., & Miller, J. (2009). Determining what individual sus scores mean: Adding an adjective rating scale. *Journal of usability studies*, 4(3), 114–123.
- Blandford, A., Furniss, D., & Makri, S. (2016). Qualitative hci research: Going behind the scenes. *Synthesis lectures on human-centered informatics*, 9(1), 1–115.
- Blažica, B., & Lewis, J. R. (2015). A slovene translation of the system usability scale: The sus-si. *International Journal of Human-Computer Interaction*, 31(2), 112–117.
- Brooke, J. (1996). Sus: a “quick and dirty” usability. *Usability evaluation in industry*, 189.
- Ceaparu, I., Lazar, J., Bessiere, K., Robinson, J., & Shneiderman, B. (2004). Determining causes and severity of end-user frustration. *International journal of human-computer interaction*, 17(3), 333–356.
- Demirkol, D., & Şeneler, Ç. (2018). A turkish translation of the system usability scale: The sus-tr. *Uşak Üniversitesi Sosyal Bilimler Dergisi*, 11(3), 237–253.
- Dubey, S. K., & Rana, A. (2010). Analytical roadmap to usability definitions and decompositions. *International Journal of Engineering Science and Technology*, 2(9), 4723–4729.
- Exact. (2019). *Exact online the no 1 online business software exact*. <https://www.exact.com/software/exact-online>.
- Fernandez, A., Insfran, E., & Abrahão, S. (2011). Usability evaluation methods for the web: A systematic mapping study. *Information and software Technology*, 53(8),

789–817.

- Ferre, X., Villalba, E., Julio, H., & Zhu, H. (2017). Extending mobile app analytics for usability test logging. In *Ifip conference on human-computer interaction* (pp. 114–131).
- Finstad, K. (2006). The system usability scale and non-native english speakers. *Journal of usability studies*, 1(4), 185–188.
- Forms, M. (2020). *Microsoft forms surveys polls and quizzes*. <https://www.microsoft.com/en-us/microsoft-365/online-surveys-polls-quizzes>.
- Grossman, T., Fitzmaurice, G., & Attar, R. (2009). A survey of software learnability: metrics, methodologies and guidelines. In *Proceedings of the sigchi conference on human factors in computing systems* (pp. 649–658).
- Hareide, O. S., & Ostnes, R. (2018). Validation of a maritime usability study with eye tracking data. In *International conference on augmented cognition* (pp. 273–292).
- Hart, S. G., & Staveland, L. E. (1988). Development of nasa-tlx (task load index): Results of empirical and theoretical research. In *Advances in psychology* (Vol. 52, pp. 139–183). Elsevier.
- Helander, M. G. (2014). *Handbook of human-computer interaction*. Elsevier.
- Hertzum, M. (2016). A usability test is not an interview. *interactions*, 23(2), 82–84.
- Ivory, M. Y., & Hearst, M. A. (2001). The state of the art in automating usability evaluation of user interfaces. *ACM Computing Surveys (CSUR)*, 33(4), 470–516.
- Jokela, T., Iivari, N., Matero, J., & Karukka, M. (2003). The standard of user-centered design and the standard definition of usability: analyzing iso 13407 against iso 9241-11. In *Proceedings of the latin american conference on human-computer interaction* (pp. 53–60).
- Lewis, J. J. R., & Sauro, J. (2017). Revisiting the factor structure of the system usability scale. *Journal of Usability Studies*, 12(4).
- Martins, A. I., Rosa, A. F., Queirós, A., Silva, A., & Rocha, N. P. (2015). European portuguese validation of the system usability scale (sus). *Procedia Computer Science*, 67, 293–300.
- Matthews, D. (2008). Usability as an erp selection criteria. *IFS White Paper, January*.
- Molich, R., Wilson, C., Barnum, C. M., Cooley, D., Krug, S., LaRoche, C., ... Traynor, B. (2020). How professionals moderate usability tests. *Journal of Usability Studies*, 15(4).
- Muller, M. J., & Kogan, S. (2010). Grounded theory method in hci and cscw. *Cambridge: IBM Center for Social Software*, 1–46.
- Nielsen, J. (1993). *Usability engineering*. Morgan Kaufmann.
- Nielsen, J. (1994a). *10 usability heuristics for user interface design*. <https://www.nngroup.com/articles/ten-usability-heuristics/>.

- Nielsen, J. (1994b). Usability inspection methods. In *Conference companion on human factors in computing systems* (pp. 413–414).
- Nielsen, J. (2000). *Why you only need to test with 5 users*. <https://www.nngroup.com/articles/why-you-only-need-to-test-with-5-users/>.
- Nielsen, J. (2012). *Usability 101 introduction to usability*. <https://www.nngroup.com/articles/usability-101-introduction-to-usability/>.
- Nielsen, J., & Landauer, T. K. (1993). A mathematical model of the finding of usability problems. In *Proceedings of the interact'93 and chi'93 conference on human factors in computing systems* (pp. 206–213).
- Nielsen, J., & Levy, J. (1994). Measuring usability: preference vs. performance. *Communications of the ACM*, 37(4), 66–75.
- NVivo. (2021). *Nvivo*. <https://www.nvivo.nl/>.
- Nyström, M., Andersson, R., Holmqvist, K., & Van De Weijer, J. (2013). The influence of calibration method and eye physiology on eyetracking data quality. *Behavior research methods*, 45(1), 272–288.
- O'Brien, H. L., Cairns, P., & Hall, M. (2018). A practical approach to measuring user engagement with the refined user engagement scale (ues) and new ues short form. *International Journal of Human-Computer Studies*, 112, 28–39.
- Pardalos, P. M., Migdalas, A., & Pitsoulis, L. (2008). *Pareto optimality, game theory and equilibria* (Vol. 17). Springer Science & Business Media.
- Parks, N. E. (2012). Testing & quantifying erp usability. In *Proceedings of the 1st annual conference on research in information technology* (pp. 31–36).
- Polson, P. G., Lewis, C., Rieman, J., & Wharton, C. (1992). Cognitive walkthroughs: a method for theory-based evaluation of user interfaces. *International Journal of man-machine studies*, 36(5), 741–773.
- Poole, A., & Ball, L. J. (2006). Eye tracking in hci and usability research. In *Encyclopedia of human computer interaction* (pp. 211–219). IGI Global.
- Rettig, M. (1991). Nobody reads documentation. *Communications of the ACM*, 34(7), 19–24.
- Rogers, B. L., & Chaparro, B. (2003). Breadcrumb navigation: Further investigation of usage. *Usability News*, 5(2), 1–7.
- SAP. (2020). *Sap business one erp software voor kleine ondernemingen*. <https://www.sap.com/netherlands/products/business-one.html>.
- Scott, J. E. (2008). Technology acceptance and erp documentation usability. *Communications of the ACM*, 51(11), 121–124.
- Singh, A., & Wesson, J. (2009). Evaluation criteria for assessing the usability of erp systems. In *Proceedings of the 2009 annual research conference of the south african institute of computer scientists and information technologists* (pp. 87–95).
- Sonderegger, A., Schmutz, S., & Sauer, J. (2016). The influence of age in usability

- testing. *Applied Ergonomics*, 52, 291–300.
- TechSmith. (2017). *Camtasia screen recorder video editor free trial techsmith*. <https://www.techsmith.com/video-editor.html>.
- Tiedtke, T., Märtin, C., & Gerth, N. (2002). Awusa—a tool for automated website usability analysis. In *proceedings of 9th international workshop on design, specification and verification dsv-is*.
- Topi, H., Lucas, W. T., & Babaian, T. (2005). Identifying usability issues with an erp implementation. In *Iceis* (pp. 128–133).
- Tullis, T. S., & Stetson, J. N. (2004). A comparison of questionnaires for assessing website usability. In *Usability professional association conference* (Vol. 1, pp. 1–12).
- Umble, E. J., Haft, R. R., & Umble, M. M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. *European journal of operational research*, 146(2), 241–257.
- UserSense. (2020, May). *System usability scale (sus)*. Retrieved from <https://www.usersense.nl/usability-testing/system-usability-scale-sus>
- Van Der Schuur, H., Van De Ven, E., De Jong, R., Schunselaar, D., Reijers, H. A., Overeem, M., ... Brinkkemper, S. (2017). Next: Generating tailored erp applications from ontological enterprise models. In *Ifip working conference on the practice of enterprise modeling* (pp. 283–298).
- Van Der Veer, G. C., & del Carmen Puerta Melguizo, M. (2002). Mental models. In *The human-computer interaction handbook: Fundamentals, evolving technologies and emerging applications* (pp. 52–80).
- Visma. (2016). *Mamut one visma*. <https://www.visma.co.uk/mamutone/>.
- WalkMe. (2002). *Walkme digital adoption platform*. <https://www.walkme.com/>.
- Wang, J., Antonenko, P., Celepkolu, M., Jimenez, Y., Fieldman, E., & Fieldman, A. (2019). Exploring relationships between eye tracking and traditional usability testing data. *International Journal of Human-Computer Interaction*, 35(6), 483–494.
- Webster, J., & Ahuja, J. S. (2006). Enhancing the design of web navigation systems: The influence of user disorientation on engagement and performance. *Mis Quarterly*, 661–678.
- Williams, M., & Moser, T. (2019). The art of coding and thematic exploration in qualitative research. *International Management Review*, 15(1), 45–55.
- Wong, W.-P., Veneziano, V., & Mahmud, I. (2016). Usability of enterprise resource planning software systems: an evaluative analysis of the use of sap in the textile industry in bangladesh. *Information Development*, 32(4), 1027–1041.
- Wulff, A. (2007). Eyes wide shut-or using eye tracking technique to test a website. *International Journal of Public Information Systems*, 3(1).

- Xu, J. J., & Topi, H. (2017). A conceptual model for user-system collaboration: Enhancing usability of complex information systems. *Communications of the Association for Information Systems, 41*(1), 31.
- Yen, P.-Y., & Bakken, S. (2009). A comparison of usability evaluation methods: heuristic evaluation versus end-user think-aloud protocol—an example from a web-based communication tool for nurse scheduling. In *Amia annual symposium proceedings* (Vol. 2009, p. 714).
- Zoom. (2021). *Video conferencing web conferencing webinars screen sharing zoom*. <https://zoom.us/>.

A. Creating a sales invoice

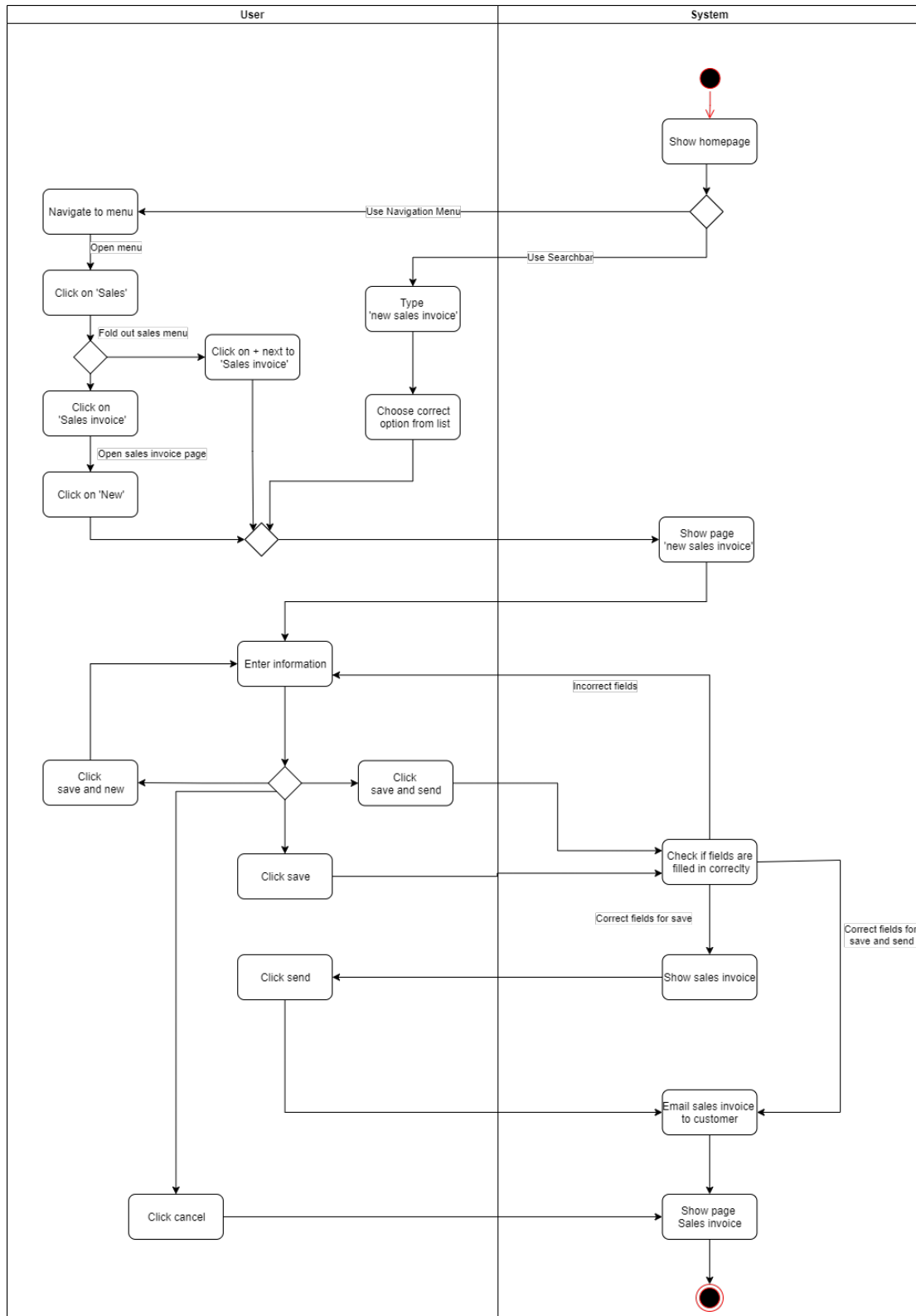


Figure 21. UML Activity diagram of creating and sending a sales invoice in Focus.

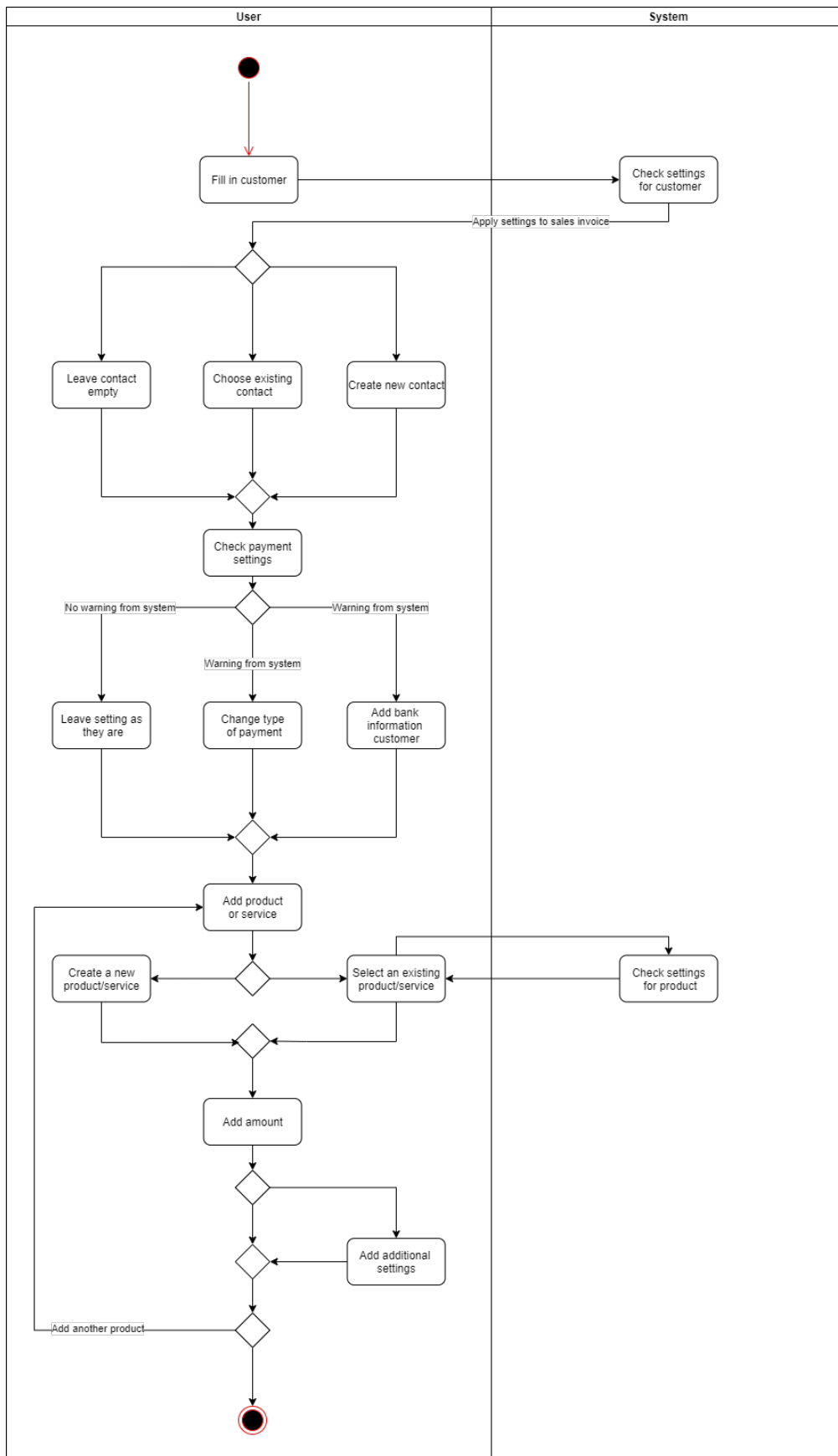


Figure 22. UML Activity diagram detail of 'enter information' in Figure 21.

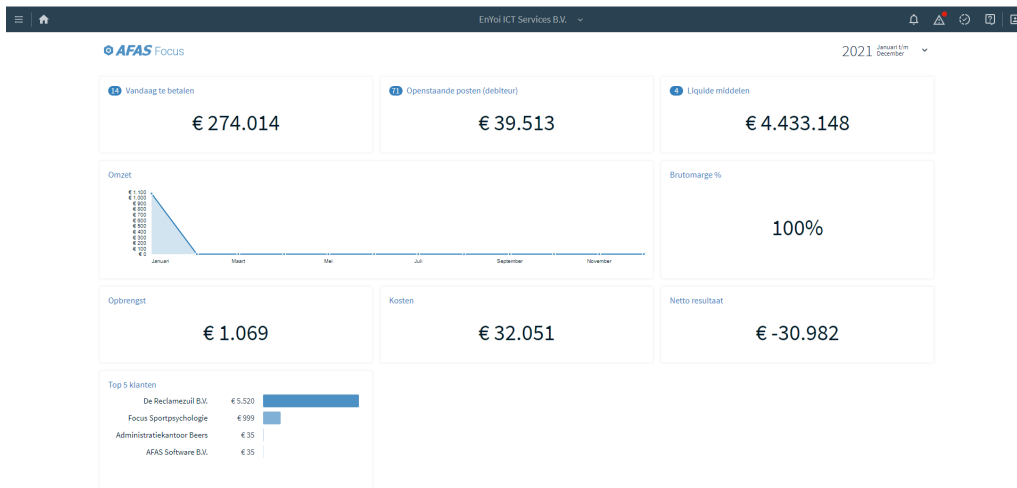


Figure 23. Home screen of Focus (demo environment).

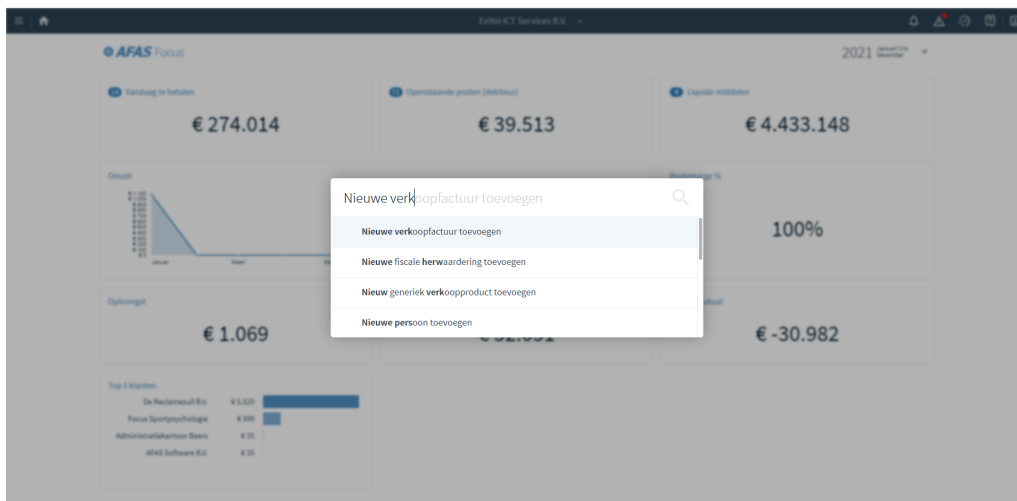


Figure 24. Spotlight function of Focus (demo environment).

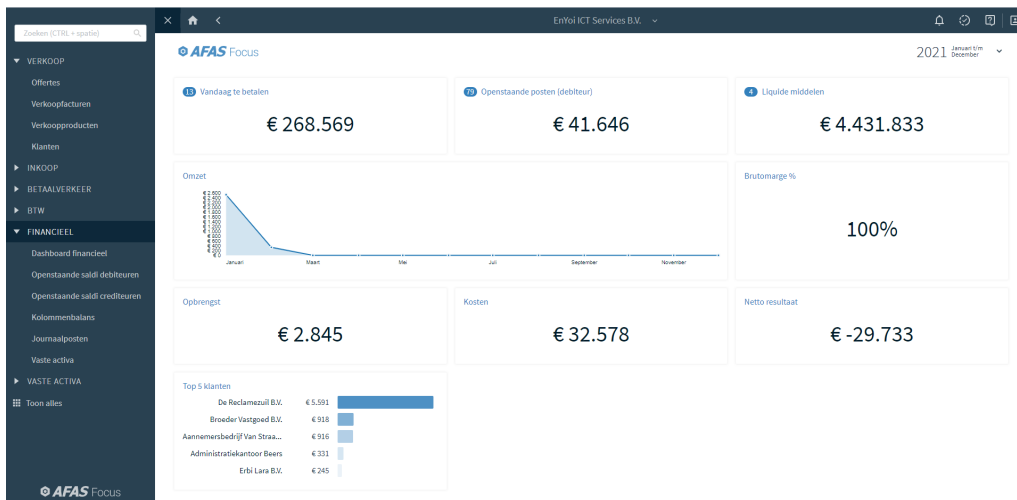


Figure 25. Home screen of Focus with navigation menu on the left side (demo environment).

Alle verkoopfacturen

Nummer	Klant	Factuurdatum	Bedrag inclusief btw	Status	Factuuradres	E-mailadres	Referentie klant	Betaalvoorwaarde	Bedrag v
CR20210000...	Accountantskantoor Van Otteren B.V. (000123)	28-01-2021	€ 10,19	→ Te verzenden	Rusland 18b, 1012 CL, Amsterdam, Nederland			30 dagen	
CR20210000...	Accento Consultants B.V. (000201)	28-01-2021	€ 194,39	→ Te verzenden	Peperstraat 147, 1502 AE, Zaandam, Nederland			21 dagen	
VF20210000...	Administratiekantoor Beers (000194)	28-01-2021	€ 42,58	✓ Verzonden	Postbus 779, 2700 AT, Zoetermeer, Nederland	info@administr...		21 dagen	
VF20210000...	Focus Sportpsychologie (000253)	28-01-2021	€ 1.208,79	✓ Verzonden	Leidatoweg 21, 2318 LJ, Leiden, Nederland	rsp@afas.nl		14 dagen	
VF20210000...	AFAS Software B.V. (000005)	01-01-2021	€ 42,58	✓ Verzonden	Philipsstraat 9, 3833 LC, Leusden, Nederland	info@afas.nl		14 dagen	
VK007227	Acer Computer B.V. (Benelux) (000158)	30-10-2020	€ 2.807,61	✓ Verzonden	Kerkstraat 73, 5211 KE, 's-Hertogenbosch, Nederland			14 dagen	
PR009061	De Reclamezuil B.V. (000184)	29-10-2020	€ 6.679,20	✓ Verzonden	Marktstraat 3, 6711 GK, Ede, Nederland			14 dagen	
PR009056	De Reclamezuil B.V. (000184)	30-09-2020	€ 4.646,40	✓ Verzonden	Marktstraat 3, 6711 GK, Ede, Nederland			14 dagen	
AB007421	Bema Betonmateriaal B.V. (000228)	01-09-2020	€ 147,98	✓ Verzonden	Gasthuisdijk 23, 8041 AE, Zwolle, Nederland			14 dagen	
AB007420	Aanemersbedrijf Van Straaten B.V. (000125)	01-09-2020	€ 1.110,78	✓ Verzonden	Edisonstraat 20, 2809 BP, Gouda, Nederland			21 dagen	
PR009051	De Reclamezuil B.V. (000184)	28-08-2020	€ 1.113,20	✓ Verzonden	Marktstraat 3, 6711 GK, Ede, Nederland			14 dagen	
VK007216	Manutan B.V. (000212)	27-08-2020	€ 812,61	✓ Verzonden	Elandlaan 2, 3734 CP, Den Dolder, Nederland			14 dagen	
VK007200	Gebroeders Van Kooten B.V. (000042)	27-08-2020	€ 626,78	✓ Verzonden	Gietenijstraat 2, 2984 AB, Ridderkerk, Nederland			14 dagen	
VK007215	ICT Groothandel Midden-Nederland (000211)	27-08-2020	€ 8.847,52	✓ Verzonden	Veerpolder 36, 2031 AR, Haarlem, Nederland			14 dagen	
AB007324	Gebroeders Van Kooten B.V. (000042)	01-08-2020	€ 230,80	✓ Verzonden	Gietenijstraat 2, 2984 AB, Ridderkerk, Nederland			14 dagen	
AB007346	Acer Computer B.V. (Benelux) (000158)	01-08-2020	€ 115,40	✓ Verzonden	Kerkstraat 73, 5211 KE, 's-Hertogenbosch, Nederland			14 dagen	
AB007367	Accento Consultants B.V. (000201)	01-08-2020	€ 40,11	✓ Verzonden	Peperstraat 147, 1502 AE, Zaandam, Nederland			21 dagen	
AB007301	Air-Trading Ruurlo (000251)	01-08-2020	€ 10,19	✓ Verzonden	Hoenderweg 66, 6712 CB, Ede, Nederland			14 dagen	
AB007366	Accento Consultants B.V. (000201)	01-08-2020	€ 194,39	✓ Verzonden	Peperstraat 147, 1502 AE, Zaandam, Nederland			21 dagen	

Figure 26. Sales invoice page of Focus (demo environment).

Verkoopfactuur toevoegen

Algemeen | Adres | Betaling

Factuurdatum: 28 januari 2021

Referentie klant:

Klant:

Bijlage:

Product	Aantal	Prijs	Regelkorting	Bedrag inclusief regelkorting	Btw-tarief	Btw-percentage

Figure 27. New sales invoice page of Focus (demo environment).

Verkoopfactuur toevoegen

Algemeen | Adres | Betaling

Factuurdatum: 28 januari 2021

Referentie klant:

Klant:

Bijlage:

Product	Aantal	Prijs	Regelkorting	Bedrag inclusief regelkorting	Btw-tarief	Btw-percentage

Figure 28. Adding a client to a sales invoice (demo environment).

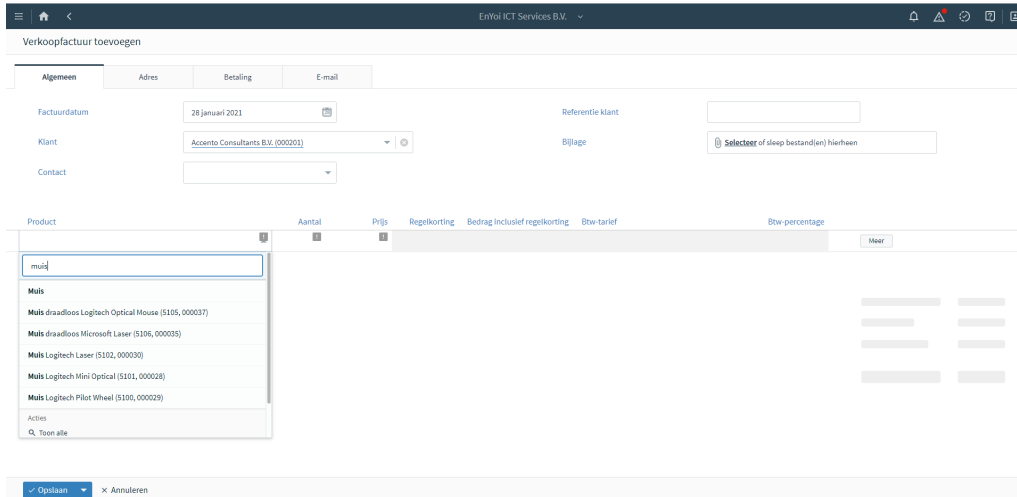


Figure 29. Adding a product to a sales invoice (demo environment).

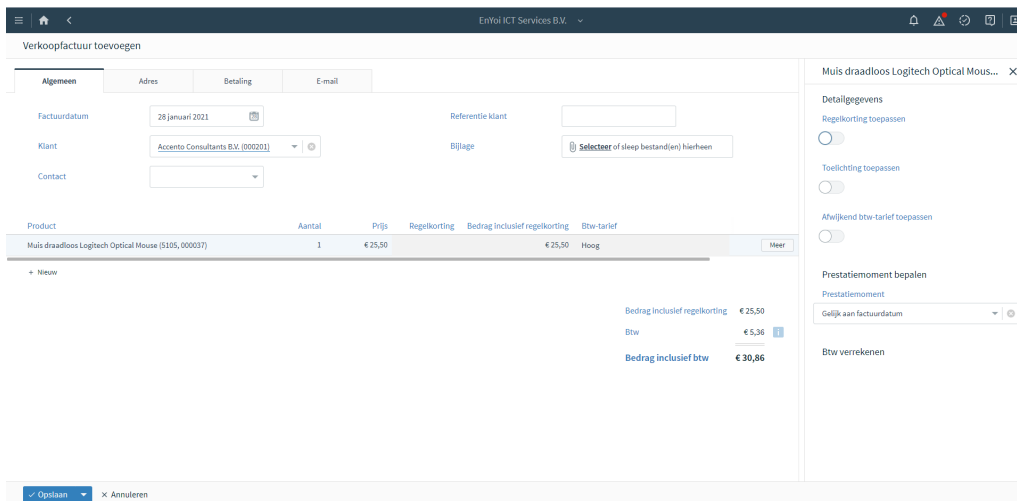


Figure 30. Additional options to a product (demo environment).

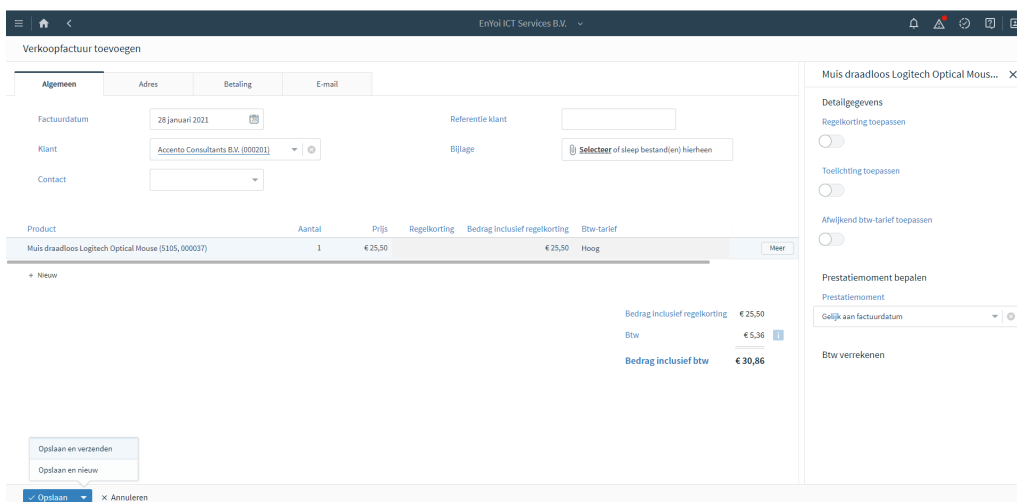


Figure 31. Different ways to save and send a sales invoice (demo environment).

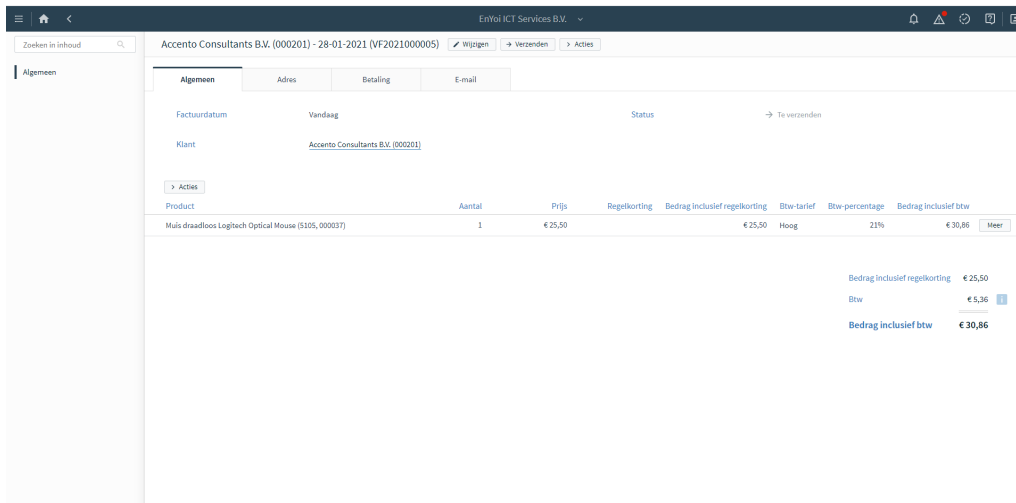


Figure 32. A saved sales invoice (demo environment).

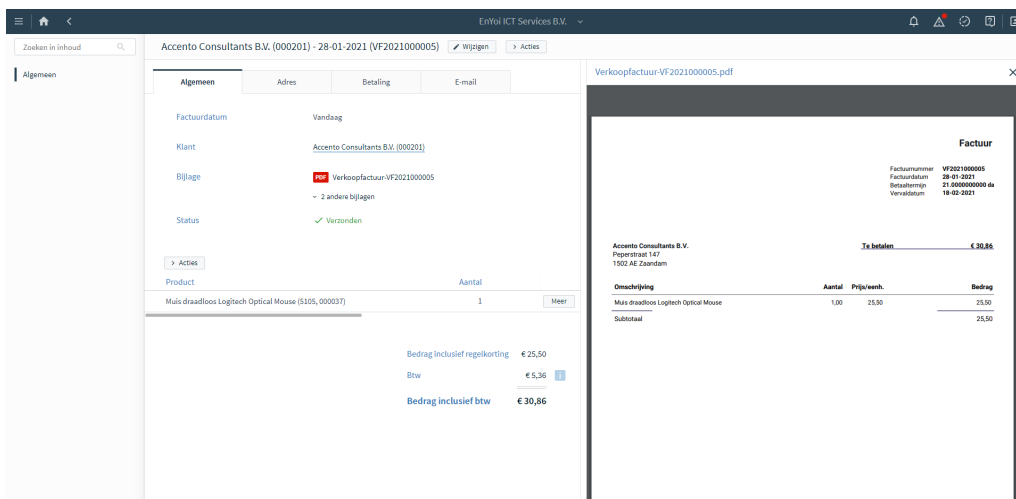


Figure 33. A sent sales invoice with PDF preview (demo environment).

B. Protocol

Dutch version, English translation below

Introductie tekst

Deze UX test is deel van een onderzoek voor een master scriptie voor de Universiteit Utrecht over de gebruiksvriendelijkheid van Focus. Hierbij wil ik vragen of u instemt met het gebruik van uw geanonimiseerde data voor het onderzoek. Geanonimiseerde data betekent dat de data geen informatie bevat waardoor u geïdentificeerd kan worden. De data kan gebruikt worden voor vervolg onderzoek binnen AFAS Software en zal niet gedeeld worden met derde partijen.

Stappen van de user test

- Vragen wat de participant zo al voor taken uitvoert in het huidige ERP product wat ze gebruiken. Bijvoorbeeld vragen wat voor factuur/correctie ze laatst hebben uitgevoerd. Aan de hand hiervan een taak aan de participant geven.
- Voordat de participant begint met het uitvoeren van de taak, vragen of ze iedere beslissing willen verwoorden en hard op willen denken zodat we weten waarom ze bepaalde beslissingen nemen.
- Tijdens het uitvoeren van de taak zo min mogelijk helpen, vragen hoe ze dit normaal zouden oplossen (verwijzen naar de help).
- Wanneer de taak afgerond is, vragen wat ze er van vonden om op deze manier de taak uit te voeren.
- Vraag: Wat vind je belangrijk in een ERP systeem/de functionaliteit die getest is? *Voorbeeld: Moet je er snel mee kunnen werken, moet het veel verschillende functionaliteiten hebben?*
- Afrondende vragen: Wat ze van Focus vinden en of er dingen zijn die ze graag anders zouden willen zien of die nog missen. Als ze op het moment met een ander systeem werken, vragen om te vergelijken wat ze hier beter vinden en wat ze juist beter vinden in het andere systeem.
- De participant de SUS in laten vullen. De link delen en een ID geven die ze in moeten vullen zodat de SUS aan de user test gekoppeld kan worden.
- Bedanken voor het meedoen aan het onderzoek.

Taken voor de user test verkoopfactuur.

1. Maak een verkoopfactuur voor Accento Consultants b.v. met de volgende pro-

- ducten: vijf toetsenborden van Microsoft en vijf draadloze muizen van Logitech.
2. Sla de verkoopfactuur op.
 3. Verzend de verkoopfactuur.
 4. Maak een verkoopfactuur voor Bierbrouwerij "Biertje" met de volgende producten: twee 17 inch monitors van Acer.
 5. Verzend de verkoopfactuur

Taken voor de user test memoriaal boeking. Voor het geval dat de participant niet direct een voorbeeld van een memoriaal boeking kan bedenken.

1. Ga naar de kolommenbalans en bekijk het onverdeelde resultaat.
2. Maak een memoriaal boeking 'Winstdeling' aan waar het onverdeelde resultaat verdeeld wordt.
3. Verdeel de winst over de volgende dingen: bonussen en winstdeling, agioreserve en tantième
4. Sla de memoriaal boeking op.

Table 7. Dutch translation of the SUS (UserSense, 2020), 1 = Helemaal mee oneens, 2 = Oneens, 3 = Neutraal, 4 = Eens, 5= Helemaal mee eens.

	1	2	3	4	5
Ik denk dat ik dit product frequent zou willen gebruiken.					
Ik vond het onnodig ingewikkeld.					
Ik vond het product makkelijk te gebruiken.					
Ik denk dat ik technische support nodig heb om het product te gebruiken.					
Ik vond de verschillende functies van het product goed met elkaar geïntegreerd.					
Ik vond dat er te veel tegenstrijdigheden in het product zaten.					
Ik kan me voorstellen dat de meeste mensen snel met het product overweg kunnen.					
Ik vond het product omslachtig in gebruik.					
Ik voelde me zelfverzekerd tijdens het gebruik van het product.					
Ik moest veel over het product leren voordat ik het goed kon gebruiken.					

Table 8. Dutch translation of the SUS, altered version (UserSense, 2020), 1 = Helemaal mee oneens, 2 = Oneens, 3 = Neutraal, 4 = Eens, 5= Helemaal mee eens.

	1	2	3	4	5
Ik dat ik met dit product mijn taken goed uit kan voeren.					
Ik vond het onnodig ingewikkeld.					
Ik vond het product makkelijk te gebruiken.					
Ik denk dat ik technische support nodig heb om het product te gebruiken.					
Ik vond de verschillende functies van het product goed met elkaar geïntegreerd.					
Ik vond dat er te veel tegenstrijdigheden in het product zaten.					
Ik kan me voorstellen dat de meeste mensen snel met het product overweg kunnen.					
Ik vond het product omslachtig in gebruik.					
Ik voelde me zelfverzekerd tijdens het gebruik van het product.					
Ik moest veel over het product leren voordat ik het goed kon gebruiken.					

English

Introduction text

This user test is part of a research for a master's thesis about the usability of Focus. Hereby I want to ask if you consent to the use of your anonymised data during this research. Anonymised data means that the data will not contain any information that can be used to identify you. The data might be used for further research by AFAS Software and will not be shared with third parties.

Steps of the user test

- Ask the participant what kind of tasks they perform in the ERP system they currently use. Ask them what kind of functionality they have used last and how they did that, what kind of products/services are sold. Based on the answer give them one of the predetermined tasks.
- Before the participant starts with their task, ask them if they want to tell each of their decisions and think out loud, this way we know why they do what they do.
- During the task help as little as possible, ask them how they would normally solve this problem (direct them to the documentation).
- When the participant is done with the task ask them how they experienced performing the task in this system.
- Question: What do you find important in an ERP system/the tested functionality?
Example: Should you be able to work quickly with it or should it contain all possible functionalities?

- Concluding question what they thought of Focus and if there are things they would like to be different. If they are currently working with another system, ask them to compare, what do they prefer in this system and what do they prefer from the other system.
- Ask the participant to fill in the SUS. Send the link and give them the ID they should fill in so the user test can be linked to their SUS. Send this information in an e-mail afterwards, to make sure the participants do not feel pressured to give nice answers.
- Thank them for participating in the user test.

Tasks for creating a sales invoice.

1. Create a sales invoice for Accento Consultants b.v. with the following products: five keyboards from Microsoft and five wireless computer mice from Logitech.
2. Save the sales invoice
3. Send the sales invoice.
4. Create a sales invoice for Bierbrouwerij "Biertje" with the following products: two 17 inch monitors from Acer.
5. Save and send the sales invoice.

Creating a memorandum booking (in case the user is not able to give an example of a memorandum booking).

1. Go to the balance sheet and check the undivided results.
2. Create a memorandum booking 'Profit share' and divided the results.
3. Divide the result into the following: Bonuses and profit shares, share premium, and royalty shares.
4. Save the memorandum booking.

Table 9. Original SUS (Brooke, 1996), 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5= Strongly agree.

	1	2	3	4	5
I think that I would like to use this system frequently.					
I found the system unnecessarily complex.					
I thought the system was easy to use.					
I think that I would need the support of a technical person to be able to use this system.					
I found the various functions in this system were well integrated.					
I thought there was too much inconsistency in this system.					
I would imagine that most people would learn to use this system very quickly.					
I found the system very cumbersome to use.					
I felt very confident using the system.					
I needed to learn a lot of things before I could get going with this system.					

B.1 Calculation of the SUS scores

The questions can be answered with a score from one to five. The odd numbered questions are positive and the even numbered questions are negative. One is subtracted from the positive scores. The negative scores are subtracted from five. Then all scores are added and multiplied by 2.5. This leads to a score on a scale from one to 100.]

C. Results

This appendix contains all the references of the codes collected during the user tests. Each list contains the references and the ID of the participant.

Experience

Positive

- A1: Je kan een bijlage toevoegen dat is een verbetering.
- B3: Hier zie je wel echt per datum wat vervalt dat is misschien wel, want soms ben ik het bij elkaar aan het optellen op een rekenmachine van hoeveel is het bij elkaar.
- B3: Op het voorblad waar veel dingen zichtbaar zijn van wat moet ik nog betalen en openstaande posten en wat de liquide middelen zijn.
- B3: Het door kunnen klikken is fijn, In de inkoopfactuur weergave, Het is wel overzichtelijk.
- B3: Maar voor de rest ziet het er wel heel, het is helder. Een witte achtergrond vind ik altijd wel prettig, lekker rustig het algeheel niet heel druk.
- C1: Dat is ook wel mooi dat je nu meerdere bijlagen gewoon hierheen kan slepen. Top.
- C1: (memoriaal boeking opgeslagen die uit balans is)Maar nu, oh naar wijzigen. Wijzigen neem ik aan, ja, helemaal goed.
- C1: En, Ik kan alles nog gewoon wijzigen, hè? Dus niet op zijn op zijn exacts, dus Ik ben blij dat jullie dat in ere houden. Het is verwerkt In de administratie waarin alles tot In de treuren nog wijzigen. Dan wordt ik blij van.
- C1: En ik zie dat het dus op tekst nu wordt gewerkt dus niet meer op nummer weet ik het niet zo zie, dan werkt het nu meer op op op naam, hè? Dus dat je grootboekrekening Als we even de kolommenbalans weer oppakken, dat hieronder materiële vaste activa ook een rekening in zou kunnen zitten. Met een hoger rekeningnummer dan bijvoorbeeld onder financiële vaste activa. Ja, Ik vind het in Profit Het werk verder prima hoor, Ik kan ermee lezen en schrijven. Maar soms wil je wel eens een andere verdichting geven, maar dan denk ik ja, Dan moet ik ook het rekeningnummer. Weer wijzigen dat er wel eens lastig.
- C1: (Bij toon alles) Hé, leuk dat ik gewoon een profit menu weer terug daar word ik blij van.
- C2: Want daar (Verkoopfacturen) ben ik gewoon hartstikke tevreden over.
- C2: Dat (klanten toevoegen) gaat heel prima.
- C2: Nee, dan moet ik hem (het adres) handmatig invullen. Maar er gaat ook ook geen probleem.

- C2: Dus dat ja, dus voor de rest ben ik hartstikke blij ermee.
- C3: Dashboard is erg nuttig om inzicht te krijgen

Neutral

- B2: Het geeft een beetje een windows gevoel.
- B3: Het is even wennen het is heel anders, maar als je eenmaal doorhebt dat je het naar vandaag moet klikken, slepen dat is dat wel logisch dat heb ik dan wel door
- C1: En Natuurlijk zijn we dat in small business nu ook gewend dat je de boekingslayour niet aan kan passen, Maar ik kan wel velden kleiner groter maken verplaatsen.
- C1: Dus in plaats van de. Kleurtjes werken nu meer uitroeptekens, helemaal goed

Negative

- A1: Je kan alleen een omschrijving geven aan de gehele boeking, bij complexe boekingen is dit niet erg prettig, dan wil je een omschrijving per regel kunnen geven.
- C1: (pop up journaalposten bij kolommenbalans)Nou, kijk, ik zie dat het scherm de dit venster is qua grootte, niet aanpasbaar. He, Als ik hier ga staan, dan kan ik. Hem ook niet groter trekken.
- C1: En dan moet ik weer wegklikken, denk ik. Ja, kijk nou, je ziet de BTW eruit gehaald. Dat kan Als je heel veel tijd over hebt, bij Profit zoals het nu staat, is na jaren met veel gebruikers ervaringen en wensen is dat er neergezet. En wil je dan ook dat een nieuw product gaat slagen, moet je minstens net zo goed doen.
- C1: Dus boekingen worden tussentijds niet opgeslagen? Betekent wel hypothetisch, want je werkt Natuurlijk in een browser op het moment dat de verbinding wegvalt, de Internetverbinding, wat dan ook en ik zit net in een hele grote boeking dat ik mijn boeking kwijt ben, dan zou ik net als voorheen, Als ik dan na een crash weer naar een dagboek gingen, zei, Ik heb een afgebroken sessie gevonden.
- C1:Een daarna, kan ik er blijkbaar ook nog acties op doen. Niet op alfabet. Daar staat een beetje onlogisch. Want Ik heb hier ook nog andere overboekingen, soort van boekingen en die staan onder systeem opties. Zou deze systeem opties die zou helemaal onderaan doen met een bijvoorbeeld een mooi lichtgrijs scheidslijn hiertussen?
- C1:Ik vrees dat. De Mensen bij aan vast met een visie hebben gedacht dat dat bonnetje eerst ingeboekt moet worden als crediteur. Dat gaan we dus niet doen? Want niet alle mutaties worden. Als crediteur ingeboekt plus op deze manier boeken, hè? Wat ik net ook al aangaf is er bij ons einde AFAS Als ik een administratie deze manier moet verwerken, ben ik echt 30 keer zo lang bezig.

- C1:Nee, jullie hebben intern ook wel de term bookings matrix. Wat nu ook gebruikt wordt in financieel. Zo willen wij als accountant boeken, snelheid daar gaat het om productie? Maar ik kan. Op deze manier kan ik dus geen kas meer boeken.
- C1:(Vier bijlages toegevoegd aan de inkoopfactuur)Kan ik hier ook stel dat ik 4 stuks heb? Ja mooi top o kijk ja niet handig niet. Om het hele boeking is nou onderaan, wat zou ik ze gewoon als als naam punt jpeg of pdf vermelden?
- C1: Maar ik had hier al toon alles, maar die om daar te komen moet ik dus altijd die (hamburger menu knop)aanklikken.
- C1: Wat ik hier mis Dat is dus echt de snelle invoer wijze. Het is te formulier georiënteerd, Dat is voor mij echt een no go ben ik gewoon keihard in, dat is AFAS ook wel gewend van mij trouwens, Maar dat is voor mij echt een reden om het product niet door te voeren.
- C1: Even kijken, stel dat dit in Duitsland is? Ja zoiets hier, Ik kan hier dus een geen btw scenario kwijt, plus een btw nummer wat ik hier nu in vul. Pikt ie, het bestaat helemaal niet
- C2: Ik stuur een herinnering, want ik zie wel gelijk aanmaning, Maar ik vind het zo hard aan deze aanmaning Als je nog niet eens herinnering hebt gestuurd (Het sturen van een herinnering is niet mogelijk, alleen een aanmaning).

Usability

High

- C1: Ik kan hier al zoeken, dus Dit is voor mij gewoon het snelfilter scherm. Ik ga even zoeken op alles van februari. 2020 Dat doet hij dus live. Je hoeft niet meer te enteren Oke dus hier kan je filter instellen. En werkt het ook nog om? Even wennen aan de snelheid, op de ouderwetse manier. Inzet van dit moet groter dan zijn dan nul een dat twee. Ja, dat doet hij dus ook top.
- C1: (Datum invullen)Oke dat gaat nu zo. Stel dat ik daar dan van maak 0 1, 0 7. Dan zet ie emAutomatisch om kan ik dat ook nog zo doen. Ja, dus, Ik kan ook Zonder streepjes doen.
- C1: Dus, Ik kan nu ook zoeken op. Op omschrijving, dus ik zat hier. De tab, ik zeg hier. Precies dat werkt mooi op deze manier.
- Het liefste zou ik zelfs, Ik ga even kijken of het werkt. Kijk, Ik kan er ook door een enteren, daar word ik heel blij van.
- C4: Fijn dat de email nog gepersonaliseerd kan worden als er nog een persoonlijke notitie oid bij moet
- C4: Voor niet erg ervaren mensen is het fijn dat je niet alle informatie in een keer ziet zoals in Profit maar eerst een deel ziet en dat je zelf verder kan klikken als je meer wil weten.

Neutral

- B2: Het huidige product (SB) is gewoon heel simpel, het is misschien ook gewoonte en ik denk dat als je hier mee aan de slag gaat dat je er wel feeling voor krijgt.
- B3: (Memoriaal boeking) In de oude afas moet je altijd echt een maand kiezen voordat je er in kan, dat zie ik hier niet, ik zie dat je hier gelijk op een datum boekt. Het verschil maakt niet uit hier is het duidelijk dat je het op 11 mei boekt. Het is alleen als je in het oude systeem wat we nu gebruiken als je dan in mei zit en ik heb een inkoopfactuur van april en ik wil april invullen dan werkt dat niet dus voor jezelf heb je een controle van ik zit in de goede maand en die check heb je hier dan niet.

Low

- A1: Wat voor mij het belangrijkste is dat als ik die boeking open, de omschrijving die ik heb meegegeven. Nu moet ik eerst heel die boeking openen, dan kan ik pas de omschrijving zien.
- A1: Als je een memoriaalboeking verwijdert dan staat er een min bedrag en een plus bedrag. En als je meerdere correctie hebt dan krijg je plus, min, plus, min en dan is het niet duidelijk wat de eindwaarde is. Als je een boeking wijzigt dan hoeft ik niet al die andere dingen te zien
- B2: Ik denk dat je gewoon moet wennen maar hier moet je nu in het bovenste scherm alle dingen invullen, maar in de oude versie kwam alles in 1 regel en dan ging alles tab tab tab, dat was gebruiksvriendelijker. Het is iets omslachtiger zo.
- C1: Kan ik kolombreedtes niet aanpassen? Ja nee, dat vind ik wel jammer. Dat zou ik wel als een Kritiekpuntje hier neer willen zetten, maar je ziet ook hier, hè? Vooral Omdat ik hem uitklap, maar zelfs de de verdichtings omschrijvingen, die zijn al al langer, terwijl er heel veel ruimte is voor een bedragen.
- C1: Nu is de Rechtermuistoets kom je uiteraard In het rolmenu van je browser terecht, dus ik dit. Dit gaat bij ons. In de praktijk gaat dit ergernis oproepen.
- C1: Dan heb ik logischerwijs niet meer zoals voorheen dat ik meerdere schermen tegelijk open kan leggen. Is dat iets wat helemaal niet meer kan In de browser tijd? Want wij gebruiken dat namelijk enorm veel. Ik gebruik het in in onze kantooromgeving ook enorm veel, Omdat je Omdat het heel vervelend is Als je bijvoorbeeld aan het boeken bent in een memoriaal dagboek en je wil even bepaalde gegevens of een klant belt of wat dan ook. En je wil even een dossier voor je neus toveren. Dan is het heel vervelend Als je altijd in schermen moet sluiten om om even tussentijds op te zoeken. Want je zit net in 1 grote boeking of ik noem maar wat. daar wat uitzoeken? En, Als je dan hier naar het menu gaat om een ander

scherm te openen en je bent deze boeking weer kwijt. Ja, Het is heel vervelend,

- C1: (Klikt op meer) Kijk, dit gaan wij als accountant heel irritant vinden. Voor Klanten werkt dit Misschien fijn als account zou dit voor mij een reden zijn om profit terzijde te schuiven, want Ik wil die btw kunnen boeken op de regel. Ik word nu gedwongen om de muis te pakken.
- C1:Deze bedrag inclusief BTW kijken en ik krijg de vraag over de BTW niet eens Nee, Je moet echt op die meer knop drukken. Je ziet hebben die interactie echt 24 keer. 7 Het is ons werk gereedschap en als wij een administratie moeten verwerken van een klant of dat nu handmatig gaat, of of of een deel scan en herken maar wij willen kunnen rammen. Het gaat om vele mutaties, dus Ik wil net als voorheen die bw, want op de grootboekrekening ga ik vanuit dat btw ook echt gezet, dus Ik kan btw boeken op deze grootboekrekening. Nou wil ik in deze regel ook in een keer mijn btw code. of hoe Het ook werkt kunnen inrammen, zodat ik Zonder interactie met de muis door kan enteren. Dus Ik heb hier nu het bedrag inclusief BTW 21 procent.
- C1:Je ziet nou al hoeveel ik nu met een muis moet doen.
- C1: Dit ga ik als accountant nooit op deze manier accepteren, want dat betekent dat ik voor elke mutatie dus een formuliertje moet invullen.
- C1: (Inkoopfactuur)Zou ik toch de btw scenario of code hier willen zien? Om de snelheid erin te houden.
- C1: En ik, maar Misschien is het ook komt door het scherm van zoom, hoor, Maar ik. Ik mis soms een beetje focus dat ik zie waar Ik ben. Op de regel De regel hij entert niet door naar nieuwe regel, want ik zie bij nieuw wel een letter n staan. Toen ik hem in toetste toen was mijn omschrijving hierboven weg, dus dan vraag ik me af waar de sneltoets hier gedrukt kan worden, want Het is geen control N want ik zag eerder als ctrl S opslaan, dat is hier. Je staat op een boekingsregels. Ik ben aan het Rammen. En Ik wil hier sneltoets doen ctrl s maar of ctrl N dit moet control N zijn focus en onafhankelijk, kun je dit ook.
- C1: Ik zie niet dat het hier kan om hem weergave aan te passen.(inkoopfactuur aanmaken) Dat je deze tabbladen dan deze informatie wellicht ook deels op het eerste tabblad krijgt, want zeker als klanten dit gaan gebruiken, dan krijg je dus altijd weer extra klik werk.
- C1:(aanmaning) Waarom moet ik een stap kiezen, dan moet het toch zelf doen. Ik wil gewoon al mijn debiteuren in een keer. Nee, Je moet gewoon de run aanmaken en hij moet een basis van de openstaande posten. Moet die zelf selecteren van die gaat mee. Die krijgt een eerste herinnering, die krijgt een derde aanmaning. Zoals het nu ook werkt.
- C1: Wat vind je van dit principe betalingen slepen? Vind ik wel grappig. Er moet een XML uit waarbij je dus ook grip wil hebben op de omschrijving hè? Je tuurlijk

wordt bijvoorbeeld factuurnummer en dergelijke getoond en Maar ik wil ook grip hebben op bijvoorbeeld omschrijving die bij de betaling wordt getoond en incasso is er nog iets belangrijks crediteuren over het algemeen niet zo, hè, maar in profit kun je nu kiezen om bijvoorbeeld de factuurnummer en een vaste omschrijving mee te geven. Die grip heb ik nuniel en stel dat ik hier een, Ik ga de komende 14 dagen tot 3 weken ga ik op vakantie en Ik wil alvast even wat Betalingen gaan agenderen

- C1: KVK vind ie dit niet meer? Alleen op basis van het eerste woord. Werkt dus niet (zoeken op naam bij crediteur toevoegen)
- C2: En dan doe ik hier ook wel gebruik van maken (adres toevoegen bij aanmaken klant) Maar ja, vaak klopt het toch niet
- C2: Het is voor hem van een leek, zeg maar is het niet gebruiksvriendelijk.
- C4: Niet direct duidelijk hoe de regelkorting toegepast moet worden. (Moest naar de meer knop verwijzen)

Suggestion

- A1: Verder in SB zit er in de weergave tabbladen met de debiteuren en crediteuren, dat zag er erg mooi uit en dat zou ik hier ook graag willen zien.
- A1: Zorg dan dat dat (de omschrijving van de boeking) hier in de weergave terecht komt. Het liefst met de btw-code en btw bedrag. want dat zijn eigenlijk de belangrijkste dingen waar je op controleert als er iets fout gaat
- B2: Omdat we de verkoopfacturen in excel maken is het vervelend dat je ze in SB niet kan toevoegen als bijlage in de boeking, dus dat hebben we opgelost door dat in de journaal boeking te doen. Dus het zou wel fijn zijn als dat bij de verkoopboeking zou kunnen. Dat mensen die niet de verkoopmodule gebruiken wel makkelijk de factuur in de boeking kunnen doen is mijn enige toevoeging.
- B3: Ik zou het ook wel mooi vinden om te kunnen zien wat ik vandaag zou moeten betalen of een week vooruit wat er aan betaling eruit moet. Dat zou ik ook wel, of wat er nog binnen komt, dus openstaande posten van debiteuren want ik ga er nu heel vaak handmatig doorheen
- B3: Omschrijving (bij memoriaal) zou ik misschien /boekstuknummer noemen.
- B3: Maar een extra kolom met het totaal bedrag wat open staat bijvoorbeeld per leverancier. Dat je snel kan zien van dat staat er open bij die
- C1: Kan ik kolombreedtes niet aanpassen? Ja nee, dat vind ik wel jammer. Dat zou ik wel als een Kritiekpuntje hier neer willen zetten, maar je ziet ook hier, hè? Vooral Omdat ik hem uitklap, maar zelfs de de verdichtings omschrijvingen, die zijn al al langer, terwijl er heel veel ruimte is voor een bedragen.
- C1: Hè, Ik kan wel schuiven in het huidige profit hè met control u dat je hem netjes

uitlijnt of dat je kolommen kan uitlijnen.

- C1: Een kasboeken geldt ook voor een bank boeken. Dus Ik ga straks ook kijken hoe de bank gedaan wordt. Moet echt op de ouderwetse profit wijze althans voor ons als account en wat ik mooi vind. Daarin is, volgens mij is dat reeleezee of twinfield twinfield geloof ik. Daarbij kun je kiezen voor de jip en Janneke klant wijze die zoals nu het formuliertjes gaat werken of Je kunt kiezen voor de accountants stijl met de met snelle boeking schermen
- C1: Eigen bankrekening, dus ik moet per boeking Rekening aangeven. Ik zou in dit scherm als dit zo blijft, hier ook de naam achter willen (bankmutatie, veld eigen bankrekening) mijn IBAN en, maar vaak heeft een bankrekening hun omschrijving lopende rekening, spaarrekening weet ik veel. Je moet net weten welk nummer welke is.
- C1: Ik zie niet dat het hier kan om hem weergave aan te passen.(inkoopfactuur aanmaken) Dat je deze tabbladen dan deze informatie wellicht ook deels op het eerste tabblad krijgt, want zeker als klanten dit gaan gebruiken, dan krijg je dus altijd weer extra klik werk.
- C1: Om het hele boeking is nou onderaan, wat zou ik ze gewoon als als naam punt jpeg of pdf vermelden? Misschien is het dan leuk, bedenk ik mij Als je dan met een muis op die regel staat dat je dan een preview krijgt, dus. Gewoon een lintje Laten zien naar een zwevende preview.
- C1: Ik vind het ook prima hoor (dat toon alles via het menu te vinden is), maar dan dan wil ik gewoon dat dat hij met een punaise altijd open blijft staan en dat deze dan standaard dichtgeklapt zijn vind ik ook niet zo erg, zeker als profit hier dezestructuur wellicht straks ook gaat, hè?
- C1: (In favorieten menu) Want dan is het wel leuk Als je de opstaat dat die dan open klapt, dus dat houdt het overzichtelijk. Leuk, maar ook efficiënt dat hij gewoon klikt zeg, maar dus met je meedenkt, zeg maar.
- C1: Kijk, in afas is het zoals die doet, een een berekening van de BTW aangiften en volledig met koppeling naar het grootboek logisch zoals het hoort en Dat is het en daar kun je verder niet op inbreken. Het enige wat je kan doen is privé gebruik invullen dus afas moet vanuit het bw echt een voorstel doen en van mij mag je je driehonderd keer waarschuwen van let op bij het afronden van de mutatiee geen enkel probleem, Alleen Wij zijn gevluht Naar nextens Omdat wij dus als accountant zelf geen grip hebben op de aangifte
- C1: (aanpassen btw-idnummer bij de crediteur) Dit is niet mooi, die moet je automatisch even omzetten naar hoofdletters. Wat ik hier graag wilde zien. Bij buitenlanders moet ik Natuurlijk bij ICP
- C1: Mij ervan vergewissen dat het BTW nummer klopt ik zou een knop willen hebben, want doen wij bij de BTW moeten we ook de icp opgave doen en tijdens

die icp opgave moet jij ook altijd een controle doen of BTW nummers kloppen dus dit. Ik zou heel graag hier een knop willen hebben van de vies controle of deze actief en correct is. Bij Nederlanders dus niet zo van belang bij buitenlanders wel.

- C1: En komt er ook een app voor de SB gebruiker waar in die deze gegevens allemaal kan raadplegen. Deze website is ook gewoon op mobiel en zo aangepast, dus je zou ook gewoon op je mobiel of tablet gewoon op de website kunnen, dus gewoon de. Maar dan moet de klant dus een licentie hebben voor afas, terwijl wij willen eigenlijk dat de klant niet meer of dat wij niet meer gehouden zijn om te koppelen met vision planner, want dat doen we eigenlijk Alleen maar Omdat afas ie functionaliteit ontbeert. Wij zouden deze gegevens die het dashboard gegevens en ook het kunnen aanleveren van facturen voor scanner en herken die ik net mooi zag dat willen kunnen aanbieden aan mijn klant.
- C1: Het dashboard met eventuele inzoom en aanleveren van inkoop/verkoopfacturen. Via de app
- C2: maar je kan het niet verplaatsen, hè? Dat je nu ziet dat er een heleboel klanten bij een organisatie staan die eigenlijk bij klanten horen.
- C2: Als ik het eenmaal heb ingevuld. Nee, je kan niet zeggen van hé, Dit is eigenlijk een persoon,
- C2: dat mis ik (bij openstaande saldi debiteuren) hier wel wacht even ja, ik mis je wat kijk, dan heb ik dit lijstje hè? En dan wil ik eigenlijk gelijk zien wat de factuur aan vast hangt, dan moet ik heel de tijd doorklikken.
- C2: Nou, ik zou eigenlijk verwachten dat je hier (openstaande debiteuren) gelijk dat je hier eigenlijk een kolom hebt waarbij gelijk het factuurnummer bij staat na staat en dat je in één keer kan klikken naar de factuur. Maar ja, als er Natuurlijk meerdere facturen aan zitten, dat weet ik niet of dat kan.
- C2: Daar hebben wij Natuurlijk weer. We hebben een een klant en die heeft een aantal panden. En dan moet ik steeds een andere referentie aan vast gehangen worden, dus ze krijgen ook diverse facturen. Dus PA weet je wel, dus vast staat er PA noem maar wat op twee WC of zo weet je dat soort dingen, dus dat zit in opdracht doen. Wil je van een andere maatschappij. En dan heb je Natuurlijk. Ja je ziet Natuurlijk niet gelijk in een oogopslag. Kijk stel Als ik bij de tweede scherm bent, zie ik dus niet, is dit nou Willem Staten 3 of zoiets, want je ziet Alleen Maar het begin van. Ja, kijk, hier zie je. Hier ziet bijvoorbeeld aannemers bedrijf van Straaten. Maar als die nou een heel veel onderaannemers heeft of bij de factuur hier zo iets met die bedrijven dus wel op de. In de omschrijving dan Ja bijvoorbeeld organics is dan bijvoorbeeld de de aannemingsbedrijf dat hier staat, zeg maar u ons, maar dan heb je Natuurlijk altijd organics Willem staat Organics. Kastanjesingel ik noem maar wat (Bij openstaande posten gefilterd op 1 debiteur wil de klant ook de omschrijving van alle facturen zien zodat de facuur niet geopend moet worden om

details te zien zoals naar welke locatie van het bedrijf het moet)

- C2: Dus Misschien dat dat de reden is. Ik weet het niet en dan hoeft van mij die streep helemaal hier niet, want zie ik toch wel maar hier. (geen streep onder sub totaal van de factuur alleen bij het totaal incl. BTW)
- C4: Inkoopfacturen: de weergave kunnen aanpassen zou fijn zijn, sommige kolommen dichter bij elkaar of aan het begin
- C4: Bij klanten ook de top 5 op andere waarden kunnen bepalen zoals betaal gedrag, of ze snel betalen of niet.
- C4: Bij klanten in de weergave direct kunnen zien wat de omzet en openstaande posten zijn, zo kunnen twee concurrenten vergeleken worden. Welke klant levert meer omzet op (niet alleen van de top 5)
- C4: Op het dashboard: de omzet kunnen customizen, per week bijvoorbeeld. Bijvoorbeeld in de zomermaanden gaat de omzet omhoog, maar het is wel handig om te weten in welke week dit begint en eindigt.
- C4: Kunnen er ook prognoses gemaakt worden? Dus als er een nieuwe weg in gaat of dingen zoals coronamaatregelen kan er dan een prognose van zoveel minder verkoop maar nog wel deze uitgaven gemaakt worden om te kijken hoe je er misschien voor gaat staan als deze prognose klopt.

Clarity

Negative

- B2: Dit is niet verplicht toch, het referentienummer?
- B2: maar ik verwachtte niet helemaal dat dat nog ingevuld moest worden. Als het vrij nieuw is dan verwacht ik wel dat er melding komt maar daarna weet je het wel. Een melding is wel handig als je het voor het eerst gebruikt, maar na een tijdje zit het wel in je systeem.
- B3: Ja ik had zo van meer ik dacht misschien staat er nog wat achter, ik was gewoon benieuwd, nou ik wel zoiets van als er een knopje meer is dan denk ik oh ik moet nog wat invullen terwijl dat helemaal niet zo is zeg maar. Ik klik er dan op en denk moet ik er dan nog iet mee of moet ik nog wat invullen.
- B3: Ik zit alleen even van waar ons boekstuknummer komt te staan
- C1: voorheen heette het de onder financieel dagboek mutaties of boeken dagboek. Nu is dat hier gesplitst bankmutaties logisch, dat zijn Natuurlijk geïmporteerde afschriften, maar memoriaal boekingen, kas mutaties en journaalposten die. Zou het logischer vinden om die gewoon onder. Ja noem een dagboek, mutaties of dagboek boekingen,
- C1: Geboekt op, wat is geboekt op? Is dat een rekeningnummer?
- C1: ben ik ook mijn view kwijt want ik druk op home en ik kom ik In het financiële

dashboard

- C1: betalen, hoe kan ik hier betalen? Dit zijn losse betalingen. Moet ik dan selecteren?
- C2: En dan doe ik hier ja een tekst, Maar dat kan hier niet. Het is blauw. Oh het kan wel
- C2: maar je kan het niet verplaatsen, hè? Dat je nu ziet dat er een heleboel klanten bij een organisatie staan die eigenlijk bij klanten horen.
- C2: Deze heb ik dan. Maar wat ik ervaar is dat Mensen constant exclusief BTW betalen en staat hartstikke duidelijk op, maar. Als men bedenkt dan Misschien wel. Nou ja, hier (factuur layout modern) staat een lekkere vette streep onder. Ik weet het niet wat die Mensen hebben. Ik heb al, Ik heb al 6 klanten gehad die zonder btw betalen
- C2: Ja, en wat ik ook merk is dat het Als de tekst te lang wordt. Hij halveert dan de tekst. Het gaat niet op een pagina twee verder en Als het op een pagina twee verder gaat, dan ziet het er niet uit
- C4: Prijs: is deze exclusief? in de regel bij het aanmaken van een verkoopfactuur
- C4: Vraag wat voor soort bestanden in de bijlage kunnen
- C4: Referentie klant niet helemaal duidelijk wat dat is
- C4: Nummer in rondje bij openstaande posten niet volledig duidelijk.

Navigation

Positive

- C1: Zo gaat het moeten zijn hier, dan word ik heel blij van zin te sneltoetsen. CTRL S
- B3: Nu wil ik eigenlijk terug naar waar ik was (kan het pijltje terug snel vinden)
- B3: Het werkt toch wel. Dat vind ik zelf altijd wel, dat werkt heel snel anders moet ik mijn muis er weer bij pakken en dat is weer een extra handeling.

Neutral

- B3: Ik krijg altijd een lijstje van de accountant voor 1 keer in de maand en dan boek ik voornamelijk de lonen in. en dat tik ik gewoon over en dat doe ik meestal met tab en dan tab je gewoon door, dat vind ik altijd makkelijk en snel werken.maar hier zal je iedere keer op een plusje moet klikken op er een regel bij te krijgen. En in de oude AFAS tab je gewoon door en dan komt er vanzelf een nieuwe regel.
- B2: Wat ik prettiger vind bij wat het nu is dat je iets minder met de muis hoeft te

werken, hier zie ik dat je heel veel. Ja ik denk dat je hier ook gewoon met tab kan werken neem ik aan

- B2: Zolang de tab functie en de sneltoetsen blijven heb ik niet het gevoel dat er echt beperkingen zijn voor mij.

Negative

- C1: Oke nee, ik zou deze (het menu) eerder constant open willen laten. Dit was het favoriete menu. Profit. Ik, ik zie liever wat ik aan klik waar ik ben.
- B2: Ik deed altijd als ik ging opslaan dan f7 ofzo en dan ging ie alle boekingen opslaan, maar ook met alt dan stond er een streepje onder een letter en hier dat vast wel ook zijn alleen zie ik het niet. Want dat deed ik best wel veel.
- B3: Ik zit eigenlijk naar onderen te scrollen of daar nog een knop zit ofzo.
- B3: Ja ik zou het bij algemeen denk ik, ik zocht eigenlijk ja nu heet het dagboek, dus daar was ik eigenlijk naar aan het zoeken.
- C4: Niet direct duidelijk hoe de regelkorting toegepast moet worden. Moest naar de meer knop verwijzen
- C4: Kan het menu niet direct vinden

Missing Functionality

- A1: Wat nog mist in het debet en credit afboeken
- A1: dus het (memo boekingen) moet op alle grootboekrekeningen ed toepasbaar zijn.
- A1: Je kan nu alleen op grootboek niveau boeken, maar nog niet op alle rekeningen
- A1: Je kan alleen een omschrijving geven aan de gehele boeking, bij complexe boekingen is dit niet erg prettig, dan wil je een omschrijving per regel kunnen geven.
- B3: Als je hier een factuur betaald hebt komt dat dan ook hier in het overzicht te staan dat je ook het verleden kan terug zien. Dat er bijvoorbeeld een factuur betaald is dat dat ook in het systeem staat. Dat zit in de huidige ook zeg maar. ik vind ook altijd wel prettig om, soms is het wel handig om na te kijken van wat hebben we al meer aan die klant betaald.
- C1: Maar ook de prognoses en budgetten bij de overzichten tussen realisatie en prognose. Die zie ik er ook nog niet in zitten
- C4: Kunnen er ook prognoses gemaakt worden? Dus als er een nieuwe weg in gaat of dingen zoals coronamaatregelen kan er dan een prognose van zoveel minder verkoop maar nog wel deze uitgaven gemaakt worden om te kijken hoe je er misschien voor gaat staan als deze prognose klopt.

- C4: Bij producten, maar dit is waarschijnlijk meer ordermanagement. Kunnen inzien welke producten goed verkopen en welke niet.

Error Message

Positive

- B2: (foutmelding want 1 lege rij) De melding was wel duidelijk, dat komt omdat je dan net iets te ver door tabt.
- B2: Het was duidelijk dat ik dat moest invullen dat moet gewoon,

Negative

- C1: Even kijken, wat vindt ie hier van? Hij is een rood zal te maken hebben met het negatieve bedrag. Het is niet correct ingevuld, ja, maar je vertelt maar niet wat. Dus wat zou je daar verwachten? Een gerichte, want blijkbaar zit er een logische controle op de achtergrond dat ik iets fout heb gedaan. Ik denk dat het te maken heeft met het feit dat ik een negatief bedrag debet heb ingevuld. Hij verwacht Natuurlijk een positief bedrag credit
- C4: Na opslaan een foutmelding bij de regel met twee producten en regelkorting de foutmelding was niet duidelijk

Unexpected Behaviour

- B2: (bij BTW) ooh het is een bedrag. (Wat had je daar verwacht?) Het is meestal een code ofzo.
- C1: Hij zou hier Omdat op 4550 met BTW geboekt mag worden, zou hij ook voor moeten stellen om BTW eruit te halen met behulp van een voorkeurs codering. Dus hij moet dan voorstellen om die € 210 eruit te filteren. Daarvoor wil ik niet eerst op meer moeten klikken. Om dit aan te zetten, dan het BTW tarief te kiezen
- C2: En dan doe ik hier ook wel gebruik van maken (adres toevoegen bij aanmaken klant) Maar ja, vaak klopt het toch niet