UNIVERSITY OF TARTU
Institute of Computer Science
Conversion Master in IT Curriculum

Änn Jõgi

Usability Evaluation of NutriData Dietary Analysis Program

Master's Thesis (15 ECTS)

Supervisor: Dietmar Pfahl, PhD

Tartu 2023

Usability Evaluation of NutriData Dietary Analysis Program

Abstract:

Usability is a sum of learnability, efficiency, memorability, errors, and satisfaction. There are many different methods for assessing usability. This master's thesis aims to assess the usability of the NutriData dietary analysis program (TAP) and create a development plan for 2023 based on usability issues found. The author assumed that there are several usability issues in TAP. The usability of TAP was assessed by heuristic assessment and usability testing. Using different methods was beneficial, as the results complemented each other and helped to prioritize the improvements. Six users' average SUS score was 68 points. The result gave TAP a rating between OK and good. Three NutriData team members conducted a heuristic evaluation. Individual assessment by several people was helpful since 35% of errors were detected by a single evaluator. Six participants took part in the usability testing. Interviews conducted during usability testing contributed significantly to the development plan. The development plan for 2023 includes almost a three-quarter of interview suggestions. The study revealed limitations of the study and helped to propose prospective methods to solve them.

Keywords:

Usability, usability testing, user research, NutriData Information System, dietary analysis program

CERCS: P175 Informatics, systems theory

NutriData toitumisprogrammi kasutatavuse testimine

Lühikokkuvõte:

Kasutajamugavuse moodustab õpitavus, efektiivsus, meeldejäävus, vead ja rahulolu ning selle hindamiseks on välja töötatud palju erinevaid meetodeid. Selle magistritöö eesmärk oli hinnata NutriData toitumisprogrammi kasutusmugavust. Töö eeldus oli, et programmis esineb kasutajamugavuse vigu. Välja tulnud kitsaskohtade põhjal sai luua Nutridata arendusplaani 2023. aastaks. Magistritöö käigus hinnati NutriData toitumisprogrammi kasutatavust kahel meetodil: heuristiline hindamine ja kasutatavuse testimine. Mitme meetodi kasutamine tasus ennast ära, kuna tulemused täiendasid üksteist ning aitasid välja mõeldud lahendusi paremini prioritiseerida. Kuue kasutaja keskmine SUS (süsteemi kasutatavuse skaala) punktisumma toitumisprogrammile oli 68 punkti, seega tulemus andis toitumisprogrammile hinnangu OK ja hea vahel. Kolm NutriData meeskonnaliiget viisid läbi heuristilise hindamise. Mitme inimese poolne individuaalne hindamine oli kasulik, kuna 35% vigadest avastati üksteisest eraldi. Kasutatavuse testimisest võttis osa kuus osalejat, kellega viidi läbi lisaks intervjuud. Intervjuude käigus tehtud ettepanekutest pea kolmveerand võeti 2023. aasta arendusplaani. Uuringu puudustele pakuti lahendusi ning saadud õppetundidest tehti järeldusi.

Võtmesõnad:

Kasutatavus, kasutatavuse testimine, kasutajauuringud, NutriData infosüsteem, toitumisprogramm

CERCS: Informatics, systems theory

Table of Contents

1 Introduction 5

2 Background 7

2.1 NutriData Food Information System 7

2.1.1 User Statistics of NutriData 8

2.1.2 User Statistics of TAP 9

2.2 Usability Evaluation Methods 10

2.2.1 Inspection Methods 12

2.2.2 Usability Testing 15

2.3 Previous Assessments of TAP 16

3 Method 21

3.1 Heuristic Evaluation 21

3.2 Usability testing 22

3.3 Workshop 24

4 Results 25

4.1 Heuristic Evaluation 26

4.2 Usability Testing 29

4.3 Workshop 35

5 Limitations of the Study 39

6 Conclusions 40

7 Summary 41

References 42

Appendix 45

I. Developed NutriData heuristic evaluation checklist based on Xerox 13 heuristics 45

II. Usability issues detected with heuristic evaluation, solution proposals and categorization during workshop 67

III. Usability testing tasks in Estonian and in English 81

IV. Consent form in Estonian and in English 83

V. The SUS questionnaire in English and in Estonian 85

VI. Post-test interview questionnaire in Estonian and in English 87

VII. Usability testing task flows 89

VIII. Summary of interviews translated in English 94

IX. Solutions and their assigned categories from workshop based on usability testing 97

X. License 99

Abbreviation List

ASP	Product Data Entry and Calculation Program (*Toote arvutus- ja sis-estusprogramm)*
HE	Heuristic evaluation
KUP	Nutrition survey program (*Toitumisuuringute küsitlusprogramm*)
NIHD	National Institute for Health Development (*Tervise Arengu Instituut*)
NutriData	NutriData Food Information System (*Toitumise infosüsteem*)
PSSUQ	Post-Study System Usability Questionnaire
SUMI	Software Usability Measurement Inventory
SUS	System Usability Scale
TAP	Dietary Analysis Program (*Toitumisprogramm*)
TKA	Food Composition Database (*Toidu koostise andmebaas*)
UT	Usability testing
UX	User experience
QUIS	Questionnaire for User Interaction Satisfaction
WS	Workshop

1 Introduction

Usability is one aspect of the user experience (UX). ISO 9241-11:2018 defines user experience as "combination of user's perceptions and responses that result from the use and/or anticipated use of a system, product or service" [1, p. 3] and usability as "extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" [1, p. 2]. Usability is a sum of learnability, efficiency, memorability, errors, and satisfaction [2].

Good user experience is important for products to attract more customers. If people have a pleasurable experience with the product, they are more likely to buy products from the same company [3]. Good usability means users can accomplish tasks effortlessly and feeling pleasure [4]. Positive emotions are mostly connected to good user experience, and negative emotions to poor usability. Usability starts to bring out positive emotions over time as it supports a positive self-image [3]. Profitable business growth comes with promoters. Customers who are extremely happy with a product return to the same company and recommend its business. Customers' willingness to recommend to a friend is the result of customer experience [5]. Achieving good usability is a complex task, and no definite rules exist to ensure it [4].

This study assesses the usability of the dietary analysis program (TAP), which is a part of the NutriData food information system (NutriData) owned by the National Institute for Health Development in Estonia (NIHD)[1]. The NHID states, "Our mission is to establish and share health-related knowledge as well as to influence health behavior and determinants of health to increase the wellbeing of the people in Estonia and help them live longer and healthier lives"[2]. NutriData is one of the tools created to achieve this mission[1], and improving its usability would help to achieve repeated use and recommendation of the program. Modules of NutriData are free to use as a public service[3].

Usability evaluators have several choices when selecting a usability evaluation method. The most common ways of evaluating the website user experience and usability are [5]:

- Using surveys and questionnaires to collect users' attitudes about the experience,
- Carrying out usability testing to observe users attempt tasks on the website,
- Having an interface expert inspect a website using guidelines and heuristics.

Previous assessments of TAP are three online surveys, one expert review, and one mouse movement tracking study. These studies have detected some usability issues previously. Therefore, the author assumed that several usability issues in TAP need solving. Chosen usability assessment tools for TAP are heuristic evaluation and usability testing. Evaluators of heuristic evaluation are NutriData team members. This thesis author works in NIHD as project manager and is one of the NutriData team members. The facilitator of the usability testing was this thesis author. NutriData team members generated solutions based on detected usability issues in a workshop. Workshop output was a development plan for 2023.

Objectives of this study are:

- Evaluating usability of TAP,
- Gathering insights of the users,

[1] https://tai.ee/et/tervis-ja-heaolu/toitumine
[2] https://en.tai.ee/en/about-us/national-institute-for-health-development
[3] Kasutus- ja privaatsustingimused - Toitumisprogramm (nutridata.ee)

- Creating a development plan for 2023 based on found usability issues and suggestions.

This thesis consists of seven chapters. Chapter 2 presents NutriData's background, an overview of different usability evaluation methods, user statistics, and previously conducted usability assessments of TAP. Chapter 3 presents the methodology of the assessment tools. Chapter 4 expands on the results of the heuristic evaluation, the usability testing, and the workshop. Chapter 5 presents limitations and recommendations on what to consider in a subsequent study. Chapter 6 gives conclusions drawn from the work done. Chapter 7 concludes the thesis.

2 Background

This chapter explains NutriData's background, its modules usage, user statistics of the most used module TAP and its previously conducted assessments. This chapter also presents an overview of usability evaluation methods.

2.1 NutriData Food Information System

NutriData consists of four different modules. Figure 1 presents the food composition data flow between these four modules. Food composition data shows nutrient content per 100 grams of foods. Foods contain macronutrients (protein, fats, carbohydrates, fiber, water), micronutrients like vitamins (vitamin A, vitamin D, and others), and minerals (like iodine, calcium, and others). This information also provides value for energy content. Usually, national food composition databases present the food data of the region.

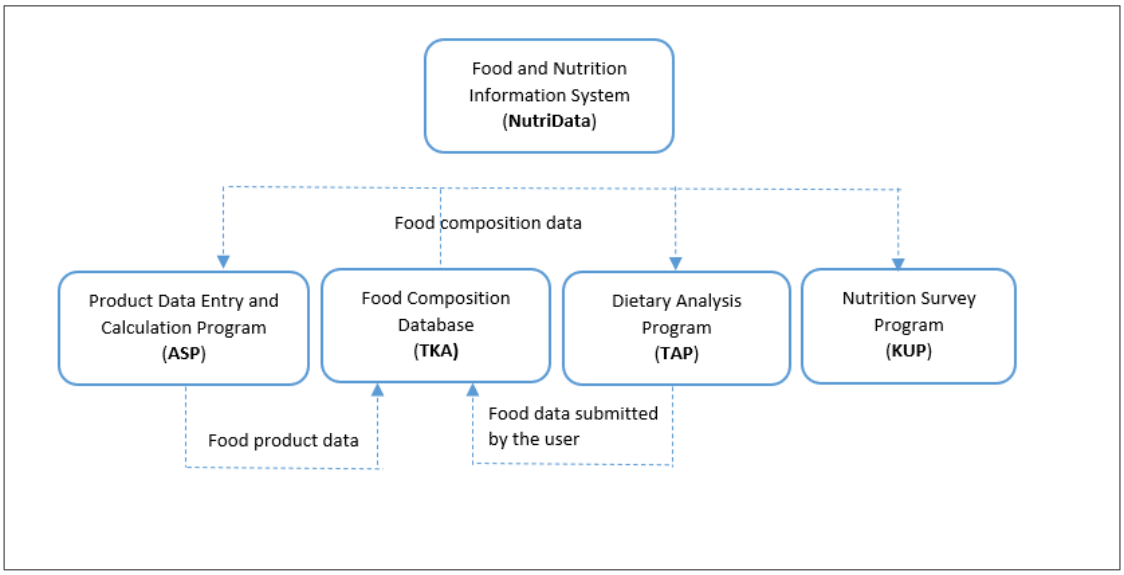


Figure 1. Food composition data flow in NutriData[4]

The Estonian National Food Composition Database (TKA) is the basis of NutriData. TKA version 12 contains data on the average nutrient content of over 4560 foods most consumed in Estonia. Each food contains up to 68 nutrient values. TKA is a publicly available online database accessible in Estonian, English, and Russian. The database is updated with revised nutrient values and foods approximately once a year. TKA foods data is implemented into three NutriData programs: Dietary Analysis Program (TAP), Nutrition Survey Program (KUP), and Product Data Entry and Calculation Program (ASP).[5]

TAP allows the user to monitor their diet. Individuals can fill out a food diary and analyze their diet for compliance with national recommendations. The program's functionalities allow caterers of children's institutions to create menus and check their compliance with the regulation. Nutritionists can create menus for their clients, and students can use the program for their studies[6]. TAP users can recommend their recipes and foods for the database (Figure 1). If these recommendations are accepted, this data will be usable for other users[4]. Based on NutriData web traffic statistics, TAP is the most used program in NutriData (Table 1).

[4] Unpublished NutriData Administrators' Guide 2020
[5] Toidu koostise andmebaas (nutridata.ee)
[6] https://tap.nutridata.ee/en/home

ASP helps food production companies to calculate nutritional labeling on packaging. The user gets nutrient values when s/he uses the program's recipe calculation system[7]. TKA manager can copy ASP users' food data to the database (Figure 1), edit and publish it for other program users[8].

KUP allows the creation of dietary surveys. The user can collect the respondents' foods, amounts, and nutrient content, usually within 24 hours.[9]

2.1.1 User Statistics of NutriData

There were 36 898 user accounts in 2022 in NutriData[10]. All NutriData programs are accessible with the same NutriData user account[8]. Table 1 shows the web traffic indicators of four modules based on Google Analytics. TAP is the most used module based on statistics.

Google Analytics[11] defines users as "Users who have initiated at least one session during the date range". Page views are defined as "Pageviews is the total number of pages viewed. Repeated views of a single page are counted". Sessions are defined as "Total number of Sessions within the date range. A session is the period time a user is actively engaged with your website, app, etc. All usage data (Screen Views, Events, Ecommerce, etc.) is associated with a session". TKA website does not require a user account[12].

Table 1. NutriData web traffic statistics[13]

Module	**01. January – 31. December 2022**		
	Users	Page views	Sessions
TAP	79 881	488 097	342 790
ASP	4 941	10 783	7 393
KUP	1 340	4 513	2 822
TKA website	25 002	143 651	81 851

The user number of TAP based on Google Analytics is higher than the NutriData user account number for several reasons. People can visit the TAP website without having a user account. Mainly this occurs because some people use TAP's energy need calculator on the website. The usage of the calculator is possible without a user account. Also, one NutriData user account owner can use TAP from different devices, triggering separate user counts for Google Analytics.

Figure 2 shows the self-declared age distribution of NutriData user accounts. As age increases, the proportion of men decreases. Most users (78%) are women, and 22% are men. The largest group of users (69%) are 18 - 45 years old. The most significant number (27%) of users are 18 - 25 years old.[10]

[7] Toote arvutus- ja sisestusprogramm (nutridata.ee)
[8] Unpublished NutriData Administrators' Guide 2020
[9] https://kup.nutridata.ee/et/
[10] Unpublished data from NutriData administrative tool
[11] Google Analytics tracking indicators' tooltips
[12] Toidu koostise andmebaas (nutridata.ee)
[13] Unpublished data from NutriData Google Analytics account

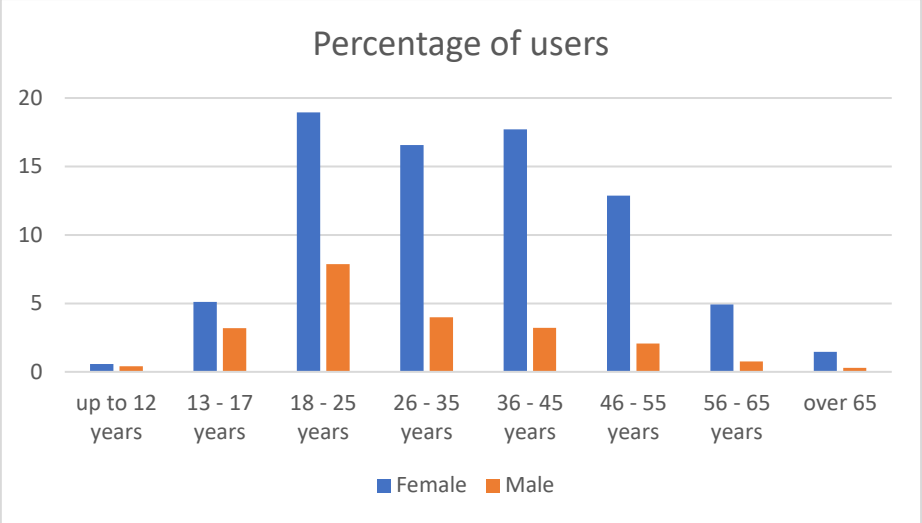


Figure 2. Self-declared age distribution of NutriData user account holders[14]

2.1.2 User Statistics of TAP

Depending on the purpose, TAP users can use the program on two different levels. The basic level allows using the program to keep a food and physical activity diary. Advanced level enables caterers of children's institutions and dietary advisors to use TAP for menu analysis[15]. Most users (93%) use the basic level, and 7% use the advanced level. TAP users can voluntarily mark the purpose of use in their profile. Based on profile answers, TAP is mainly used to monitor nutrition (Figure 3). Examples of other purposes for using TAP are helping a child, giving dietary advice, concerning training, for health reasons, someone recommended, and similar[14].

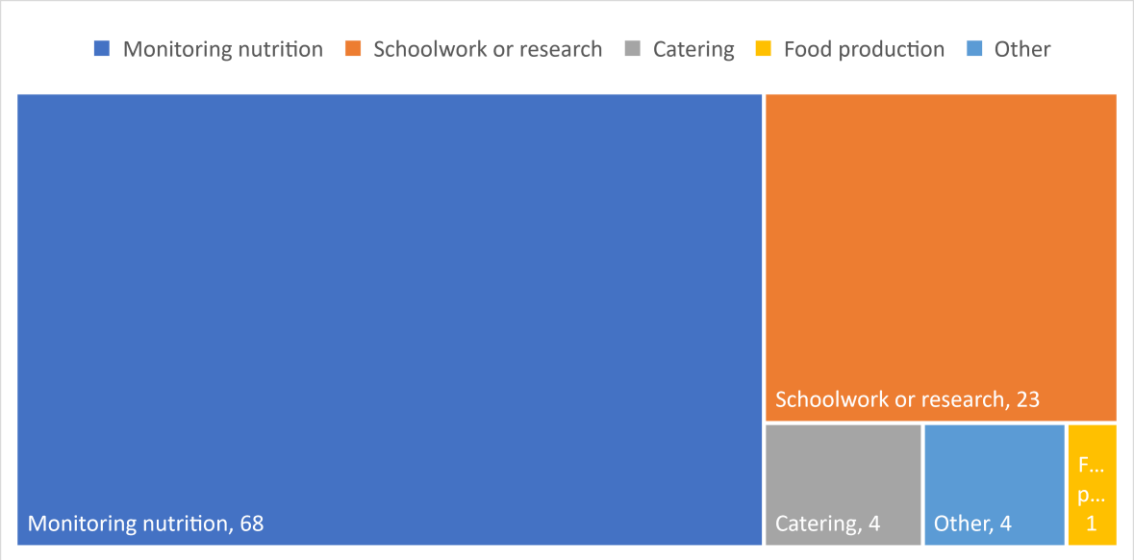


Figure 3. Percentage of answers for use (in 2019-2022)[14]

Figure 4 presents users' most popular affinity categories based on Google Analytics in 2022. The affinity category shows the general interests of the users that have visited TAP. The average user of TAP is a 35 – 44 years old woman whose first interest is food and cooking. Most users in TAP are women (70%), and 30% of the users are men. The most used devices

[14] Unpublished data from NutriData administrative tool
[15] https://tap.nutridata.ee/en/home

in 2022 are mobiles 55% of the sessions, computers 45% of sessions, and tablets 1% of cases.[16]

Figure 4. Average user based on Google Analytics (in 2022)[16]

The characteristics of the average TAP user based on Google Analytics differ from those of an average NutriData user account holder. There are several reasons for this. The largest number of NutriData user account holders are TAP users. However, some NutriData user account holders are KUP or ASP users. Google Analytics also takes into account website visitors who do not have a user account. NutriData account holders self-declare their age and sex; in some cases, it is not declared accurately.

2.2 Usability Evaluation Methods

The most common ways of evaluating the website user experience and usability are [3]:

- Using surveys and questionnaires to collect users' attitudes about the experience,
- Carrying out usability testing to observe users attempt tasks on the website,
- Having an interface expert inspect a website using guidelines and heuristics.

Many different methods help to evaluate usability and user experience. These methods can provide qualitative, quantitative, or mixed data. Figure 5 presents a cluster diagram of UX research methods[17]. The X-axis separates the methods based on whether the method is for studying a situation or the solution. The Y-axis separates the methods based on whether qualitative or quantitative data are collected.

[16] Unpublished data from NutriData Google Analytics account
[17] UX Research Methods and Techniques [2023 Guide] | Konrad®

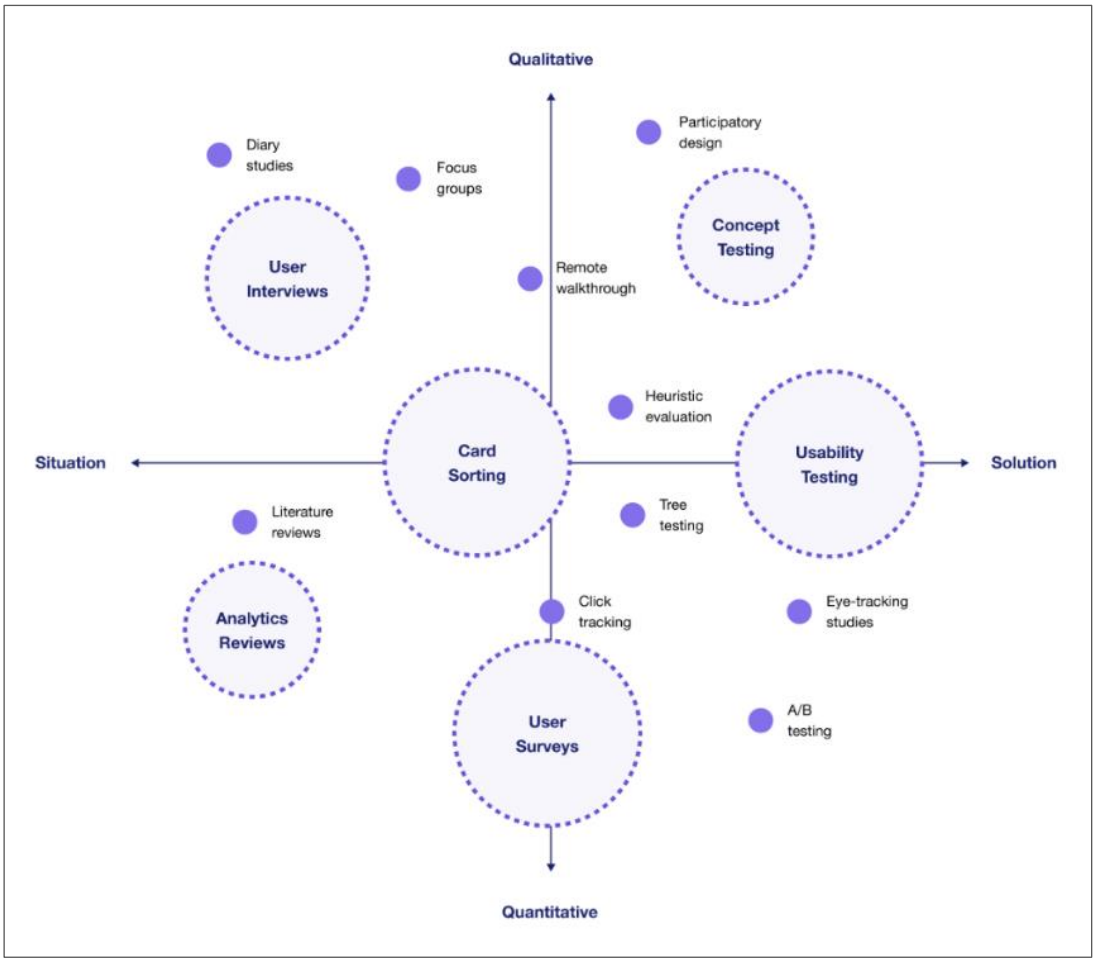


Figure 5. Landscape of UX Research Methods from Konrad UX research guide 2023[18]

Figure 5 methods' short description is as follows.

Diary studies: data is self-recorded as participants fulfill diaries (logs). This method collects data about users' behavior, activities, and experiences over time. This method helps to define UX feature requirements [4].

Focus groups: a group of people participates in a discussion led by a moderator. This method helps to assess user needs and is helpful in the system development phase. It is not a method for evaluating design usability but helps discover what users want [5].

User interviews: the researcher asks questions about a topic of interest in one-on-one sessions. This method helps to learn about users' perceptions of design. The method is not about usability but is a standard method at the end of a usability test that helps to discuss observed behaviors [6].

Remote walkthrough: during a cognitive walkthrough, an individual or a group of people evaluate the learnability of a product or service. They go through predefined action sequences and give feedback on success and failure. Experts, rather than users, do the walkthroughs [7]. Remote testing means that the evaluators and the tester are in a different location [8].

[18] UX Research Methods and Techniques [2023 Guide] | Konrad®

Participatory design: participants construct an ideal experience. They combine design elements and materials to express what matters to them most and why [9].

Concept testing: a new concept or product is introduced to one person or many participants. This method helps evaluate whether the product meets the target audience's needs [9].

Heuristic evaluation: this method reviews a product against general principles. It helps to discover the positive and negative things about a product or service [10].

Usability testing: participants perform tasks based on a scenario within a product or service. It is conducted one-to-one with a researcher in the lab [9].

Eye-tracking studies: an eye-tracking device precisely measures where participants look when interacting with a product or service. The result is visualizations like gaze plots, gaze replays, or heat maps. This method gives an insight into how people process web pages [11].

A/B testing: this method tests different variants of designs to see their effect on user behavior. This method helps decide which variant has the most desired effect on the user's behavior [12].

Click testing: this method analyzes the sequence of pages users visit as they use the site [9].

User surveys: a quantitative method to gather attitudes toward products or services. Questions are typically more close-ended than open-ended. Typically, participants are recruited through e-mail or social media [9].

Card sorting: users aggregate a list of content items and label them suitably. This method helps to understand the audience's thoughts but does not necessarily give the best categorization. Commonly a tree test will follow a cart sorting [13].

Tree testing: this method helps to assess whether it is easy to find items in the menu (tree). Participants find the location where specific tasks can be completed [13].

Literature reviews: an overview of previously published works on a topic.

Analytics reviews: this method analyzes collected metrics implemented on-site [9].

This list of methods is not comprehensive. There are many more methods out there or variations of well-known ones. Different methods should be used for evaluation, allowing for combined insights to understand product usability better [9].

The following two subsections present an overview of two commonly used methods: inspection and usability testing. Both methods have their advantages and disadvantages. Inspection methods implementation cost is relatively cheap because these do not involve users. Instead, evaluators examine an interface for problems [14]. Including users gives a better perspective. Usability testing observes how users interact with the system [15].

2.2.1 Inspection Methods

There are many inspection methods. One of the best-known is a heuristic evaluation. Heuristic evaluation means that an evaluator reviews a product against a set of general principles to see if these are violated and finds out the positive and negative things about the interface [10]. Jakob Nielsen has developed 10 usability heuristics for user interface design (Table 2) and writes: "They are called "heuristics" because they are broad rules of thumb and not specific usability guidelines" [16]. The best results are achieved by using different independent evaluators. Three to five evaluators are sufficient. The advantages of the method are its low cost, intuitiveness of the method, short planning time, and ability to implement

it even in the initial stages of development. Method disadvantages are that it is biased by the evaluator mindset and typically does not give breakthroughs or directions on solving problems found [10]. The heuristic evaluation target is general usability, has a comprehensive scope, and evaluates the interface against guidelines from the analysts' perspective [17]. Heuristic evaluation is considered one of the three components of cheap discount usability methodology. Two other components are simple user testing and narrowed prototypes [18].

Table 2. Jakob Nielsen's ten usability heuristics based on Nielsen article [16].

No	Heuristic	Content explanation	Example
1	Visibility of system status	The design should always keep users informed about what is going on, through appropriate feedback within a reasonable amount of time.	You Are Here indicators on mall maps show people where they currently are, to help them understand where to go next.
2	Match between system and the real world	The design should speak the users' language. Use words, phrases, and concepts familiar to the user, rather than internal jargon. Follow real-world conventions, making information appear in a natural and logical order.	When stovetop controls match the layout of heating elements, users can quickly understand which control maps to which heating element.
3	User control and freedom	Users often perform actions by mistake. They need a clearly marked "emergency exit" to leave the unwanted action without having to go through an extended process.	Digital spaces need quick emergency exits, just like physical spaces do.
4	Consistency and standards	Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform and industry conventions.	Check-in counters are usually located at the front of hotels. This consistency meets customers’ expectations.
5	Error prevention	Good error messages are important, but the best designs carefully prevent problems from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.	Guard rails on curvy mountain roads prevent drivers from falling off cliffs.
6	Recognition rather than recall	Minimize the user's memory load by making elements, actions, and options visible. The user should not have to remember information from one part of the interface to another. Information required to use the design (e.g. field labels or menu items) should be visible or easily retrievable when needed.	It’s easier for most people to recognize the capitals of countries, instead of having to remember them. People are more likely to correctly answer the question Is Lisbon the capital of Portugal? rather than What’s the capital of Portugal?
7	Flexibility and efficiency of use	Shortcuts — hidden from novice users — may speed up the interaction for the expert user so that the design can cater to both inexperienced and experienced	Regular routes are listed on maps, but locals with knowledge of the area can take shortcuts.

		users. Allow users to tailor frequent actions.	
8	Aesthetic and minimalist design	Interfaces should not contain information that is irrelevant or rarely needed. Every extra unit of information in an interface competes with the relevant units of information and diminishes their relative visibility.	An ornate teapot may have excessive decorative elements, like an uncomfortable handle or hard-to-wash nozzle, that can interfere with usability.
9	Help users recognize, diagnose, and recover from errors	Error messages should be expressed in plain language (no error codes), precisely indicate the problem, and constructively suggest a solution.	Wrong way signs on the road remind drivers that they are heading in the wrong direction and ask them to stop.
10	Help and documentation	It's best if the system doesn't need any additional explanation. However, it may be necessary to provide documentation to help users understand how to complete their tasks.	Information kiosks at airports are easily recognizable and solve customers' problems in context and immediately.

The following two paragraphs explain one of the inspection methods, a cognitive walkthrough, and are based on the article by Salazar [17]. A cognitive walkthrough evaluates how learnable the product is for new users. Like heuristic evaluation, it does not rely on users. Instead, a team of reviewers walks through given tasks and evaluates the interface from a first time user's angle. They complete defined tasks in a workshop setting and, during each step of the task, answer four key questions [17]:

1. Will users try to achieve the right result?
2. Will users notice that the correct action is available?
3. Will users associate the correct action with the result they are trying to achieve?
4. After the action, will users see that progress toward the goal?

Complex and new applications with new designs and interaction patterns benefit from cognitive walkthroughs the most. A good example would be the launch of a new public service. Conducting a walkthrough for known functionality in different systems, like e-commerce checkout flow, is not sensible. Most users have had previous experiences and can use e-commerce checkout without problems. The cognitive walkthrough target is learnability. The chosen activities limit its scope, and it explores potential users' behaviors toward the system from the perspective of a new user [17].

As observed by Harley [19], an expert review allows experienced UX experts to review a system to discover possible usability issues. The expert lists usability strengths and problems, rates the problems by severity, recommends changes to fix found errors, and includes examples of best practices. An expert presents results over a meeting or video and gives a written document. It would be helpful to combine expert review with usability testing. An expert review could identify minor issues that users would not detect, like too many fonts, wrong alignments, or colors. Also, it could detect major problems and apparent issues, which could be addressed before testing with users. Expert reviews often evaluate the current state of the live design, and its outcome is an excellent input before planning a major system redesign. In the creative phase, systems should review design iteratively, not just in the end [19].

The evaluator compares a system against a detailed checklist set in a guideline review method. These comprehensive written guidelines are targeted for larger projects and can be used to create and evaluate existing systems. Well-known and comprehensive guidelines

were presented in 1986 by the U.S. Air Force and MITRE Corporation [20]. Microsoft[19] and Apple[20] have released and updated their guidelines over the years.

2.2.2 Usability Testing

The following three paragraphs explain usability testing and are based on the article by Moran [15]. Usability testing is a popular UX research methodology. It is an empirical study where a facilitator asks a participant (user) to complete tasks. Facilitator observes the participant's behavior and listens to the feedback (Figure 6). The usability testing goal is to uncover problems, discover opportunities, and learn about users [15].

Moran writes that the facilitator's task is to give instructions, answer questions that arise, and ask follow-up questions. The facilitator's responsibility is to ensure that collected data is valid, high-quality, and uninfluenced. The tasks in usability testing can be very specific or very open-ended, but they are realistic activities that participants would otherwise perform in real life. Usually, participants are users of the product or service under testing. The "think-aloud" method is often used where participants express their thought during the test [15].

Moran explains the usability test environment as follows. Usability test sessions can be conducted either in person or remotely. In person sessions mean the facilitator and the participant are in the same room. Remote sessions mean the facilitator and the participant are in two different physical locations. Remote testing is widespread because it is cheaper than in person testing. Moderated remote tests use screen-sharing software. Another option is to perform a remote unmoderated test using the online remote-testing tool. The facilitator sets up written tasks, and the participant completes them independently. Records of the completed sessions are accessible by the facilitator [15].

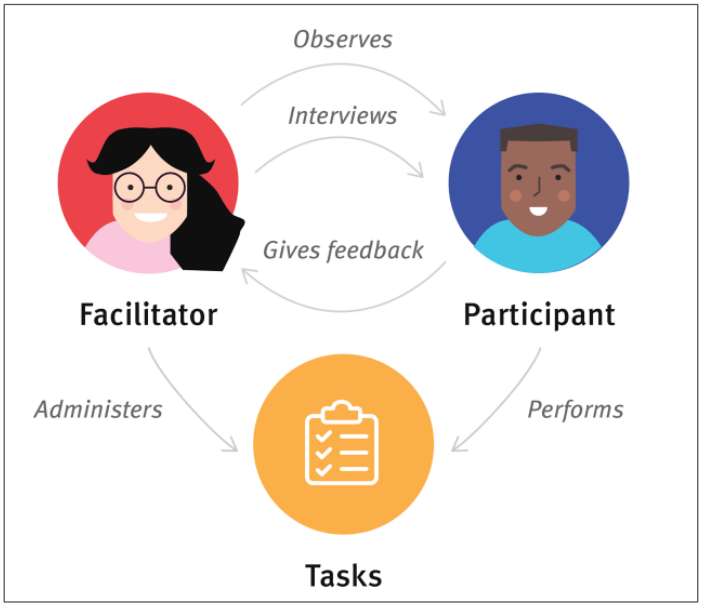


Figure 6. Flow of Information in Usability Testing [15]

An important aspect of usability testing is choosing the environment. Often the question is whether lab or field testing is the better option. Studies examining the possible advantages of field testing are inconclusive [21]. Some good reasons for choosing field testing are: that

[19] https://learn.microsoft.com/en-us/windows/win32/uxguide/guidelines?source=recommendations
[20] https://developer.apple.com/design/human-interface-guidelines/guidelines/overview

there is not enough knowledge about users and their context, a need for a bigger picture, or systems are not accessible in the lab environment [22].

A usability test allows for the collection of qualitative or quantitative data. Qualitative usability testing is more used, and it focuses on finding errors in the user experience. Quantitative usability testing collects metrics and compares product or service performance against a standard called benchmarking [15]. Benchmarking allows us to assess design and process changes over time. It is comparing a product to an earlier version, a competitor, an industry standard, or set goals. The power of these results comes when using those metrics to calculate return on investment (ROI) [23].

The cost of usability testing can vary between a few hundred dollars to several hundred thousand dollars. Expensive studies may include testing in different countries, testing with numerous user groups, using expensive equipment like eye-trackers, using a usability lab, and conducting detailed analysis [15]. Inexpensive simplified user testing includes only a few participants, focuses on collecting qualitative data, and uses a think-aloud method [18]. Remote usability tests are popular due to feasibility; often, they need less time and money than in-person studies [15].

Elaborate usability tests are a waste of resources and running many small affordable tests with at most 5 participants is preferred. Even with one test user, usability testing finds almost a third of usability problems. Nielsen emphasizes that zero test users give zero insights [24]. According to a formula developed by Nielsen and Landauer [25], using at least 15 users will discover all the usability problems. With every added participant, there is some overlap in what to learn, and after the fifth participant, the same findings repeatedly occur. The usability test goal is to improve design, not to document all the problems. Nielsen recommends running multiple tests with five users. The first study with 5 participants will find 85% of the problems, and after creating a new design, retesting will show if the new interface has resolved the problems. With the new study, new problems will be discovered, and the circle will start again. User experience improves more with three studies with five users each than with a study with 15 users. If a website has highly distinct groups of users, Nielsen recommends 3-4 users from each category if testing two groups of users [24].

As written by Nielsen [26], aspects of simplified user testing are a small number of participants, representative users who perform representative tasks, and not interfering with participants. Instead, let them talk [26].

Usability testing allows to study solutions and helps to validate decisions. Typically, the method is carried out on the fully functional prototype or the minimum viable product. Researchers can benchmark different quantitative metrics (for example, "Time to Completion") to evaluate business impact and decide what areas to work on with following updates.[21]

2.3 Previous Assessments of TAP

TAP was created in 2006 and has been ongoing and evolving ever since. There have been several assessments of TAP in previous years between 2016 - 2021 (Table 3). Assessment tools include three online surveys, mouse movement tracking, and a UX expert review. The NutriData was redesigned, and its platform was restructured in the spring of 2019. Therefore, not all assessments are one-to-one comparable.[22]

[21] UX Research Methods and Techniques [2023 Guide] | Konrad®
[22] Unpublished documents from NHDI

Table 3. Previous assessments of NutriData[23]

Date	Assessment
2016 in October	Online Survey
2018 in March	Mouse movement tracking
2018 in May	Online Survey
2019 in October	Online Survey
2021 in December	UX Expert Review

The survey in 2016 was anonymous. A questionnaire link on the program webpage collected 299 responses. This survey aimed to determine which functionalities need improvement during restructuring. The respondents' primary purpose for using TAP was to monitor energy gain and reduce weight (71%) or maintain it (32%). TAP was used to monitor macronutrient intake by over half of the respondents (56%) and micronutrient intake by just over a third (36%). A food diary and menu analysis were the most used functionalities (95% of respondents). Half of the survey participants (52%) indicated they were satisfied with TAP's ease of use, as they rated it with a "4" on a 5-point scale. Fewer people (22%) felt that TAP was excellent (score "5"). Almost a third of the participants (27%) were not satisfied with TAP, rating TAP with scores "3", "2" or "1". The scaled average was 3.9. Adding the recipes was considered the most challenging functionality, as 32% of the respondents found it to be the most difficult action. Filling out a food diary was complicated in the opinion of 24% of the respondents and adding food products by 20%. Most TAP users (73%) learned how to use the program for up to a week, and 7% of respondents felt they had not mastered it. Respondents wished for mainly three things: the phone app (57%), specific foods and recipes (60%), and diet plans (41%).[24]

Mouse movement tracking took place in 2018. A two-week trial in Hotjar[25] aimed to learn users' behavior. Hotjar is a heatmap tool that lets a company visualize where users click and how far down a page they scroll on the company's web page being tested. Visual heatmaps were created based on 2000 recorded sessions. Figure 7 presents an example of a heatmap created with the study. The purpose of the assessment was to evaluate the popularity of different functionalities. This information was input for the restructuring process in 2019. Hotjar heatmap analysis showed that long-term users used many different functionalities, and their activities were significantly faster than the activities of new users. Using a food image series to determine food weight was a popular functionality. The energy need calculator was used in many sessions without logging in to the program. This result showed that it is crucial to maintain access to the energy need calculator for webpage guests. Some functionalities could have been more straightforward for users, for example, how to copy several menu days at once or understand the menu analysis results. Often users added to the food diary either raw or dry ingredients instead of ready-to-eat foods. This use of the program caused these people to either overestimate or underestimate their nutrient availability.[26]

[23] Unpublished documents from NHDI
[24] Unpublished survey results 2016
[25] Hotjar: Website Heatmaps & Behavior Analytics Tools
[26] Unpublished Hotjar analysis results 2018

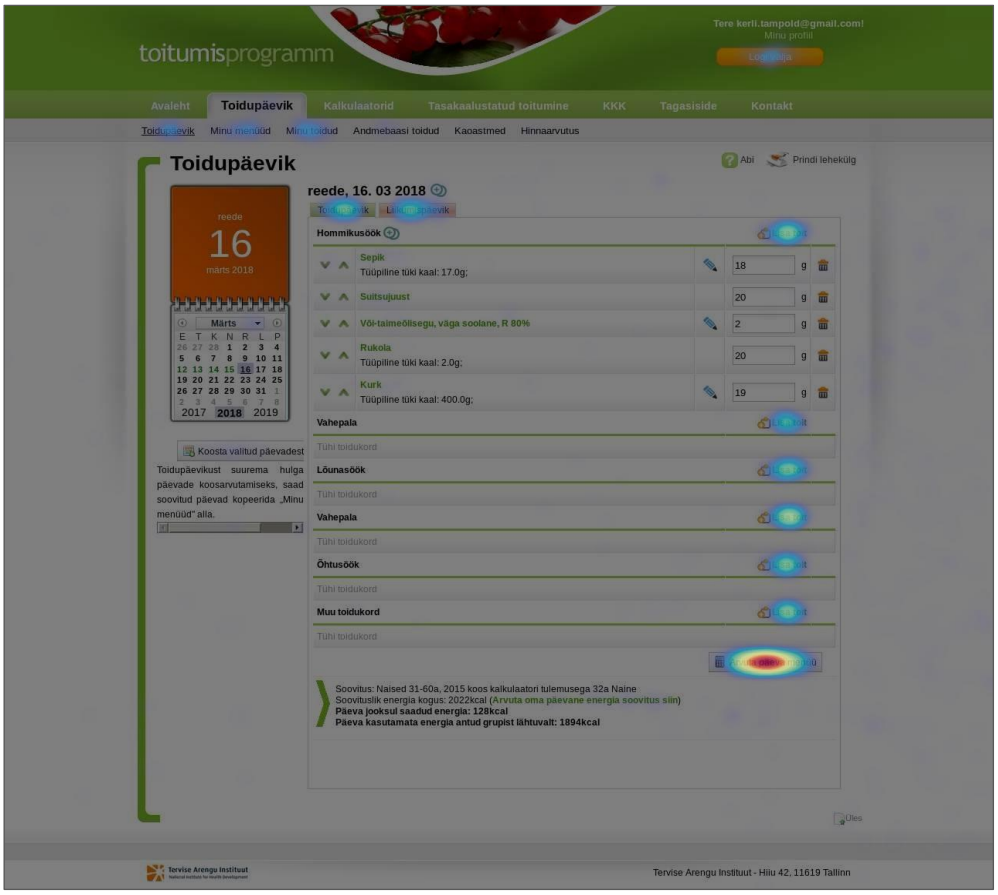


Figure 7. Snipping of a heatmap created with mouse movement study in 2018.[27]

The following online survey took place in May 2018. Four hundred eighty-six people were invited to participate in the survey by e-mail. The invitations were sent to advanced level users who registered their accounts as caterers. Seventy-eight people responded. The survey was anonymous. The survey collected feedback on the program features implemented in 2017. Also, it assessed whether to keep the functionalities of the physical activity diary and price calculation in the restructuring process for the advanced level user. Respondents found that the most challenging functionalities were adding recipes (40%), management of processing waste (33%), and adding food products (28%). Only 6% of respondents used a physical activity diary, and 12% used the price calculation functionality. Respondents suggested some changes that already existed in the program, which showed that these functions were not visible to the users.[28]

Another anonymous online survey took place in October 2019. A questionnaire link on the program webpage collected 256 responses. The survey asked for feedback on the new design and the changed functionalities implemented in spring. Most respondents (67%) liked the new TAP website, and 24% disliked it (9% of respondents were new users and had no comparison). TAP's average ease of use score was 3.4 on a 5-point scale. This score was lower than in 2016 (3.9 points). Energy need calculator continued to be popular in 2019, as in 2016. One previously challenging functionality (adding recipes) was now considered less complicated. Making challenging functionalities easier was one of the aims of restructuring. Most people liked the updates to features "My Food" (71%), and to "My Menu" (68%). The functionalities of "My menu" and "My Foods" are in Table 4. Little more than half (57%)

[27] Unpublished Hotjar analysis results 2018
[28] Unpublished survey results 2018

liked the food diary changes. More than a third of respondents (37%) noticed the added functionality allowing users to simultaneously analyze several food diary days. Most respondents found the new design to be modern and its use more logical. However, there were also a few answers with the opposite opinion.[29]

UX expert review was conducted in December 2021 by an out-of-house company. The review aimed to assess the overall user experience and determine what needs improvement. The company gave the results in a recorded meeting. The UX expert review revealed some non-compliances with accessibility requirements and brought out five main areas to work on:

1. Design and functionality of the food search window,
2. The complexity of adding a recipe,
3. Comprehensibility of the calendar,
4. Usability of physical activity diary,
5. Uniformity of conformation modals.[30]

The expert gave specific recommendations for each area. The food search window received the most recommendations. The review also recommended adding video tutorials and first-time user-guided tours.[30]

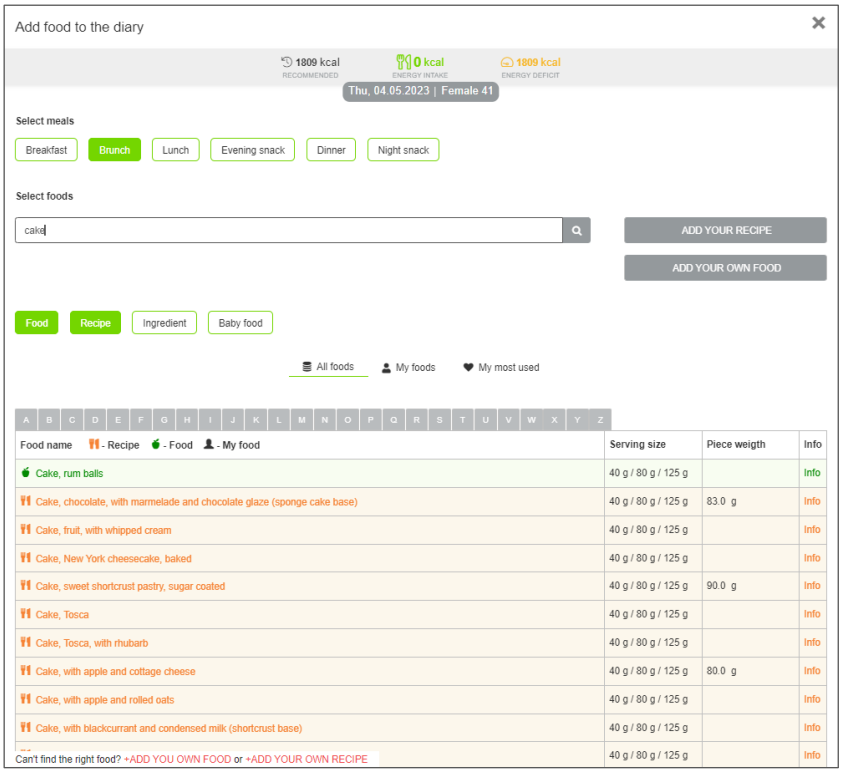


Figure 8. Results for the word "cake" from the food search window in TAP.[31]

Audit recommendations for food search windows (Figure 8) were as follows:

- Accessibility requirements are not met in the search results presented on orange background with orange text. Accessibility requirements would improve with the white background and with adding darkness in the text color,
- Add an auto-suggestion mechanism to the search box,

[29] Unpublished survey results 2019
[30] Unpublished expert review report and recording 2021
[31] https://tap.nutridata.ee/en/home

- The window is quite dense in functionality. It took several uses of practice to hit the logic. The audit recommended trying to find some alternative visual layouts, experimenting with a simple-to-complex approach,
- Explain all the button meanings by adding a question mark with a tooltip at the end of the line. The user may not know what the difference between food, recipe, ingredient, and baby food is,
- Serving size and piece weight fields remains incomprehensible. It would be worth removing them altogether,
- The field question „How much did you eat in grams?" does not consider all user types. Some users are planning their meals. For better understanding, rephrase „How much food in grams?".[32]

In summary, three online surveys gave a perspective of users' attitudes toward TAP. What functionalities were complicated for them, what was the overall experience, and what did they feel that is missing from the TAP. Online surveys did not show how users behave. Survey results were biased because the survey was open to anyone who wished to answer. Mouse movement tracking showed how users behave. It showed that some people overestimate or underestimate their nutrient intake. UX expert review revealed many usability issues and recommendations for development.

[32] Unpublished expert review report and recording 2021

3 Method

NutriData is a comprehensive information system, and the scope of the study is limited to TAP. Improving the most used program will have the most considerable positive effect on the information system. Previous assessment methods (expert review, mouse-tracking, surveys with questionnaires) were excluded from the method choices as combined methods will give a better understanding of the system's usability.

Figure 9 presents the flow of TAP usability evaluation. All NutriData team members carry out a heuristic evaluation. The project manager carries out usability testing. NutriData team members discuss findings in a workshop. A workshop is a common way to create development plans in NIHD. However, the specific chosen usability evaluation methods outputs are used as inputs for the workshop first time.

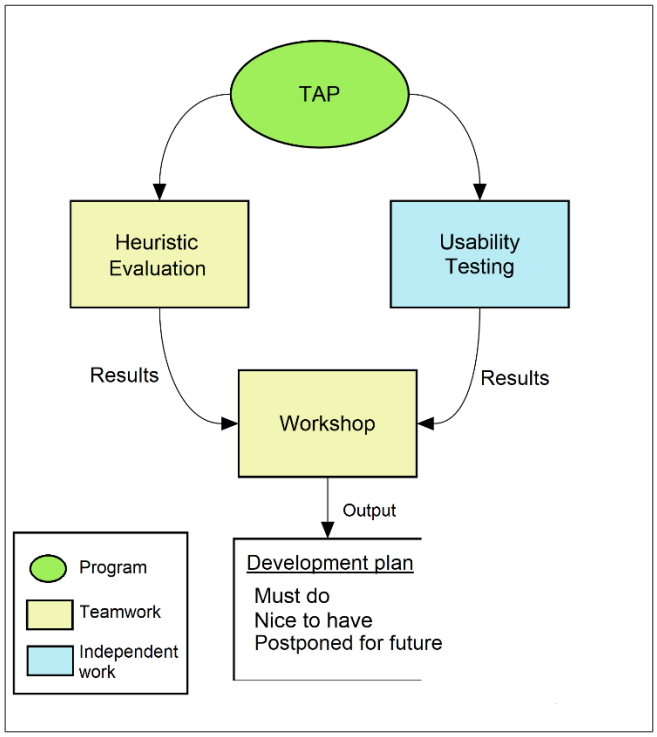


Figure 9. Methodology of evaluation of TAP

The device used in testing is limited to a computer. The thesis author assumes that correcting found errors on a computer also improves user experience on a mobile. This method could be adapted to the assessment by mobile for subsequent usability testing.

Pearson correlation coefficient is used to recognize patterns.

3.1 Heuristic Evaluation

This evaluation uses the Nielsen list of ten heuristics. This method is feasible because it does not require users, and its cost is low. This method aims to search for usability problems in the entire system.

Heuristic evaluation (HE) has three steps:

HE-Step 1 Develop a template for evaluating Nielsen heuristics,
HE-Step 2 Carrying out a heuristic evaluation by NutriData team members,
HE-Step 3 Comparing and prioritizing found issues within the results.

The goal of the **HE-Step1** is to develop an instrument for evaluating Nielsen Heuristics. There is no standard questionnaire or template for evaluating Nielsen heuristics. An internet search (in Google) for suitable available templates takes place. If there are no templates, creating one from scratch is necessary. All articles and video material about Nielsen Heuristics produced by Nielsen Norman Group are worked through to create a template from scratch. Suppose at least one or more candidates are for the evaluation template. In that case, the best-suited template is chosen based on the following criteria: it is comprehensive and an easy tool for novice evaluators. If the context does not fit 100%, the template is adjusted.

The goal of the **HE-Step 2** is to carry out the evaluation. Every team member familiarizes themself with the Nielsen heuristics principles. They read through articles and look through video materials about Nielsen heuristics that Nielsen Norman Group have produced on their website. A template review takes place in an arranged meeting. If anything needs to be clarified, it will be explained in the meeting so that every team member will have the same understanding of the template. Then each team member fulfills the template individually.

The goal of the **HE-Step 3** is to compare and prioritize collected results. Found issues are prioritized based on their severity and impact. If there are no issues, there is no need for analysis. Prioritized issues are input for the development plan workshop.

3.2 Usability testing

The goal of usability testing is to identify problems in TAP's most used functionalities and learn user behaviors. To get complete results, two types of users are in the test: first-time users and users with an existing NutriData user account. Participation in the test is voluntary and unpaid. Usability testing (UT) has eight steps:

UT-Step 1 Definition of usability testing tasks,
UT-Step 2 Recruiting participant,
UT-Step 3 Scheduling an appointment,
UT-Step 4 Collecting a participant's consent,
UT-Step 5 Recording participants performing tasks,
UT-Step 6 Participants fulfilling the standardized usability questionnaire,
UT-Step 7 Interviewing a participant with follow-up questions,
UT-Step 8 Analyzing results.

The goal of the **UT-Step 1** is to specify and develop tasks executed on the program (Table 4). Testing tasks include activities carried out frequently in TAP. The usability test includes alternative ways to achieve the tasks. Created tasks include complex exceptional situations when users have turned to the helpdesk previously. One task tests the usage of the most challenging function. Based on surveys, the most popular feature is the food diary; adding recipes is the most challenging functionality.

Table 4. TAP features and functionalities

Feature	Functionalities
Food diary	Keeping a diary, analyzing nutrients
Physical activity diary	Keeping a diary, tracking weight
My menus	Creating menus for customers, analyzing nutrients
My foods	Adding foods, adding recipes

Processing waste	Modifying database processing waste coefficients

The goal of the **UT-Step 2** is to recruit two types of participants. Nielsen recommends using 3 - 4 users from each category if testing two groups of users. Together 6 – 8 participants are recruited. Half of them have an existing NutriData user account, and half have never used the program. Volunteer participants are selected based on average TAP user characteristics. Monitoring an average user will help to detect the problems of the majority. Most participants (75%) are women aged 20 – 44 years. A quarter of the participants are men in the same age range. Participants come from the NutriData team's circle of acquaintances.

The goal of the **UT-Step 3** is to find the best time and setting for a candidate to participate in testing. The participant can choose a suitable date and time in three weeks period. The participant chooses the environment for conducting a test. There are three options: participants' home in person, evaluators' home in person, or participants' home remotely.

The goal of the **UT-Step 4** is to collect consent and ensure that a participant understands the study objectives and what participation entitles. Firstly, the consent form is created based on good practices. The consent forms of the various NIHD studies are used as a basis. At the beginning of the test, the facilitator explains the study's purpose and the testing method and answers questions raised. The created consent form is introduced and signed either on paper or digitally.

The goal of the **UT-Step 5** is to collect data with as little facilitator influence as possible. The facilitator introduces a "Think-aloud" method at the beginning of the test and encourages participants to use it. Using the "Think-aloud" method is optional as some participants might feel uncomfortable. The facilitator is not commenting or giving help during the test. Facilitator's role is to observe and take notes. The facilitator answers the questions when asked directly.

The goal of the **UT-Step 6** is to assess participants' perceived usability after the usability test and establish usability metrics for future usage. An internet search (in Google) for standardized questionnaires to assess a product occurs. After comparing different questionnaires, the best-suited one is chosen based on the following criteria: it is widespread, it is an industry standard, it is used as a usability metric, and it would not overburden participants.

The goal of the **UT-Step 7** is to understand occurred errors in the session and users' thinking in depth by conducting an interview. Examples of follow-up interviews are searched on the internet. The interview questionnaire is created based on good practices. Questions are selected based on the object of the assessment.
The usability questionnaire should gather information about the following:

- Characteristics of a user (demographics, tech-literacy),
- Previous experiences either with TAP or with a similar program,
- Impression about the tested website.

Some information about a user (age, sex, and whether a person has an account in NutriData) is collected in UT-Step 2. In UT-step 7, broader and more specific background information is asked, which helps to interpret the results better. An interview is conducted orally and recorded.

The goal of the **UT-Step 8** is to compare and prioritize collected results and calculate the average score for the chosen usability metric. Two types of user flow charts for each task are created, the ideal (simplest) user flow chart and actual participant's flow charts. Differences between these flow charts indicate possible poor user experience. Analyzed test results and post-test interview summaries are input for the development plan workshop.

3.3 Workshop

The workshop helps to find out possible improvement options. NutriData team members will discuss findings, suggestions, and errors found during heuristic evaluation and usability testing. The workshop (WS) has three steps:

WS-Step 1 Creating an improvements list based on the results of heuristic evaluation,
WS-Step 2 Creating an improvements list based on the results of usability testing,
WS-Step 3 Categorizing the improvements list for the development plan.

The goal of the **WS-Step 1** is to create an improvements list for found usability issues from heuristic evaluation. Each team member proposes solutions for the heuristic evaluation's findings. If none of the team members come up with a solution, the development company gets the detected usability issue and is to offer a solution. Team members divide proposed improvements into three groups: "Must do", "Nice to have", and "Future". Features with reasonable cost and high impact go into the "Must do" category. Some features have a low impact but are easy to implement, and these are categorized as "Must do" as well, for example, rephrasing a button name. Features with high impact and high cost go into the "Nice to have" category. Features with low impact and unfeasible cost go into the "Future" category.

The goal of the **WS-Step 2** is to create an improvements list for found usability issues from usability testing. Each team member proposes solutions for the usability testing's findings. If none of the team members come up with a solution, the development company gets the detected usability issue and is to offer a solution. Team members divide proposed improvements into three groups: "Must do", "Nice to have", and "Future". Features with reasonable cost and high impact go into the "Must do" category. Some features have a low impact but are easy to implement, and these are categorized as "Must do" as well, for example, rephrasing a button name. Features with high impact and high cost go into the "Nice to have" category. Features with low impact and unfeasible cost go into the "Future" category.

The goal of the **WS-Step 3** is to create a categorized development plan based on two improvement lists from WS-Step 1 and WS-Step 2. The development plan for 2023 consists of "Must do" features. In the case of resource surplus (time and budget), nice to have features go into the development plan for 2023. Future developments are looked at again when planning a development plan for 2024.

4 Results

Figure 10 gives an overview of activities carried out during usability evaluation. The author of this thesis works as a project manager in the NutriData team. Therefore, the label project manager marks her work. The author participated in two group activities, as she is one of the three members of the NutriData team.

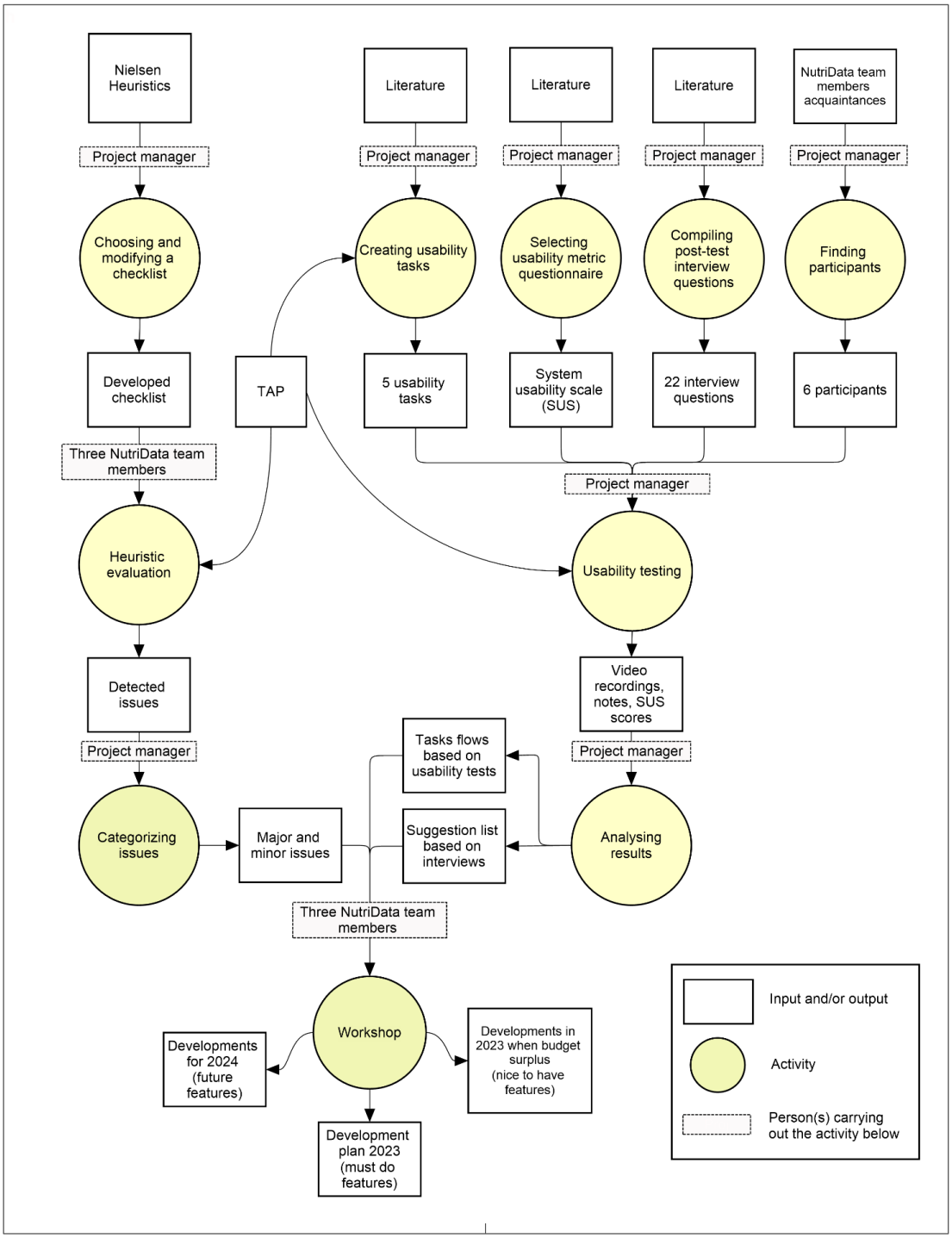


Figure 10. Usability evaluation of TAP

Heuristic evaluation steps are: to develop an instrument for evaluating Nielsen heuristics (HE-Step 1), to carry out the evaluation (HE-Step 2), and to compare and prioritize collected results (HE-Step 3). The heuristic evaluation took place in February 2023.

Usability testing steps are: to specify and develop tasks executed on the program (UT-Step 1); to recruit two types of participants (UT-Step 2); to find the best time and setting for a candidate to participate in testing (UT-Step 3); to collect consent and to make sure that a participant understands the study objectives and what participation entitles (UT-Step 4), to collect data with as little facilitator influence as possible (UT-Step 5), to assess participant's perceived usability and establish usability metric for future usage (UT-Step 6), to understand occurred errors in session and users thinking in depth by conducting an interview (UT-Step 7) to compare and prioritize collected results (UT-Step 8). Usability testing with 6 participants took place in March 2023.

Workshop steps are to create an improvements list based on found usability issues (WS-Step 1 and WS-Step 2) and a development plan based on a categorized improvements list (WS-Step 3). Workshop took place in April 2023.

4.1 Heuristic Evaluation

HE-Step 1: A Google search for "Nielsen heuristic evaluation template" on 23 January 2023 found four approaches. Only one of the templates met the comprehensive and easy-to-follow criteria for novice evaluators - the Xerox Corporation template "Heuristic Evaluation - A System Checklist" from 1995 [27]. This template evaluates 13 heuristics from which the first ten overlap Nielsen heuristics. The other three were separate from Nielsen heuristics. Chosen Xerox template context did not fit 100%. There are four types of changes:

Type 1 Changing words and phrases to match the company's jargon and context,
Type 2 Adding examples and explanations to a specific question,
Type 3 Deleting the questions about functions or options that do not exist in TAP,
Type 4 Deleting the questions about command lines.

An example of Type 1 modification: in NIHD jargon, data entry screens are called data entry modals, and the word "screen" is replaced by the word "modal". The purpose of this change is that the questions would speak the language of the evaluator. An example of Type 2: there is a checklist question "Are error messages worded so that the system, not the user, takes the blame?" An example is added behind this question - "You specified a printer that's offline" (users blame), "The specified printer is offline" (systems blame). The purpose of this additional information is to help novice evaluator to understand questions better. An example of Type 3: a checklist question asks, "Does the system automatically enter a dollar sign and decimal for monetary entries?" This question is deleted as there are no monetary entries in TAP. The purpose of this deletion is not to overburden the evaluator and keep them focused. Graphical interfaces were rare when Xerox developed this checklist in 1995, and a user could also use command lines. Questions related to the command line are irrelevant now, so Type 4 modifications are made. For example, "Can users define their own synonyms for commands?" is deleted. Appendix I presents the original template and the changes made.

The answer options for the Xerox checklist are yes, no, and N/A (not applicable). The answers to the checklist questions might be between yes and no as well. Therefore, the modified checklist has five answer options, yes, often, rarely, no, and N/A.

Having a comprehensive evaluation checklist covers all the heuristics thoroughly. As each heuristic block has a different number of questions and their impact is different, creating another questionnaire to prioritize which areas to tackle first (Figure 11) is necessary. On the questionnaire, an evaluator gives a heuristic score between 0 to 4, where 0 means not a

usability problem and 4 means a major usability problem. If a score is more than a zero, an evaluator writes an explanation of why this is a usability problem.

Evaluate ten usablity heuristics where 0 - not a usability problem; 1 - cosmetic problem only; 2 - minor usability problem; 3 - medium usability problem; 4 - major usability problem. Add comment for every heuristic with score above 0.

...	0	1	2	3	4	Comments
Visibility of system status	○	○	○	○	○	
Match between system and the real world	○	○	○	○	○	
User control and freedom	○	○	○	○	○	
Consistency and standards	○	○	○	○	○	
Error prevention	○	○	○	○	○	
Recognition rather than recall	○	○	○	○	○	
Flexibility and efficiency of use	○	○	○	○	○	
Aestehetic and minimalist design	○	○	○	○	○	
Recognise, diagnose, and recover from errors	○	○	○	○	○	
Help and documentation	○	○	○	○	○	

Figure 11. The Nielsen's ten usability heuristics ranking questionnaire.

Evaluators are Estonians but fluent in English. Templates were not translated into Estonian as something might get lost in translation. Evaluators were allowed to add comments in Estonian.

HE-Step 2: There were three evaluators, 29-, 31-, and 41-years old women. Two of the team members use TAP daily bases, and one uses TAP once a month. All members have used and tested different food diary apps beforehand. Evaluators read through 10 articles [28, 29, 30, 31, 32, 33, 34, 35, 36, 37] and watched ten short videos[33] about Nielsen Heuristics published by Nielsen Norman Group. A team meeting took place to introduce the developed heuristic evaluation checklist and questionnaire. At first, evaluators fulfill the heuristic evaluation checklist individually and then give an overall score for different heuristics by fulfilling the questionnaire.

HE-Step 3: Most of the usability issues (65%) were detected by several evaluators. If several evaluators find the same issue, then this is considered a single usability issue. The remaining 35% of errors are found individually and counted as separate issues. The results of the evaluators were analyzed together. Each checklist question was assessed as to whether it is a major usability problem, a minor usability problem, or it is not a usability issue. Answer options "Yes" and "N/A" are categorized as not a usability issue. All other options, "Often", "Rarely", and "No", are looked through individually and categorized between major, minor, and not an issue, based on the comments. Even though the answer "No" usually

[33] The 10 Usability Heuristics - YouTube

would mean a significant issue, that is not always the case. For example, the question "Is sound used to signal an error?" was answered "No" by all evaluators. All evaluators also commented that adding this feature would not be necessary. Therefore, this question is found not to be a usability issue. Table 5 presents found issues in each heuristic block. Heuristics are ranked based on the average severity score from the ranking questionnaire. There are 63 usability issues based on the heuristic evaluation assessment of three people (Appendix II). Comments in Appendix II are in the original language, i.e., Estonian.

Table 5. Issues found in the heuristic evaluation.

Heuristic	Average severity score (range)	Number of questions	Minor issues	Major issues
User control and freedom	3.3 [3,4]	16	6	3
Visibility of system status	2.7 [2,4]	26	6	2
Help and documentation	2.3 [2,3]	22	6	4
Recognition rather than recall	2 [1,3]	35	9	1
Aesthetic and minimalist design	1.7 [1,3]	10	2	1
Recognize, diagnose, and recover from errors	1.7 [1,3]	18	3	2
Match between system and the real world	1 [1,1]	18	8	1
Consistency and standards	1 [1,1]	47	6	0
Error prevention	0.7 [0,2]	7	2	0
Flexibility and efficiency of use	0 [0,0]	10	1	0

The average severity score shows that major usability issues have a different impact. Some major issues impact all users, and some only a part of users, as some major usability issues are part of the functionality that users do not use primarily. The Pearson correlation between the number of issues found and the average severity score is positive 0.70.

Figure 12 presents the questionnaire's score points from multiple evaluators. Average score points show which heuristics need fixing first in the opinion of NutriData team members. The heuristic "User control and freedom" has the highest average severity score of 3.3, which means a significant usability problem in this block. Following the heuristic "Visibility of the system status," the average severity score is 2.7, a medium usability problem. No usability issues are in the heuristic "Flexibility and efficiency of use".

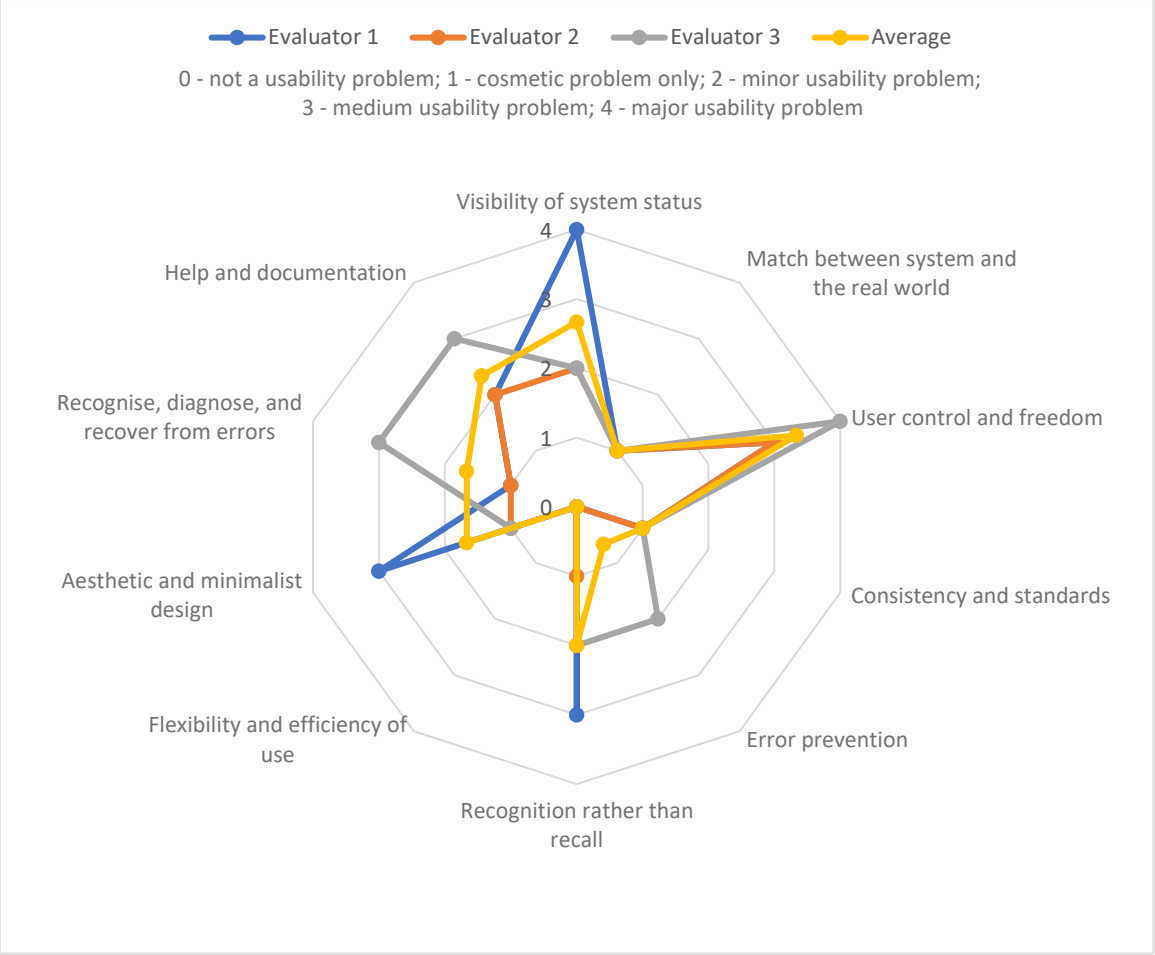


Figure 12. Severity scores for heuristics

The developed heuristic evaluation checklist allowed looking at TAP from multiple angles. Multiple evaluators detected most issues, and 35% were detected by only one of the evaluators. Some heuristics were rated differently. Evaluator 1 scored "Visibility of system status" with a 4 (major usability issue), and two other evaluators gave a score of 2 (minor usability issue). Evaluator 3 scored "Recognize, diagnose, and recover from errors" with a 3 (medium usability problem), and two other evaluators gave a score of 1 (cosmetic problem only). Evaluator 1 scored "Aesthetic and minimalist design" with a 3 (medium usability issue), and two other evaluators gave a score of 1 (cosmetic problem only). All evaluators agreed that "User control and freedom" is the most problematic heuristic. "Flexibility and efficiency of use" was seen as not a usability issue by all evaluators.

4.2 Usability Testing

Usability testing is conducted in Estonian because the TAP's target group is Estonians. The consent form, tasks, follow-up questions, and questionnaire were developed in Estonian and translated into English for the master's thesis. Annexes III, IV, V, and VI present the original language and translated material.

UT-Step 1: The most used feature in TAP is a "Food Diary". Table 4 presents "Food" functionalities. Some people fulfill their food diary after their meals (recall method), and some users fulfill the food diary during the meal or planning their meals. Created tasks for usability testing cover all these different alternative uses of the food diary (Appendix III). Entering

food in a diary means the user has to use the food search window. This window is a part of many other functionalities in NutriData:

- adding foods to menus and recipes in TAP,
- adding foods in the food diary questionnaire in KUP,
- adding ingredients in product recipes in ASP.

Testing the food diary will also benefit other functions and programs. Logging in or creating an account was not found to be a problematic activity based on previous surveys. Therefore, these activities are not tested with usability testing. Fewer tasks help keep focus and not overburden a participant nor novice facilitator.

Task 1: The first task asks the user to recall his last meal and enter it into the food diary. It allows observing the participant's natural use of the program. This task also imitates the behavior of a participant in the nutrition survey and some users' behavior in TAP who use the recall method when fulfilling a food diary.

Task 2: The second task asks to insert a given list of foods as lunch. This way, it covers a second type of users who insert foods during the meal. The task also imitates the situation where users cannot use a scale because she is eating in the cafeteria. Users must either guess the weight of the foods or use aids. TAP gives different aiding information about food items, and this task allows to see if users find and use them. The task assesses whether the user finds and uses functionalities such as determining the quantity of food by a food image series, using a household measure, or the weight of the piece. The task asks a user to add one tbs sugar into the food diary, and the user should use the household measure table. The user must insert a slice of bread into the food diary and should use the information for one piece of weight. The user should determine the amount for half of a plate of boiled potatoes, a quarter plate of sauce, or a salad with the food image series. The task also tests the situation where the database does not have a recipe for the salad. The user could, in this case, put the items from salads separately into a food diary, create their recipe, or use the most similar recipe. It allows observing how users solve this situation. The helpdesk has been approached many times with the question of what a user needs to add to the food diary if the food is absent from the database.

Task 3: The third task asks a person to add a banana and a Nestle muesli bar to a food diary. The user is in a situation where the database gives two profiles for a food item: a peeled banana and an unpeeled banana. The user should insert the unpeeled banana because it has been weighed with peels. NutriData database does not include the Nestle muesli bar present in the task. The user must solve a case of a missing food item and could either insert into the food diary a similar food item or create a new one.

Task 4: According to surveys, the most difficult functionality is creating a recipe. Participants who did not create a recipe naturally during tasks 1 or 2 will have to create one in task 4. Users that already created a recipe can skip this task during usability testing. The easiest way to create a recipe would be to use an existing food recipe as a base. This task observes if users see and use this functionality and what makes it challenging to create a recipe.

Task 5: Most users only use TAP for counting calories and checking the adequacy of macronutrients. Nevertheless, an online survey in 2016 indicates that 36% of people monitor micronutrient adequacy. NIHD wishes to direct people to monitor the adequacy of micronutrients in their diet. With this task, we can see what kind of information they find the most useful or do they need something more.

UT-Step 2: Participants come from NutriData team members' circle of acquaintances. Six people agreed to participate in the study (Table 6). Most of them matched the characteristics

of the average user in NutriData, a female aged 18 – 45. Two males represent 22% of male users.

Table 6. Participants of user testing

Participant	NutriData account	Age	Sex	Environment
Participant 1	No	42	Female	Remotely
Participant 2	No	37	Male	In person
Participant 3	No	23	Female	Remotely
Participant 4	Yes (a regular TAP user)	29	Female	Remotely
Participant 5	Yes (previously used TAP for a week)	29	Female	Remotely
Participant 6	Yes (previously used TAP for two weeks)	47	Male	Remotely

UT-Step 3: Participants could choose a suitable date and time between 6 March and 2 April. Participants decided whether to do the test in person at their home, at the evaluator's home, or remotely over Zoom (Table 6). The time for one usability test is two hours.

UT-Step 4: A consent form was developed based on three previous NIHD forms used in different studies (Appendix IV). The consent form explains the purpose of the study, the conditions of the study, the storage and processing of the collected data, and what this study entitles. At the beginning of the appointment, the facilitator informed the participant about the study's objectives and content and introduced the consent form. All participants signed the consent digitally.

UT-Step 5: First-time TAP users logged in with the given account information, as creating an account is not one of the tasks. Program users were using their accounts to perform tasks. A "Think-aloud" method was introduced and encouraged, but it was not compulsory. All participants used the "Think-aloud" method to some extent. Participants were given the tasks by e-mail or chat during the test. The participant read the first task, fulfilled it, and then proceeded to the next task. The facilitator observed the session and marked up situations where a user needed clarification. These notes were used later in post-interviews.

The facilitator used a boomerang technique when answering participants' questions during a usability test. The boomerang technique means the facilitator formulates a generic, non-threatening question like "What would you normally do?" or "What would you do if you were doing this on your own?" The facilitator reminds participants to try and work out the issue themselves as they would not be in a research setting [38]. Here are two examples of questions and answers during the test:

> **Participant** "Should I add seasoning to my recipe?"
> **Facilitator** "Think like an actual user. If you are monitoring your diet, do you consider it important to add seasoning?"
> **Participant** "No, I would only add salt. I do not consider the rest of the seasoning important as its amount is minor."
>
> **Participant** "Can I search for extra information by using Google?"
> **Facilitator** "Would you use Google during fulfilling food diary?"
> **Participant** "Yes, I have used it before this way."

UT-Step 6: A Google search for "post-study standardized usability questionnaire" on 20 February 2023 occurred. Four different, mainly discussed questionnaires (QUIS, SUMI, PSSUQ, and SUS) came up.

QUIS[34] and SUMI[35] were discarded from the further investigation because the questionnaires are too long (122 and 50 items accordingly) and licensed. Using these questionnaires would be an overburden to participants, and extra funding would be necessary.

PSSUQ originally consisted of 19 questions [39], and now the last version (version 3) consists of 16 questions[36]. SUS consists of 10 questions [40]. Therefore, the burden for participants with these two questionnaires is comparable. SUS is more suitable than PSSUQ. SUS is more widely cited, with over 5500 citations [40], whereas PSSUQ has over 2000 citations [39]. PSSUQ is susceptible to agreement bias as the wording is positive. The wording in SUS has a positive tone with odd-numbered questions and a negative tone with even-numbered questions. Lastly, academic research has supported SUS because of its validity, reliability, and sensitivity [41]. These questions have become an industry standard because they are easy to understand and reliable. SUS questions are beneficial for tracking the improvement of a product over time, and often SUS score is used as a usability metric. In the case of repeated usability testing, SUS questions are a sound basis for the comparison of the evaluation of the product[37]. Generally, the participant answers the SUS questionnaire after evaluating a system and before the discussion takes place [40]. SUS best meets the criteria of this study methodology.

Appendix V presents an online questionnaire with SUS questions created on KUP. Participants fulfilled this questionnaire after completing usability tasks and before the follow-up interview (Appendix III).

UT-Step 7: A Google search for "follow-up questionnaire for usability testing" and "questions after usability testing" on 20 February 2023 took place.

Based on two sources[38], typical four categories of questions are:

- Screening questions,
- Pre-test questions,
- In-test questions,
- Post-test questions.

The follow-up questionnaire questions were selected from the last three categories: pre-test, in-test, and post-test questions. **UT-Step 2** included screening questions for deciding if a person is suitable for usability tests. According to the methodology, the aim was to influence the participant as little as possible. Therefore, questions of the pre-test and in-test categories were asked after the test. After working through two examples[38] and articles [42, 43, 44], the questionnaire was created. The interview also included questions about problematic functionalities based on previous TAP assessments, like creating a recipe or using a food search window. Appendix VI presents the created post-test interview questionnaire.

UT-Step 8: SUS score range is 0 to 100. Each question contributes to a total score from 0 to 4. For odd questions, the scale number 1 equals a score of 0, and the scale number 5

[34] QUIS™ - The Questionnaire for User Interaction Satisfaction | UM Ventures
[35] SUMI Questionnaire Homepage (uxp.ie)
[36] PSSUQ (Post-Study System Usability Questionnaire) - UIUX Trend
[37] https://www.playbookux.com/usability-testing-questions/
[38] Usability Testing Questions To Gather Actionable Insight (hotjar.com)
10 Examples of Usability Test Questions For Software (delightfuldesignstudio.com)

equals a score of 4. For even questions, the scale is opposite, meaning the scale number 1 equals a score of 4, and the scale number 5 equals a score of 0. The sum of the scores was multiplied by 2.5 [40]. The SUS score of the six participants varied between 62.5 – 77.5. An average SUS score was 68. Based on 500 studies, a score over 68 is above average [45], and anything under 68 is below average, meaning it is at or around the 50th percentile. The score of the current assessment was somewhere between ok and good (Figure 13) [46]. The Pearson correlation between a higher score and prior use is weak (0.16).

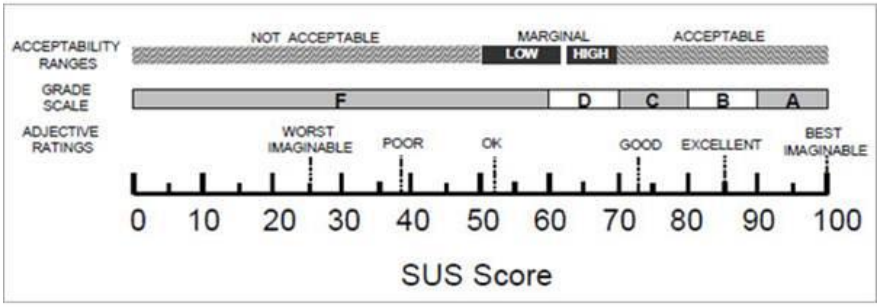


Figure 13. A comparison of the adjective ratings, acceptability scores, and school grading scales in relation to the average SUS score [46]

An ideal task flow was created for each usability task. This flow represents the simplest and most correct way to perform tasks. An actual flow of the task execution was compiled for each participant. If a user solved the task differently, it was marked either red (significant difference and major usability issue) or orange (minor difference and minor usability issue). Figure 14 shows a snipping from these flows. Appendix VII presents all tasks and their different flows.

Figure 14. Snipping of an ideal and real flow for Task 2

The most significant deviation from the ideal flow occurred at task 5 (Table 7). Previous TAP users made fewer errors than new users. The negative correlation (Pearson) between errors and prior use is strong (-0.85). There was a total of 60 issues in the task flows.

Table 7. Participants' minor and major differences in each task compared to an ideal flow.

Tasks	P1		P2		P3		P4		P5		P6		Total	
	MI[1]	MA[2]	MI	MA	MI	MA	MI	MA	MI	MA	MI	MA	MI	MA
Task 1	0	2	3	0	2	1	0	0	1	0	0	0	6	3
Task 2	2	1	1	3	1	1	0	0	1	1	0	0	5	6
Task 3	0	0	0	1	0	0	0	0	0	0	1	1	1	2
Task 4	1	2	1	1	1	2	0	0	0	0	0	0	3	5
Task 5	2	2	1	5	2	1	5	0	0	5	0	6	10	19
Total	5	7	6	10	6	5	5	0	2	6	1	7	25	35

[1] slight difference and minor usability issue
[2] significant difference and major usability issue

Based on the results, TAP memorability is good. Even though two account holders (participants 5 and 6) have used TAP briefly, their task flows have fewer errors than new users' task flows.

Interview audio files were automatically transcribed to text files and corrected online using a webpage speech recognition service tekstiks.ee [47]. Appendix VIII presents a summary of the interviews' main points.

Here is a list of improvement suggestions created for the workshop based on interviews:

Suggestion 1 Adding an introduction video to the front page,
Suggestion 2 Adding a tutorial video inside of the program,
Suggestion 3 Adding pie charts in analysis,
Suggestion 4 In the food search window, when clicking "My foods" button should display all my previously created foods,
Suggestion 5 Make a choice "Choose a quantity from food image" more visible and rephrase the tab's name. Use the same icon as in the food diary,
Suggestion 6 The "How many portions did you eat" question and the field's default setting are confusing. If one is selected, why is the amount zero? Change the functionality,
Suggestion 7 At the analysis results buttons "Underconsumption", "Normal consumption", and "Overconsumption" should have an info button and on/off switching icon,
Suggestion 8 Adding a food pyramid analysis,
Suggestion 9 The difference between the "Percentage of energy intake" and the "Percentage of the nationally recommended energy intake" needs to be clarified. Current tooltips need to be improved. Add calculation example or pop-out info button,
Suggestion 10 Change the wording for "Recommended energy intake" in the food diary to "Daily recommended energy intake",
Suggestion 11 Increasing visibility to added foods in the food diary and ingredients in the recipe,
Suggestion 12 Empty plates in the food image series are confusing. Add explanatory info,
Suggestion 13 Change the visibility of the "Analysis of the day" button,
Suggestion 14 Change the names of processing types to "Under 15 minutes" and "Over 15 minutes",

Suggestion 15 Add information on why a user must fulfill processing type or weight yield. It is confusing why it is compulsory,
Suggestion 16 Make serving size and piece weight meaning understandable,
Suggestion 17 Move the position of the button "Set processing type for all" above,
Suggestion 18 When the user sets menu settings using the energy calculator, the calculator should keep these settings in the memory,
Suggestion 19 Drop-down buttons need to be more visually noticeable in the analysis. Change the color of the button.

Usability testing gave an insight into how users behave. The facilitator was surprised that two participants inserted foods with zero amounts. The program was rated as OK by the average SUS score. Post-test interviews gave 19 improvement suggestions. The facilitator had not come up with about half of these suggestions previously.

4.3 Workshop

The workshop took place in April with three NutriData team members. The workshop discussion took place about usability issues in the heuristic evaluation and usability testing. The workshop was held in Estonian. Therefore, solution suggestions in Appendix II are in the original language.

WS-Step 1: NutriData team members discussed possible solutions for each detected issue. The solutions found in the discussion got assigned into the following categories: "Must do", "Nice to have", and "Future" (Table 8). Appendix II presents issues detected with heuristic evaluation and their categorization into minor or major issues. During the workshop, these comments from different evaluators were discussed, and solutions were proposed. Appendix II also presents comments and solutions in Estonian and the workshop categorization for each solution.

Table 8. Workshop solution's division into categories.

Heuristics	Average severity score	Number of total issues	Must do	Nice to have	Future
User control and freedom	3.3	9	3	2	4
Visibility of system status	2.7	8	4	2	2
Help and documentation	2.3	10	6	2	2
Recognition rather than recall	2	10	5	4	1
Aesthetic and minimalist design	1.7	3	2	1	0
Recognise, diagnose, and recover from errors	1.7	5	5	0	0
Match between system and the real world	1	9	3	4	3
Consistency and standards	1	6	3	0	3
Error prevention	0.7	2	1	0	1
Flexibility and efficiency of use	0	1	1	0	0

Many times, the same improvement suggestion solved different issues. For example, adding a tutorial video near any functionality would make online instructions visually distinct and easy to find simultaneously. Therefore, the sum of suggestions is less than the sum of the issues assigned as "Must do".

Not all features suggested for major issues are in the "Must do" category (Table 9). Some major issues only influence some users or might be with unreasonable cost. For example, when analyzing heuristic evaluation comments, not having an "Undo" functionality was considered a major issue. Workshop discussion led to the conclusion that "Undo" features for all activities is a "Nice to have" feature because it is considered an expensive feature, and most of the activities have a confirmation modal that helps prevent unwanted action. Almost half of the minor issues were included in the development plan because either they are easy to implement or the scope of the impact is high, as the additional change will affect most users. For example, removing inconsistencies in button names and prompts is not time-consuming and can be implemented with low cost by the IT support company. Table 9 shows the heuristic evaluation of major and minor issues distribution between "Must do", "Nice to have", and "Future" categories after the workshop.

Table 9. Major and minor issue distribution into categories as a result of the workshop.

Heuristic evaluation category	Must do (percentage of total issues, %)	Nice to have (percentage of total issues, %)	Future (percentage of total issues, %)
Major issues (14 total)	10 (71%)	4 (29%)	0 (0%)
Minor issues (49 total)	24 (49%)	10 (20%)	15 (31%)

WS-Step 2: NutriData team members discussed possible solutions for detected differences in user task flows. The solutions found in the discussion and improvement suggestions from interviews got assigned into the following categories: "Must do", "Nice to have", and "Future".

Discussion over six aspects based on task flows, and 19 suggestions from interviews took place in a workshop (Appendix IX).

Task flow differences and interviews confirmed some heuristic evaluation findings and suggested some new feature developments.

After looking at task flows, open discussion occurred on how to help users achieve the ideal flow. Workshop participants came up with solutions for six discussion aspects. Appendix IX presents the solutions distribution between categories. Three solutions are the "Must do" features, one is a "Nice to have", and two proposed solutions are assigned a "Future" category. An example of the "Must do" feature based on user flows is that the user should not be able to add food with a 0 amount in a food diary, and when adding a 0 amount in a recipe, the user must confirm this decision. Caterers might need the option to insert salt and seasoning with 0 amount as the season is added to taste. User flows confirmed that the food search window, adding an amount, and creating a recipe is confusing, as heuristic evaluation suspected.

Appendix IX also presents interview suggestion distribution between categories. A total of 14 (Suggestions 1, 4, 5, 7, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19) out of 19 suggestions from interviews were assigned as the "Must do" category. Suggestions 3, 6, and 8 were assigned as the "Future" category. Suggestions 2 and 13 matched the suggestions from the heuristic evaluation. Based on heuristic evaluation issue assignments, suggestion 2 was in a "Must do" category, and suggestion 13 was in a "Nice to have" category.

WS-Step 3: Table 10 presents the development plan for 2023. These improvements were all categorized as "Must do". The development plan includes most of the major issues detected with heuristic evaluation (71%) and almost half of the minor issues (49%). The

development plan includes half the user flow discussion points (3 aspects) and almost three-quarters (74%) of interview suggestions. Results show that different evaluation methods complement and validate each other. Some developments are necessary based on both evaluation: heuristic evaluation and usability testing. Some developments are necessary based on either heuristic evaluation or usability testing. Each improvement fixes one or more detected usability issues. Issues that were present in both evaluations will be solved first.

Table 10. Development plan for 2023

Id[1]	Improvements	Origin
1	Changes in recipe functionality: change the names of processing types to "Under 15 minutes" and "Over 15 minutes", change the name "Fat frying", default setting as simple view, and more settings open with button "More options", move position of the button "Set processing type for all" above, add information on why a user must fulfill processing type or weight yield. It is confusing why it is compulsory. Harmonize weight yield label.	Heuristic evaluation, usability testing, interview
2	Changes in adding an amount modal: make a choice "Choose a quantity from food image" more visible and rephrase the tab's name, use the same icon as in the food diary, and consider new placement, add explanatory info for empty plates, add info buttons for serving size and piece weight, change the label names, change design.	Heuristic evaluation, usability testing, interview
3	Changes in the food search window: "My foods" button should display all previously created foods by the user, info buttons for filters, default setting as simple view, and more settings open with button "More options", design changes.	Heuristic evaluation, usability testing, interview
4	The user should not be able to add food with 0 amount in food diary and when adding a 0 amount in recipe, the user must confirm this decision (Caterers add season with 0 grams).	Usability testing
5	Changes in prompts and error messages: rephrasing for clarity, same grammar, telling the user what to do, adding missing alerts, removing redundant tooltips, harmonizing confirmation buttons names.	Heuristic evaluation
6	Icon changes: change too similar icons and avoid using the same icons for different functions.	Heuristic evaluation
7	Adding a possibility to set weight and height under the profile.	Heuristic evaluation
8	Allowing to move pop-up windows and change the functionality of back/forward buttons in web browser.	Heuristic evaluation
9	Adding an introduction video to the front page.	Interview
10	Adding tutorial videos inside of the program.	Heuristic evaluation, interview
11	At the analysis results buttons "Underconsumption", "Normal consumption", and "Overconsumption" should have an info button and on/off switching icon.	Usability testing, interview
12	The difference between the "Percentage of energy	Interview

	intake" and the "Percentage of the nationally recommended energy intake" needs to be clarified. Current tooltips need to be improved.	
13	Removing the inconsistencies in label names.	Heuristic evaluation
14	Removing the inconsistencies and inappropriate design. Mouse movement causes similar background changes, removing redundant space in the food search window, eliminating contrast errors.	Heuristic evaluation
15	Adding saving functionality to a shortcut Crtl+S.	Heuristic evaluation
16	Adding timer for functionalities that need more than 5 seconds for processing and prompt when the process failed.	Heuristic evaluation
17	Change the wording for "Recommended energy intake" in the food diary to "Daily recommended energy intake".	Usability testing, interview
18	When the user sets menu settings using the energy calculator, the calculator should keep these setting in the memory.	Interview
19	Drop-down buttons need to be more visually noticeable in the analysis. Change the color of the button.	Interview

[1] Id numbers are used to match the development plan and proposed solutions presented in Appendix II and Appendix IX

In conclusion, the workshop produced a comprehensive development plan for 2023. Improvements validated by different sources are prioritized and will be implemented first. Adding new functionalities and features has previously been the usual way of creating a development plan in NIHD. This study creates a development plan based on the usability assessment results.

5 Limitations of the Study

This chapter presents a list of issues, their impact, and possible solutions to how these issues could be addressed if a similar study was conducted again or conducted by someone else.

Issue 1: The usability testing was performed only once before implementing the development plan 2023.
Impact: The project management has no information concerning the impact of different changes in the program on the usability of the program.
Solution: Include into the methodology post-implementation usability testing. The change in the SUS score will help to understand in which direction and how much the user experience and usability changed.

Issue 2: The device used for the usability evaluation was a computer. However, half of the web traffic comes from mobile.
Impact: This excludes a large group of users.
Solution: Used method could be adapted to the assessment by mobile. After deploying improvements, the subsequent study should use a mobile device. If this methodology is applied for the first time, both computer and mobile could be used in usability testing as devices.

Issue 3: Evaluators assessed heuristics the first time and were inexperienced.
Impact: Inexperienced evaluators may have missed several shortcomings.
Solution: The evaluator must know the system rather than he or she has experience. Involve more than one person if they do not have previous experience.

Issue 4: Workshop discussion involved only detected issues.
Impact: Several usability issues could still remain overlooked.
Solution: When there is no time constraint, include all checklist questions and task flows in the workshop discussion. Discussing heuristic evaluation checklist questions that were found not to be a usability issue might reveal some overlooked issues. Discussing how to reduce time spent on tasks in the accepted task flows might still improve usability.

Issue 5: This study took six months to prepare and complete.
Impact: Doing the usability testing annually for each year's development plan is not feasible.
Solution: Using usability evaluation to create a development plan once in two to three years is reasonable.

This study had several issues. Most recommended solutions are easy to implement in subsequent studies. Using only a computer as a device greatly impacted the study. Using a mobile as a study device is the most important recommendation for the next time.

6 Conclusions

Usability evaluators have several choices when selecting a usability evaluation method. This study demonstrated the relevance of including more than one method when assessment results are basis for creating development plan. Using two methods (heuristic evaluation and usability testing) simultaneously validates and complements results from different methods.

Literature suggests doing an inspection evaluation first, implementing improvements based on the results, and then usability testing should follow [19]. Using two methods together helped to prioritize the improvements better. Issues detected by both evaluation methods will be solved via implementation of the development plan first. Based on this study's results, using heuristic evaluation and usability testing together is more reasonable when budget constraints exist.

Involving multiple evaluators in heuristic evaluation is recommended [10]. This study's results confirm the recommendation. Three evaluators found individually a third (35%) of the detected issues in this study.

Involving 6 participants in usability testing was sufficient as the mistakes in task flows were repeating. Study results align with the suggestion of 5 participants per usability testing [24]. Usability testing was an excellent insight into understanding users. Some detected usability issues surprised the facilitator. Usability testing is often seen as a great tool when creating a new system[39]. Assessing the usability of the existing system with usability testing proved to be a valuable tool for building up a development plan as well.

The development plan for 2023 prepared with the help of this study includes a remarkable 74% of interview suggestions. Conducting a comprehensive post-test interview should be included in a usability test if feasible as it provides valuable insight and recommendations for development.

[39] UX Research Methods and Techniques [2023 Guide] | Konrad®

7 Summary

Usability is a sum of learnability, efficiency, memorability, errors, and satisfaction. Good customer experience thrives company business growth, but achieving it is complex. There are no uniform rules to achieve good usability. Many different methods and variants help to evaluate usability and user experience.

This master's thesis aims to assess the usability of the NutriData dietary analysis program and create a development plan for 2023 based on usability issues found. The author assumed several usability issues in TAP based on previously conducted usability assessments of TAP.

TAP's usability was assessed using heuristic assessment and usability testing. Using different methods was beneficial, as the results complemented each other and helped to prioritize the improvements.

Three NutriData team members conducted a heuristic evaluation. Individual assessment by several people was helpful since 35% of errors were detected by a single evaluator. All evaluators agreed that "User control and freedom" was the most problematic heuristic. One heuristic, "Flexibility and efficiency of use", was seen as not a usability issue by all evaluators.

Six participants took part in the usability testing. Usability task flows of NutriData account holders had fewer errors than new user flows. Interviews conducted during usability testing contributed significantly to the development plan. The development plan for 2023 includes almost a three-quarter of interview suggestions. Some developments are necessary based on both evaluation: heuristic evaluation and usability testing. Some developments are necessary based on either heuristic evaluation or usability testing. Each improvement fixes one or more detected usability issues.

Six users' average SUS score was 68 points. The result gave TAP a rating between OK and good. The correlation between a higher SUS score and prior TAP usage is weak.

The study revealed limitations of the study and helped to propose prospective methods to solve them. Using a mobile as a study device is the most important recommendation for the subsequent TAP usability study.

In conclusion, based on this study's results, using two methods (heuristic evaluation and usability testing) helps to prioritize improvements in the development plan and is more reasonable when budget constraints exist.

References

[1] Standard: ISO 9241-11:2018. Ergonomics of human-system interaction. International Organization for Standardization.

[2] Nielsen J. Usability 101: Introduction to Usability, 2012. https://www.nngroup.com/articles/usability-101-introduction-to-usability (24.04.2023)

[3] Kujala S., Talya M.-S. Emotions, Experiences and Usability in Real-Life Mobile Phone Use. *Conference on Human Factors in Computing Systems - Proceedings*, 2013.

[4] Lawrence D., Tavakol S. Balanced Website Design. London: Springer. 2007.

[5] Reichheld F.F. The one number you need to grow. *Harvard Business Review*, 2003.

[6] Lewis J. R. Usability Testing. *Handbook of Human Factors and Ergonomics*. Fourth Edition. New York: John Wiley & Sons, Inc, 2012, pp. 1267–1312.

[7] Salazar K. Diary Studies: Understanding Long-Term User Behavior and Experiences, 2016. https://www.nngroup.com/articles/diary-studies (03.02.2023)

[8] Nielsen J. The Use and Misuse of Focus Groups, 1997. https://www.nngroup.com/articles/focus-groups (03.02.2023)

[9] Pernice K. User Interviews: How, When, and Why to Conduct Them, 2018. https://www.nngroup.com/articles/user-interviews (03.02.2023)

[10] Salazar K. How to Conduct a Cognitive Walkthrough Workshop, 2022. https://www.nngroup.com/articles/cognitive-walkthrough-workshop (20.02.2023)

[11] Andreasen M. S., Nielsen H. V., Schroder S. O., Stage J. What Happened to Remote Usability Testing? An Empirical Study of Three Methods. *Proceedings of Conference on Human Factors in Computing* Systems, Association for Computing Machinery, 2007, pp. 1405-1414.

[12] Roher C. When to Use Which User-Experience Research Methods, 2022. https://www.nngroup.com/articles/which-ux-research-methods (28.0. 2023)

[13] Nielsen J., Molich R. Heuristic Evaluation of User Interfaces, *Conference on Human Factors in Computing*, Association for Computing Machinery, 1990, pp. 249-256.

[14] Moran K. Setup of an Eyetracking Study, 2019. https://www.nngroup.com/articles/eyetracking-setup (03.02.2023)

[15] Harley A. Multivariate vs. A/B Testing: Incremental vs. Radical Changes, 2018. https://www.nngroup.com/articles/multivariate-testing (03.02.2023)

[16] Whitenton K. Tree Testing: Fast, Iterative Evaluation of Menu Labels and Categories, 2017. https://www.nngroup.com/articles/tree-testing (03.02.2023)

[17] Nielsen J. Technology Transfer of Heuristic Evaluation and Usability Inspection, 1995. https://www.nngroup.com/articles/technology-transfer-of-heuristic-evaluation (28.04.2023)

[18] Moran K. Usability Testing 101, 2019. https://www.nngroup.com/articles/usability-testing-101 (06.01.2023)

[19] Nielsen J. 10 Usability Heuristics for User Interface Design, 2020. https://www.nngroup.com/articles/ten-usability-heuristics (26.12.2022)

[20] Salazar K. Evaluate Interface Learnability with Cognitive Walkthroughs, 2022. https://www.nngroup.com/articles/cognitive-walkthroughs/#:~:text=Definition%3A%20A%20cognitive%20walkthrough%20is%20a%20task-based%20usability-inspection,interface%20that%20could%20be%20challenging%20to%20new%20users (28.12.2022)

[21] Nielsen J. Discount Usability: 20 Years, 2009. https://www.nngroup.com/articles/discount-usability-20-years (07.01.2023)

[22] Harley A. UX Expert Reviews, 2018. https://www.nngroup.com/articles/ux-expert-reviews (10.12.2022)

[23] Smith S. L., Moiser J. N. Guidelines for Designing User Interface Software, 1986 https://hcibib.org/sam/index.html (24.04.2023)

[24] Sauer J., Sonderegger A., Heyden K., Biller J., Klotz J. Extra-laboratorial usability tests: An empirical comparison of remote and, *Applied Ergonomics*, 2019, kd. 74, pp. 85-96.

[25] Farrell S. Field Studies, 2016. https://www.nngroup.com/articles/field-studies (12.02.2023)

[26] Moran K. Benchmarking UX: Tracking Metrics, 2020. https://www.nngroup.com/articles/benchmarking-ux (08.01.2023)

[27] Nielsen J. Why You Only Need to Test with 5 Users, 2000. https://www.nngroup.com/articles/why-you-only-need-to-test-with-5-users (8.01.2023)

[28] Nielsen J., Landauer T. K. A mathematical model of the finding of usability problems, *Proceedings of ACM INTERCHI'93 Conference*, 1993, pp. 206-213

[29] Nielsen J. Recruiting Test Participants for Usability Studies, 2003. https://www.nngroup.com/articles/recruiting-test-participants-for-usability-studies (10.01.2023)

[30] Pierotti D. Heuristic Evaluation - A System Checklist, 1995. https://uxheuristics.net/heuristics/nielsenxerox-13-usability-heuristics (8.10.2022)

[31] Harley A. Visibility of System Status (Usability Heuristic #1), 2018. https://www.nngroup.com/articles/visibility-system-status (16.02.2023)

[32] Kaley A. Match Between the System and the Real World: The 2nd Usability Heuristic Explained, 2018. https://www.nngroup.com/articles/match-system-real-world (16.02.2023)

[33] Rosala M. User Control and Freedom (Usability Heuristic #3), 2020. https://www.nngroup.com/articles/user-control-and-freedom (16.02.2023)

[34] Krause R. Maintain Consistency and Adhere to Standards (Usability Heuristic #4), 2021. https://www.nngroup.com/articles/consistency-and-standards (16.02.2023)

[35] Laubheimer P. Preventing User Errors: Avoiding Unconscious Slips, 2015. https://www.nngroup.com/articles/slips (16.02.2023)

[36] Budiu R. Memory Recognition and Recall in User Interfaces, 2014. https://www.nngroup.com/articles/recognition-and-recall (16.02.2023)

[37] Laubheimer P. Flexibility and Efficiency of Use: The 7th Usability Heuristic Explained, 2020. https://www.nngroup.com/articles/flexibility-efficiency-heuristic (16.02.2023)

[38] Fessenden T. Aesthetic and Minimalist Design (Usability Heuristic #8), 2021. https://www.nngroup.com/articles/aesthetic-minimalist-design (16.02.2023)

[39] Nielsen J. Error Message Guidelines, 2001. https://www.nngroup.com/articles/error-message-guidelines (16.02.2023)

[40] Joyce A. Help and Documentation: The 10th Usability Heuristic, 2020. https://www.nngroup.com/articles/help-and-documentation (16.02.2023)

[41] Pernice K. Talking with Participants During a Usability Test, 2014. https://www.nngroup.com/articles/talking-to-users (20 02 2023).

[42] Lewis J. R., James R. IBM Computer Usability Satisfaction Questionnaires: Psychometric Evaluation and Instructions for Use, *International Journal of Human-Computer*, 1995, kd. 7, pp. 57-78.

[43] Brooke J. SUS: A quick and dirty usability scale, 1995.

[44] Panagiotidi M. Standardized usability questionnaires: which one to use?, 2021. https://uxpsychology.substack.com/p/standardized-usability-questionnaires (20.02.2023)

[45] Schade A. Avoid Leading Questions to Get Better Insights from Participants, 2017. https://www.nngroup.com/articles/leading-questions (20.02.2023)

[46] Farrell S. Open-Ended vs. Closed-Ended Questions in User Research, 2016. https://www.nngroup.com/articles/open-ended-questions (20.02.2023)

[47] Nielsen J. Interviewing Users, 2010. https://www.nngroup.com/articles/interviewing-users (20.02.2023)

[48] Sauro J. Measuring Usability with the System Usability Scale (SUS), 2011. https://measuringu.com/sus (18.04.2023)

[49] Bangor A., Kortum P., Miller J. Determining What Individual SUS Scores Mean: Adding an Adjective Rating Scale, *Journal of usability studies*, 2009, kd. 4, nr 3, pp. 114-123.

[50] Olev A., Alumäe T. Estonian Speech Recognition and Transcription, *Baltic J. Modern Computing*, 2022, kd. 10, nr 3, pp. 409-421.

Appendix

I. Developed NutriData heuristic evaluation checklist based on Xerox 13 heuristics

Changes:
Type 1 - word and phrases changes to match the company's jargon and context (marked yellow);
Type 2 – additional information, adding example and/or explanations to a specific question (marked green);
Type 3 – questions are deleted because certain functions or options are not used in NutriData or they are about command line (marked red);
Type 4 – questions are deleted because they are related to command line which are irrelevant for TAP (marked dark red).

Add comment to every checklist question if the answer is not „Yes".

1. Visibility of System Status

The system should always keep user informed about what is going on, through appropriate feedback within reasonable time.

#	Review Checklist	Yes	Often	Rarely	No	N/A	Comments
1.1	Does every ~~display~~ page begin with a title or header that describes ~~screen~~ its contents?	O	O	O	O	O	
1.2	Is there a consistent icon design scheme and stylistic treatment across the system?	O	O	O	O	O	
1.3	Is a single, selected icon clearly visible when surrounded by unselected icons?	O	O	O	O	O	
1.4	Do help and info ~~menu~~ instructions, prompts, and error messages appear in the same place(s) on each menu page?	O	O	O	O	O	
1.5	In multipage data entry ~~screens~~ modal, is each page of the modal labeled to show its relation to others?	O	O	O	O	O	
1.6	~~If overtype and insert mode are both available, is there a visible indication of which one the user is in?~~	O	O	O	O	O	

1.7	If pop-up windows are used to display error messages, do they allow the user to see the field in error?	O	O	O	O	O	
1.8	Is there some form of system feedback for every operator action?	O	O	O	O	O	
1.9	After the user completes an action (or group of actions), does the feedback indicate that the next group of actions can be started?	O	O	O	O	O	
1.10	Is there visual feedback in menus or dialog boxes about which choices are selectable?	O	O	O	O	O	
1.11	Is there visual feedback in menus or dialog boxes about which choice the cursor is on now?	O	O	O	O	O	
1.12	If multiple options can be selected in a menu or dialog box, is there visual feedback about which options are already selected?	O	O	O	O	O	
1.13	Is there visual feedback when objects are selected or moved?	O	O	O	O	O	
1.14	Is the current status of an icon clearly indicated?	O	O	O	O	O	
1.15	Is there feedback when ~~function keys~~ action buttons are pressed?	O	O	O	O	O	
1.16	If there are observable delays (greater than fifteen seconds) in the system's response time, is the user kept informed of the system's progress?	O	O	O	O	O	
1.17	Are response times appropriate to the task?	O	O	O	O	O	
1.18	Typing, cursor motion, mouse selection: 50-150 milliseconds	O	O	O	O	O	
1.19	Simple, frequent tasks: less than 1 second	O	O	O	O	O	
1.20	Common tasks: 2-4 seconds	O	O	O	O	O	
1.21	Complex tasks: 8-12 seconds	O	O	O	O	O	
1.22	Are response times appropriate to the user's cognitive processing?	O	O	O	O	O	
1.23	Continuity of thinking is required and information must be remembered throughout several responses: less than two seconds.	O	O	O	O	O	
1.24	High levels of concentration aren't necessary and remembering information is not required: two to fifteen seconds.	O	O	O	O	O	

1.25	Is the menu-naming terminology consistent with the user's task domain?	O	O	O	O	O	
1.26	Does the system provide *visibility:* that is, by looking, can the user tell the state of the system and the alternatives for action?	O	O	O	O	O	
1.27	Do GUI (Graphical User Interface) menus make obvious which item has been selected?	O	O	O	O	O	
1.28	Do GUI menus make obvious whether deselection is possible?	O	O	O	O	O	
1.29	~~If users must navigate between multiple screens, does the system use context labels, menu maps, and place markers as navigational aids?~~	O	O	O	O	O	

2. Match Between System and the Real World

The system should speak the user's language, with words, phrases, and concepts familiar to the user, rather than system- oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

#	Review Checklist	Yes	Often	Rarely	No	N/A	Comments
2.1	Are icons concrete and familiar?	O	O	O	O	O	
2.2	Are menu choices ordered in the most logical way, given the user, the item names, and the task variables?	O	O	O	O	O	
2.3	If there is a natural sequence to menu choices, has it been used?	O	O	O	O	O	
2.4	Do related and interdependent fields appear on the same screen?	O	O	O	O	O	
2.5	If shape is used as a visual cue, does it match cultural conventions?	O	O	O	O	O	
2.6	Do the selected colors correspond to common expectations about color codes?	O	O	O	O	O	
2.7	When prompts imply a necessary action, are the words in the message consistent with that action?	O	O	O	O	O	
2.8	~~Do keystroke references in prompts match actual key names?~~	O	O	O	O	O	
2.9	On data entry ~~screens~~ modals, are tasks described in terminology	O	O	O	O	O	

	familiar to users?						
2.10	Are field-level prompts (help texts) provided for data entry modals ~~screens~~? For example, if password does not meet the requirements.	O	O	O	O	O	
2.11	For question-and-answer interfaces, are questions stated in clear, simple language?	O	O	O	O	O	
2.12	~~Do menu choices fit logically into categories that have readily understood meanings?~~	O	O	O	O	O	
2.13	Are menu titles ~~parallel grammatically~~ linguistically in the same grammar case?	O	O	O	O	O	
2.14	Does the command language employ language that is understandable for user (his jargon) and avoid computer technical language ~~jargon~~?	O	O	O	O	O	
2.15	Are ~~command~~ button names specific rather than general?	O	O	O	O	O	
2.16	~~Does the command language allow both full names and abbreviations?~~	O	O	O	O	O	
2.17	Are input data codes meaningful?	O	O	O	O	O	
2.18	~~Have uncommon letter sequences been avoided whenever possible?~~	O	O	O	O	O	
2.19	Does the system automatically enter leading or trailing spaces to align decimal points?	O	O	O	O	O	
2.20	~~Does the system automatically enter a dollar sign and decimal for monetary entries?~~	O	O	O	O	O	
2.21	~~Does the system automatically enter commas in numeric values greater than 9999?~~	O	O	O	O	O	
2.22	Do GUI menus offer activation: that is, make obvious how to say „now do it"? For example, pay your shopping cart now.	O	O	O	O	O	
2.23	Has the system been designed so that ~~keys~~ buttons with similar names do not perform opposite (and potentially dangerous) actions?	O	O	O	O	O	

2.24	Are ~~function keys~~ action buttons labeled clearly and distinctively, even if this means breaking consistency rules?	O	O	O	O	O	

3. User Control and Freedom

Users should be free to select and sequence tasks (when appropriate), rather than having the system do this for them. Users often choose system functions by mistake and will need a clearly marked „emergency exit" to leave the unwanted state without having to go through an extended dialogue. Users should make their own decisions (with clear information) regarding the costs of exiting current work. The system should support undo and redo.

#	Review Checklist	Yes	Often	Rarely	No	N/A	Comments
3.1	If setting up windows is a low-frequency task, is it particularly easy to remember?	O	O	O	O	O	
3.2	~~In systems that use overlapping windows, is it easy for users to rearrange windows on the screen?~~	O	O	O	O	O	
3.3	~~In systems that use overlapping windows, is it easy for users to switch between windows?~~	O	O	O	O	O	
3.4	When a user's task is complete, does the system wait for a signal from the user before processing? For example, inserted input in the field is saved after a save button is pressed not in the background.	O	O	O	O	O	
3.5	Can users type-ahead in a system with many nested menus?	O	O	O	O	O	
3.6	Are users ~~prompted~~ asked to confirm commands that have drastic, destructive consequences?	O	O	O	O	O	
3.7	Is there an "undo" function at the level of a single action, a data entry, and a complete group of actions?	O	O	O	O	O	
3.8	Can users cancel out of operations in progress?	O	O	O	O	O	
3.9	~~Are character edits allowed in commands?~~	O	O	O	O	O	
3.10	Can users reduce data entry time by copying and modifying	O	O	O	O	O	

	existing data?						
3.11	Are character edits allowed in data entry fields?	O	O	O	O	O	
3.12	If menu lists are long (more than seven items), can users select an item either by moving the cursor or by typing a mnemonic code? For example, in NutriData physical activity list, your food and menu lists.	O	O	O	O	O	
3.13	~~If the system uses a pointing device, do users have the option of either clicking on menu items or using a keyboard shortcut?~~	O	O	O	O	O	
3.14	Are menus broad (many items on a menu) rather than deep (many menu levels)?	O	O	O	O	O	
3.15	~~If the system has multiple menu levels, is there a mechanism that allows users to go back to previous menus?~~	O	O	O	O	O	
3.16	~~If users can go back to a previous menu, can they change their earlier menu choice?~~	O	O	O	O	O	
3.17	Can users move forward and backward between fields or dialog box (modals) options?	O	O	O	O	O	
3.18	If the system has multipage data entry ~~screens~~ modals, can users move backward and forward among all the pages in the set?	O	O	O	O	O	
3.19	If the system uses a question-and-answer interface, can users go back to previous questions or skip forward to later questions?	O	O	O	O	O	
3.20	Do ~~function keys~~ action buttons that can cause serious consequences have an undo feature?	O	O	O	O	O	
3.21	Can users easily reverse their actions?	O	O	O	O	O	
3.22	~~If the system allows users to reverse their actions, is there a retracing mechanism to allow for multiple undos?~~	O	O	O	O	O	
3.23	Can users set their own system, session, file, and screen defaults?	O	O	O	O	O	

4. Consistency and Standards

Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.

#	Review Checklist	Yes	Often	Rarely	No	N/A	Comments
4.1	Have industry or company formatting standards (font size, color, text alignment etc) been followed consistently in all screens within a system?	O	O	O	O	O	
4.2	Has a heavy use of all uppercase letters on a screen been avoided?	O	O	O	O	O	
4.3	Do abbreviations not include punctuation?	O	O	O	O	O	
4.4	Are integers right-justified and real numbers decimal-aligned?	O	O	O	O	O	
4.5	Are icons labeled?	O	O	O	O	O	
4.6	Are there no more than twelve to twenty icon types?	O	O	O	O	O	
4.7	Are there salient visual cues to identify the active window?	O	O	O	O	O	
4.8	Does each window have a title?	O	O	O	O	O	
4.9	Are vertical and horizontal scrolling possible in each window?	O	O	O	O	O	
4.10	Does the menu structure match the task structure?	O	O	O	O	O	
4.11	Have industry or company standards been established for menu design, and are they applied consistently on all menu screens in the system?	O	O	O	O	O	
4.12	Are menu choice lists presented vertically?	O	O	O	O	O	
4.13	If ~~"exit"~~ „log out" is a menu choice, does it always appear at the bottom of the list?	O	O	O	O	O	
4.14	Are menu titles either centered or left-justified?	O	O	O	O	O	
4.15	Are menu items left-justified, with the item number or mnemonic preceding the name?	O	O	O	O	O	
4.16	Do embedded field-level prompts appear to the right of the field	O	O	O	O	O	

	label?						
4.17	Do on-line instructions appear in a consistent location across screens?	O	O	O	O	O	
4.18	Are field labels and fields distinguished typographically?	O	O	O	O	O	
4.19	Are field labels consistent from one data entry ~~screen~~ modal to another?	O	O	O	O	O	
4.20	Are fields and labels left-justified for alpha lists and right-justified for numeric lists?	O	O	O	O	O	
4.21	Do field labels appear to the left of single fields and above list fields?	O	O	O	O	O	
4.22	Are attention-getting techniques used with care?	O	O	O	O	O	
4.23	Intensity: two levels only	O	O	O	O	O	
4.24	Size: up to four sizes	O	O	O	O	O	
4.25	Font: up to three	O	O	O	O	O	
4.26	Blink: two to four hertz	O	O	O	O	O	
4.27	Color: up to four (additional colors for occasional use only)	O	O	O	O	O	
4.28	Sound: soft tones for regular positive feedback, harsh for rare critical conditions	O	O	O	O	O	
4.29	Are attention-getting techniques used only for exceptional conditions or for time-dependent information?	O	O	O	O	O	
4.30	Are there no more than four to seven colors, and are they far apart along the visible spectrum?	O	O	O	O	O	
4.31	Is a legend provided if color codes are numerous or not obvious in meaning?	O	O	O	O	O	
4.32	Have pairings of high-chroma (pure colors that does not contain white, gray, or black), spectrally extreme colors been avoided?	O	O	O	O	O	
4.33	Are saturated blues avoided for text or other small, thin line symbols?	O	O	O	O	O	

4.34	Is the most important information placed at the beginning of the prompt?	O	O	O	O	O	
4.35	Are user actions named consistently across all prompts in the system?	O	O	O	O	O	
4.36	Are system objects named consistently across all prompts in the system?	O	O	O	O	O	
4.37	Do field-level prompts provide more information than a restatement of the field name?	O	O	O	O	O	
4.38	For question-and-answer interfaces, are the valid inputs for a question listed?	O	O	O	O	O	
4.39	Are menu choice names consistent, both within each menu and across the system, in grammatical style and terminology?	O	O	O	O	O	
4.40	Does the structure of menu choice names match their corresponding menu titles?	O	O	O	O	O	
4.41	Are commands used the same way, and do they mean the same thing, in all parts of the system?	O	O	O	O	O	
4.42	Does the command language have a consistent, natural, and mnemonic syntax?	O	O	O	O	O	
4.43	~~Do abbreviations follow a simple primary rule and, if necessary, a simple secondary rule for abbreviations that otherwise would be duplicates?~~	O	O	O	O	O	
4.44	~~Is the secondary rule used only when necessary?~~	O	O	O	O	O	
4.45	~~Are abbreviated words all the same length?~~	O	O	O	O	O	
4.46	Is the structure of a data entry value consistent from ~~screen~~ page to ~~screen~~ page?	O	O	O	O	O	
4.47	Is the method for moving the cursor to the next or previous field consistent throughout the system?	O	O	O	O	O	
4.48	If the system has multipage data entry ~~screens~~ modals, do all pages	O	O	O	O	O	

	have the same title?						
4.49	If the system has multipage data entry ~~screens~~ modals, does each page have a sequential page number?	O	O	O	O	O	
4.50	Does the system follow industry or company standards for ~~function key~~ action buttons assignments?	O	O	O	O	O	
4.51	Are high-value, high-chroma (pure color) colors used to attract attention?	O	O	O	O	O	

5. Help Users Recognize, Diagnose, and Recover from Errors

Error messages should be expressed in plain language (NO CODES).

#	Review Checklist	Yes	Often	Rarely	No	N/A	Comments
5.1	Is sound used to signal an error?	O	O	O	O	O	
5.2	Are prompts stated constructively, without overt or implied criticism of the user?	O	O	O	O	O	
5.3	Do prompts imply that the user is in control?	O	O	O	O	O	
5.4	Are prompts brief and unambiguous.	O	O	O	O	O	
5.5	Are error messages worded so that the system, not the user, takes the blame? For example, „You specified a printer that's offline” (users blame), „The specified printer is offline” (systems blame).	O	O	O	O	O	
5.6	~~If humorous error messages are used, are they appropriate and inoffensive to the user population?~~	O	O	O	O	O	
5.7	Are error messages grammatically correct?	O	O	O	O	O	
5.8	Do error messages avoid the use of exclamation points?	O	O	O	O	O	
5.9	Do error messages avoid the use of violent or hostile words? For example, „You didn't enter a name” (hostile), "Enter a name” (positive).	O	O	O	O	O	

5.10	Do error messages avoid an anthropomorphic tone? For example, computer is overloaded instead computer is tired.	O	O	O	O	O	
5.11	Do all error messages in the system use consistent grammatical style, form, terminology, and abbreviations?	O	O	O	O	O	
5.12	Do messages place users in control of the system?	O	O	O	O	O	
5.13	~~Does the command language use normal action-object syntax?~~	O	O	O	O	O	
5.14	~~Does the command language avoid arbitrary, non-English use of punctuation, except for symbols that users already know?~~	O	O	O	O	O	
5.15	If an error is detected in a data entry field, does the system place the cursor in that field or highlight the error?	O	O	O	O	O	
5.16	Do error messages inform the user of the error's severity?	O	O	O	O	O	
5.17	Do error messages suggest the cause of the problem and are precise? Not vague generalization like „Syntax error”.	O	O	O	O	O	
5.18	Do error messages provide appropriate semantic information? Not like „An error of type 2 has occurred."	O	O	O	O	O	
5.19	Do error messages provide appropriate syntactic information? The construction (form) of the sentence is unambiguous.	O	O	O	O	O	
5.20	Do error messages indicate what action the user needs to take to correct the error?	O	O	O	O	O	
5.21	If the system supports both novice and expert users, are multiple levels of error-message detail available?	O	O	O	O	O	

6. Error Prevention

Even better than good error messages are a careful design which prevents a problem from occurring in the first place.

#	Review Checklist	Yes	Often	Rarely	No	N/A	Comments
6.1	~~If the database includes groups of data, can users enter more than~~	O	O	O	O	O	

	~~one group on a single screen?~~						
6.2	~~Have dots or underscores been used to indicate field length?~~	O	O	O	O	O	
6.3	~~Is the menu choice name on a higher-level menu used as the menu title of the lower-level menu?~~	O	O	O	O	O	
6.4	Are menu choices logical, distinctive, and mutually exclusive?	O	O	O	O	O	
6.5	Are data inputs case-blind whenever possible?	O	O	O	O	O	
6.6	~~If the system displays multiple windows, is navigation between windows simple and visible?~~	O	O	O	O	O	
6.7	~~Are the function keys that can cause the most serious consequences in hard-to-reach positions?~~	O	O	O	O	O	
6.8	Are the ~~function keys~~ action buttons that can cause the most serious consequences located far away from low-consequence and high-use ~~keys~~ buttons?	O	O	O	O	O	
6.9	~~Has the use of qualifier keys been minimized?~~	O	O	O	O	O	
6.10	~~If the system uses qualifier keys, are they used consistently throughout the system?~~	O	O	O	O	O	
6.11	Does the system prevent users from making errors whenever possible?	O	O	O	O	O	
6.12	Does the system warn users if they are about to make a potentially serious error?	O	O	O	O	O	
6.13	~~Does the system intelligently interpret variations in user commands?~~	O	O	O	O	O	
6.14	Do data entry screens and dialog boxes indicate the number of character spaces available in a field?	O	O	O	O	O	
6.15	Do fields in data entry ~~screens~~ modals and dialog boxes contain default values when appropriate?	O	O	O	O	O	

7. Recognition Rather Than Recall

Make objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

#	Review Checklist	Yes	Often	Rarely	No	N/A	Comments
7.1	For question-and-answer interfaces, are visual cues and white space used to distinguish questions, prompts, instructions, and user input?	O	O	O	O	O	
7.2	Does the data display start in the upper-left corner of the screen?	O	O	O	O	O	
7.3	Are multiword field labels placed horizontally (not stacked vertically)?	O	O	O	O	O	
7.4	Are all data a user needs on display at each step in a transaction sequence?	O	O	O	O	O	
7.5	Are prompts, cues, and messages placed where the eye is likely to be looking on the screen?	O	O	O	O	O	
7.6	Have prompts been formatted using white space, justification, and visual cues for easy scanning?	O	O	O	O	O	
7.7	Do text areas have "breathing space" around them?	O	O	O	O	O	
7.8	Is there an obvious visual distinction made between "choose one" menu and "choose many" menus?	O	O	O	O	O	
7.9	~~Have spatial relationships between soft function keys (on-screen cues) and keyboard function keys been preserved?~~	O	O	O	O	O	
7.10	Does the system gray out or delete labels of currently inactive soft ~~function keys~~ action buttons?	O	O	O	O	O	
7.11	Is white space used to create symmetry and lead the eye in the appropriate direction?	O	O	O	O	O	
7.12	Have items been grouped into logical zones, and have headings been used to distinguish between zones?	O	O	O	O	O	

7.13	Are zones no more than twelve to fourteen characters wide and six to seven lines high?	O	O	O	O	O	
7.14	Have zones been separated by spaces, lines, color, letters, bold titles, rules lines, or shaded areas?	O	O	O	O	O	
7.15	Are field labels close to fields, but separated by at least one space?	O	O	O	O	O	
7.16	Are long columnar fields broken up into groups of five, separated by a blank line?	O	O	O	O	O	
7.17	Are optional data entry fields clearly marked?	O	O	O	O	O	
7.18	~~Are symbols used to break long input strings into "chunks"?~~	O	O	O	O	O	
7.19	Is reverse video (this is a computer display technique whereby the background and text color values are inverted) or color highlighting used to get the user's attention? For example, yes is green and no is red.	O	O	O	O	O	
7.20	Is reverse video used to indicate that an item has been selected?	O	O	O	O	O	
7.21	Are size, boldface, underlining, color, shading, or typography used to show relative quantity or importance of different screen items?	O	O	O	O	O	
7.22	Are borders used to identify meaningful groups?	O	O	O	O	O	
7.23	Has the same color been used to group related elements?	O	O	O	O	O	
7.24	Is color coding consistent throughout the system?	O	O	O	O	O	
7.25	Is color used in conjunction with some other redundant cue?	O	O	O	O	O	
7.26	Is there good color and brightness contrast between image and background colors?	O	O	O	O	O	
7.27	Have light, bright, saturated colors been used to emphasize data and have darker, duller, and desaturated colors been used to de-emphasize data?	O	O	O	O	O	
7.28	Is the first word of each menu choice the most important?	O	O	O	O	O	
7.29	Does the system provide *mapping:* that is, are the relationships	O	O	O	O	O	

	between controls and actions apparent to the user?						
7.30	~~Are input data codes distinctive?~~	O	O	O	O	O	
7.31	Have frequently confused data pairs been eliminated whenever possible?	O	O	O	O	O	
7.32	Have large strings of numbers or letters been broken into chunks?	O	O	O	O	O	
7.33	Are inactive menu items grayed out or omitted?	O	O	O	O	O	
7.34	Are there menu selection defaults?	O	O	O	O	O	
7.35	~~If the system has many menu levels or complex menu levels, do users have access to an on-line spatial menu map?~~	O	O	O	O	O	
7.36	Do GUI menus offer affordance: that is, make obvious where selection is possible?	O	O	O	O	O	
7.37	~~Are there salient visual cues to identify the active window?~~	O	O	O	O	O	
7.38	Are ~~function keys~~ action buttons arranged in logical groups?	O	O	O	O	O	
7.39	Do data entry ~~screens~~ modals and dialog boxes indicate when fields are optional?	O	O	O	O	O	
7.40	On data entry ~~screens~~ modals and dialog boxes, are dependent fields displayed only when necessary? For example, the State field is only shown when you choose country USA.	O	O	O	O	O	

8. Flexibility and Minimalist Design

Accelerators-unseen by the novice user-may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions. Provide alternative means of access and operation for users who differ from the „average" user (e.g., physical or cognitive ability, culture, language, etc.).

#	Review Checklist	Yes	Often	Rarely	No	N/A	Comments

8.1	If the system supports both novice and expert users, are multiple levels of error message detail available?	O	O	O	O	O	
8.2	~~Does the system allow novices to use a keyword grammar and experts to use a positional grammar?~~	O	O	O	O	O	
8.3	~~Can users define their own synonyms for commands?~~	O	O	O	O	O	
8.4	Does the system allow novice users to enter the simplest, most common form of each command, and allow expert users to add parameters?	O	O	O	O	O	
8.5	~~Do expert users have the option of entering multiple commands in a single string?~~	O	O	O	O	O	
8.6	~~Does the system provide function keys for high-frequency commands?~~	O	O	O	O	O	
8.7	For data entry screens with many fields or in which source documents may be incomplete, can users save a partially filled screen?	O	O	O	O	O	
8.8	Does the system automatically enter leading zeros?	O	O	O	O	O	
8.9	~~If menu lists are short (seven items or fewer), can users select an item by moving the cursor?~~	O	O	O	O	O	
8.10	~~If the system uses a type-ahead strategy, do the menu items have mnemonic codes?~~	O	O	O	O	O	
8.11	~~If the system uses a pointing device, do users have the option of either clicking on fields or using a keyboard shortcut?~~	O	O	O	O	O	
8.12	Does the system offer "find next" and "find previous" shortcuts for database searches?	O	O	O	O	O	
8.13	On data entry ~~screens~~ modals, do users have the option of either clicking directly on a field or using a keyboard shortcut?	O	O	O	O	O	
8.14	On menus, do users have the option of either clicking directly on a menu item or using a keyboard shortcut?	O	O	O	O	O	

8.15	In dialog boxes, do users have the option of either clicking directly on a dialog box option or using a keyboard shortcut?	O	O	O	O	O	
8.16	Can expert users bypass nested dialog boxes with either type-ahead, user-defined macros, or keyboard shortcuts?	O	O	O	O	O	

9. Aesthetic and Minimalist Design

Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

#	Review Checklist	Yes	Often	Rarely	No	N/A	Comments
9.1	Is only (and all) information essential to decision making displayed on the screen?	O	O	O	O	O	
9.2	Are all icons in a set visually and conceptually distinct?	O	O	O	O	O	
9.3	Have large objects, bold lines, and simple areas been used to distinguish icons?	O	O	O	O	O	
9.4	Does each icon stand out from its background?	O	O	O	O	O	
9.5	~~If the system uses a standard GUI interface where menu sequence has already been specified, do menus adhere to the specification whenever possible?~~	O	O	O	O	O	
9.6	Are meaningful groups of items separated by white space?	O	O	O	O	O	
9.7	Does each data entry ~~screen~~ modal have a short, simple, clear, distinctive title?	O	O	O	O	O	
9.8	Are field labels brief, familiar, and descriptive?	O	O	O	O	O	
9.9	Are prompts expressed in the affirmative, and do they use the active voice?	O	O	O	O	O	
9.10	~~Is each lower-level menu choice associated with only one higher~~	O	O	O	O	O	

	~~level menu?~~						
9.11	Are menu titles brief, yet long enough to communicate?	O	O	O	O	O	
9.12	Are there pop-up or pull-down menus within data entry fields that have many, but well-defined, entry options?	O	O	O	O	O	

10.Help and Documentation

Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

#	Review Checklist	Yes	Often	Rarely	No	N/A	Comments
10.1	~~If users are working from hard copy, are the parts of the hard copy that go on-line marked?~~	O	O	O	O	O	
10.2	Are on-line instructions visually distinct?	O	O	O	O	O	
10.3	Do the instructions follow the sequence of user actions?	O	O	O	O	O	
10.4	If menu choices are ambiguous, does the system provide additional explanatory information when an item is selected?	O	O	O	O	O	
10.5	Are data entry screens and dialog boxes supported by navigation and completion instructions?	O	O	O	O	O	
10.6	If menu items are ambiguous, does the system provide additional explanatory information when an item is selected?	O	O	O	O	O	
10.7	Are there memory aids for commands, either through on-line quick reference or prompting?	O	O	O	O	O	
10.8	Is the help function visible; for example, a ~~key~~ button labeled HELP or a special menu?	O	O	O	O	O	
10.9	Is the help system interface (navigation, presentation, and conversation) consistent with the navigation, presentation, and	O	O	O	O	O	

	conversation interfaces of the application it supports?						
10.10	Navigation: Is information easy to find?	O	O	O	O	O	
10.11	Presentation: Is the visual layout well designed?	O	O	O	O	O	
10.12	Conversation: Is the information accurate, complete, and under-standable?	O	O	O	O	O	
10.13	Is the information relevant?	O	O	O	O	O	
10.14	Goal-oriented (What can I do with this program?)	O	O	O	O	O	
10.15	Descriptive (What is this thing for?)	O	O	O	O	O	
10.16	Procedural (How do I do this task?)	O	O	O	O	O	
10.17	Interpretive (Why did that happen?)	O	O	O	O	O	
10.18	Navigational (Where am I?)	O	O	O	O	O	
10.19	Is there context-sensitive help?	O	O	O	O	O	
10.20	Can the user change the level of detail available?	O	O	O	O	O	
10.21	Can users easily switch between help and their work?	O	O	O	O	O	
10.22	Is it easy to access and return from the help system?	O	O	O	O	O	
10.23	Can users resume work where they left off after accessing help?	O	O	O	O	O	

11.Skills

The system should support, extend, supplement, or enhance the user's skills, background knowledge, and expertise not replace them.

#	Review Checklist	Yes	No	N/A	Comments
11.1	Can users choose between iconic and text display of information?	O	O	O	

11.2	Are window operations easy to learn and use?	O	O	O	
11.3	If users are experts, usage is frequent, or the system has a slow response time, are there fewer screens (more information per screen)?	O	O	O	
11.4	If users are novices, usage is infrequent, or the system has a fast response time, are there more screens (less information per screen)?	O	O	O	
11.5	Does the system automatically color-code items, with little or no user effort?	O	O	O	
11.6	If the system supports both novice and expert users, are multiple levels of detail available.	O	O	O	
11.7	Are users the initiators of actions rather than the responders?	O	O	O	
11.8	Does the system perform data translations for users?	O	O	O	
11.9	Do field values avoid mixing alpha and numeric characters whenever possible?	O	O	O	
11.10	If the system has deep (multilevel) menus, do users have the option of typing ahead?	O	O	O	
11.12	When the user enters a screen or dialog box, is the cursor already positioned in the field users are most likely to need?	O	O	O	
11.13	Can users move forward and backward within a field?	O	O	O	
11.14	Is the method for moving the cursor to the next or previous field both simple and visible?	O	O	O	
11.15	Has auto-tabbing been avoided except when fields have fixed lengths or users are experienced?	O	O	O	
11.16	Do the selected input device(s) match user capabilities?	O	O	O	
11.17	Are cursor keys arranged in either an inverted T (best for experts) or a cross configuration (best for novices)?	O	O	O	
11.18	Are important keys (for example, ENTER , TAB) larger than other keys?	O	O	O	
11.19	Are there enough function keys to support functionality, but not so many that scanning and finding are difficult?	O	O	O	
11.20	Are function keys reserved for generic, high-frequency, important functions?	O	O	O	
11.21	Are function key assignments consistent across screens, subsystems, and related	O	O	O	

	products?				
11.22	Does the system correctly anticipate and prompt for the user's probable next activity?	O	O	O	

12.Pleasurable and Respectful Interaction with the User

The user's interactiuon with the system should enhance the quality of her or his work life. The user should be treated with respect. The design should be aestheticaly pleasing with artistic as well as functional value.

#	Review Checklist	Yes	No	N/A	Comments
12.1	Is each individual icon a harmonious member of a family of icons?	O	O	O	
12.2	Has excessive detail in icon design been avoided?	O	O	O	
12.3	Has color been used with discretion?	O	O	O	
12.4	Has the amount of required window housekeeping been kept to a minimum?	O	O	O	
12.5	If users are working from hard copy, does the screen layout match the paper form?	O	O	O	
12.6	Has color been used specifically to draw attention, communicate organization, indicate status changes, and establish relationships?	O	O	O	
12.7	Can users turn off automatic color coding if necessary?	O	O	O	
12.8	Are typing requirements minimal for question and answer interfaces?	O	O	O	
12.9	Do the selected input device(s) match environmental constraints?	O	O	O	
12.13	If the system uses multiple input devices, has hand and eye movement between input devices	O	O	O	
	been minimized?				
12.14	If the system supports graphical tasks, has an alternative pointing device been provided?	O	O	O	
12.15	Is the numeric keypad located to the right of the alpha key area?	O	O	O	
12.16	Are the most frequently used function keys in the most accessible positions?	O	O	O	

12.17	Does the system complete unambiguous partial input on a data entry field?	O	O	O	

13.Privacy

The system should help the user to protect personal or private information- belonging to the user or the his/her clients.

#	Review Checklist	Yes	No	N/A	Comments
13.1	Are protected areas completely inaccessible?	O	O	O	
13.2	Can protected or confidential areas be accessed with certain passwords.	O	O	O	
13.3	Is this feature effective and successful.	O	O	O	

II. Usability issues detected with heuristic evaluation, solution proposals and categorization during workshop

Detected issues	Heuristic evaluation: minor or major	Evaluators comments in Estonian. E1 – first evaluator, E2 – second evaluator, E3 – third evaluator	Workshop proposed solutions	Workshop category: must do (development plan Id number from Table 10), nice to have, future.
User Control and Freedom				
Low-frequency tasks are not easy to remember.	Major	**E1** Ma ei ole kindel, et enamus harva tehtavaid tegevusi oleks lihtsalt meelde jäetavad. Näiteks kaalu ja pikkuse muutmine. **E2** Kaalu ja pikkuse muutmine ei jää hästi meelde kus seda teha saab, ilmselt ei ole ka loogiline, et seda teed liikumispäevikus, mitte enda profiili alt.	Kaalu ja pikkuse peaks küll ma arvan profiili alla jätma nii süva kui põhitasandis. Nad võivad jääda ka vanasse kohta alles (liikumispäevik ja siis minu menüüdes) aga lisaks profiili alla.	Must do (Id 7)
The user can not take back actions with severe consequences.	Major	**E1** Menüü kustutamine või näiteks terve kausta koos sisuga kustutamine. **E2** Kui sa ei ole midagi salvestanud või oled kustutanud, siis seda enam tagasi ei saa. **E3** Loobu on olemas, enamasti, v.a menüü päevas.	Undo funktsiooni lisamine kui gmailil, et tegevusekinnituse aknas on mingid sekundid võimalik. Kuid kuna ilmselt kallis arendus ja hetkel küsitakse ka kustutamise kinnitust, pigem vähem tähtsam arendus.	Nice to have
The undo function is not available.	Major	**E1** Lugedes artikleid, tundus see mõte, et nagu drive näide, et alla tekib väike hüpikaken, kus on võimalik teha undo seni kuni see teade kaob. Ma arvan, et ehk toitude ja menüüde kustutamisel oleks see kasulik. Meil menüüde taastamiseks on abi küsitud. Menüüd küll. **E2** Toidupäevikust/menüüst saab küll toidu kustutada aga eelmist vaadet tagasi ei saa. **E3** Kui kogemata ikkagi kustutasin/tühjendasin toidu vms, siis ma pean selle uuesti lisama, algusest peale. Võiks olla sellisel juhul olemas undo.	Ütleks et suur probleem, aga oleneb hinnapakkumisest, kas saab implementeerida. Uurida hinda, iga tegevus versus mõned – lihtsus hind? Aga ilmselt tundub liigne, liialt kallis, et mahuks selle aasta plaanidesse.	Nice to have
After a task is complete, the system does not	Minor	**E2** Nt menüü tuleb salvestada, aga toidupäevikusse toite lisades ei pea neid eraldi salvestama.	Hetkel jäime kahevahele, et kas on ka kasutajaid, kes teeb muudatusi ja	Future

always wait for a signal from the user before processing.			siis ei soovigi neid salvestada. Seda peaks tulevikus testima.	
The users are only sometimes asked to confirm commands with drastic, destructive consequences.	Minor	**E1** Kas üksiku toidu või liikumispäeviku tegevuse või menüü päeva toidu kustutamisel peaks olema kustutamise kinnituse küsimus? **E3** Olen korduvalt kogemata kustutanud menüüs toite ühe hiireklõpsuga.	Lisada kinnitusmodalid.	Must do (Id 5)
Operations in progress can not be canceled.	Minor	**E1** Kas peaks ka toidu koguse lisamise aknasse või toidu otsinguaknasse panema tühista nupp? Keeruline ise hinnata. **E2** Sellist võimalust otseselt pole, cancel-dada saab nö lahkudes funktsionaalsusest mujale.	Kuna kaks kohta olemas, kuidas kinni panna, tundub üleliigne. Kui siis ainult toidu koguse lisamisel. Tasuks võibolla joonistada maha uus varioant ja vaadata, kas see teeb asja keerulisemaks või mitte.	Future
Modifying existing data is only sometimes possible.	Minor	**E2** Toidukorda saab kopeerida, aga toidukordade järjestust ei saa toidupäevikus muuta.	Toidukordade järjestuse muutmine drag-drop funktsionaalsuse abil. Eelnevalt on küsitud hinnapakkumist ja hetkel see liiga kallis, mida ette võtta.	Future
Going back and forward between modals is not always possible.	Minor	**E2** Kui pop-up aken on avatud, siis seal ei saa back/forward nuppudega edasi tagasi liikuda (edasi tagasi liigub see aken, mis on pop-up taga). Inimesed tegelikult eeldavad, et kui and töötavad pop-up akna sisuga, siis and saavad seal liikuda edasi tagasi.	Back/forward nuppude toimimine korda teha.	Must do (Id 8)
The user can not reverse their actions easily.	Minor	**E1** Osadel funktsioonidel ei ole ilmselt probleem, kuna küsitakse kinnitus. **E2** Undo funktsiooni ei ole. **E3** Kui kustutad, siis tagasi saab ikka lisada, aga st et oled nö alguspunktis jälle.	Sama gmaili undo funktsionaalsus aitaks kui seda kõikidele kustutamise tegevustele rakendada. Aga eeldatavalt kallis kogu süsteemi muutus. Kui siis jääb ainult selle ülemiste mõnede funktsioonidele selle võimaluse lisamine sobiva hinnapakkumise korral.	Future
Visibility of System Status				
After the user completes an action (or group of	Major	**E1** Kui ma nüüd vaatan meie toitude lisamist kas menüüsse, toidupäevikusse või retseptidesse, siis ma	Toidu otsinguaknale tuleb teha uus kujundus. Üleliigne info panna	Must do (Id 3)

actions), feedback does not indicate that the next group of actions can start.		näen et võib jääda segaseks. Kuigi teade lisatud tuleb, siis ei anta teada mida ma võiksin edasi teha ja otsinguaken jääb lahti nii suurelt, et ma ei näe tegelikult et toit on toidupäevikus või retseptis. Ehk siis see, et ma võiks uusi toiduaineid lisada või mis seal juba olemas on, ma ei näe. **E2** Kui oled menüüsse/toidupäevikusse toitusid lisanud ja oled lisamise modali peal, siis ei näe, millised toidud on juba lisatud. Oled pidanud selle endale meelde jätma. **E3** Tegevus tehakse ära, aga edasi suunitlusi ei anta – kuigi ma ei tea, mida peaks kuvama kasutajale ja kas see ei tekitaks liigset müra?	rohkem filtreid alla. Otsinguaknast eemaldada algne üleliigne tekst, kuvada vaid siis kui otsingutulemusi ei tule. Kaotada ära serveerimiskoguste ja tk kaalu veerud. Mõelda kas peaks otsinguaknassse tulema veel lisatekstid. Kujunduse käigus katsetada. Või piisab juba kui otsinguaken on väiksem.	
By looking, the user can not tell the state of the system and alternatives for actions sometimes.	Major	**E1** Ikkagi ei saaks ma aru ilmselt seal retsepti tehes ja toite päevikusse lisades, et mis on alternatiivid tegutsemiseks. Nt enam ei taha lisada toite, sulge toiduotsinguaken. **E2** Toidupäevikus/menüüs toitude lisamisel ei ole näha, mis on lisatud ja koolitusel panin tähele, et kasutajad ei saa aru, kuidas and oma päeva vaatesse tagasi saavad. Sama probleem ka teiste pop-up akende puhul (neid ei osata sulgeda – vajutatakse kõrvale ja siis kaob ära see, mis lahti oli)	Lisatud teate asukoht läbi katsetada mujal, tõsta ülespoole natukene. Väiksema kujundusega otsinguaknas vaadata kas sobib anda ka teate, et mis just lisati nagu oli eelmisel platvormil.	Must do (Id 1)
In the multipage data entry modal, pages do not have labels to show their relation to each other.	Minor	**E1** Toidu vahetamine ja Koostisosa vahetamine on kahel eraldi lehel. Äkki aitaks seal tõesti nimetuse muutmine selgemaks asju teha, kuid ilmselt on see vähetähtis prioriteetsuselt, kuna vähe kasutatav funktsionaalsus. **E3** Toidu vahetamine ja koostisosa vahetamine – terve tegevus ei ole ühel lehel nähtav	Panna toidu vahetamise juures pealkirja ½ 2/2. Muuta nimetus ise Toidu vahetamine menüüdes nt Toidu asendamine/vahetamine kõikides valitud menüüs korraga või kogu menüüs korraga vms. Tooltip on Vaheta menüüs toit, kas see annab lisateavet? Harvaesinev funktsionaalsus, siin näeksin küll video vajalikkust. Video saaks teha alles peale.	Nice to have

Not every operator's action gives feedback.	Minor	**E1** Näiteks liikumispäevikus kas tundide muutmisel või tegevuse kustutamisel antakse alla see teade – Muudetud. Aga nt kui kustutan menüü päevast toidu või salvestan päev, siis teadet ei kuvata. Kuigi sa näed seda visuaalselt. Kaob toit ja sulgub menüü päev. **E3** Kui menüü päevas teen muudatusi, siis programm teavitust ei anna (Muudetud, Kustutatud vms) – lihtsalt viib tegevuse läbi. Isegi mitte peale Salvestust.	Arendajalt võtta väljavõte teadetest ning need ühtlustada. Puuduolevad lisada.	Must do (Id 5)
Not all selectable choices are understandable visually.	Minor	**E2** Avalehel LOO KONTO, mis tundub olevat klikatav, aga tegelikult ei ole. Minu menüüdes, toitudes tumehall riba – 'kaustad' ei ole klikatavad samal ajal kui kõik teised tumehallil ribal olevad tegevused on klikatavad. Kui hakkad uut menüüd looma, siis päevade/toidukordade lahtrile minnes ja seal klikates on näha ainult kohta kuhu kirjutada. Taustavärvid muutuvad ainult neil lahtritel, mis on üle ühe hallid, aga need mis on valged, need ei muutu. Siin peaks minu meelest kõik päevad olema sama taustavärviga, mitte üle ühe erinevat värvi ja sel juhul saks taustavärv muutuda kõikidel päevadel/toidukordadel, mille peale oled klikanud. **E3** Pigem on, aga teatud juhtudel kasutajad ikka ei saa aru, et nt minu profiilil need Põhitasand ja Süvatasand on vajutatavad nupud – samas see vb vanema generatsiooni märkamatus.	Roheline ja joon ümber punane nt nii bänner kui. Äkki saab sisse loginud saaks selle osa shadowiga katta CCs-i kaudu panna tükk peale. Kerstini sinine värv. Tekst üldisem muuta paremaks põhitasand ja süvatasand, infonupp (isiklik, tööalane) Põhitasandile ja soole panna nö on/off ikoonid peale, nagu telefonis. Kaustad hetkel tulevikuks pigem video. Minu toitudes ja minu menüü päevades et üle hiirega minnes oleks tausta muutus nagu gmailis.	Nice to have
When there are noticeable delays (greater than fifteen seconds) in the system's response time, the user is not informed of the system's progress.	Minor	**E1** Minu meelest kui analüüs kaua aega võtab või näiteks jääbki ketrama, siis midagi ei anta teada. **E2** Ei ole protsentuaalset ringi, mis näitaks, kui suur osa on laetud. **E3** Kui exceli laadimine või menüü arvutustulemuste laadimine jääb ketrama, siis kasutaja näeb küll seda ringikest, mis nö ketrab (vahel seisab),	Võiks olla lahendus kui jääb ketrama mingi aeg, et mis kasutaja edasi tegema peab? Antakse teade, et tegevus ei õnnestunud ja reload page. Piirang et ei saa korraga aastat analüüsida vms. Peaks teade mingi aja	Must do (Id 16)

		aga mingit infot sellest ei saa, kas toiming on veel töös või kokku jooksnud – siin see pulgameetod (pulk täitub värviga), mis oli oldschool windowsil, oleks visuaalselt selgem	jooksul tekkima.	
Not all response times are appropriate to the task.	Minor	**E1** Üldiselt jah. Näiteks jagatud menüüde või toitude vastu võtmine on ehk vahel aeglane, aga harva kasutatav funktsionaalsus ja kuna tehakse kõigest koopiad, et kujuta ka kuidas lihtsalt seda kiiremaks saada.	Selle muutmine on olnud keeruline eelnevalt ja hetkel ei näe, et seda saaks eelarvesse lisada.	Future
Complex tasks take more than 8-12 seconds.	Minor	**E1** Analüüs võib kauem võtta. **E2** Proovisin mitut menüüd korraga analüüsida, minul toimis suhteliselt kiiresti (4 sek), aga vb kui on rohkem menüüsid rohkemate toitudega siis läheb kauem aega. **E3** Menüü analüüs võib vahel aeglasem olla või exceli alla laadimine.	Selle muutmine on olnud keeruline eelnevalt ja hetkel ei näe, et seda saaks eelarvesse lisada.	Future
Help and Documentation				
Online instructions are not visually distinct.	Major	**E1** Otseselt neid ei ole, aga infonupud on mõneti abiks. Videod võiks olla funktsionaalsuste juures (video ikoon ja sellele tooltip mida sa selles videos näha saad. **E2** Virtuaaltuuri vms ei ole. Need vist ei käi siia alla, aga sinised abinupud on hästi nähtavad, Kasutusjuhend on vb natuke ebaloogilises kohas. Võiks olla järsku videojuhendite juures. **E3** Kasutusvideote olemasolu võiks kuidagi selgemini välja tuua, hetkel ei tea kuidas.	Eraldi menüüribale ala-tab Videojuhendid ja sarnaselt TKA veebilehe lahendusega need sinna lisada.	Must do (Id 10)
Instructions do not follow the sequence of the user.	Major	**E1** Sama mis eelmine kommentaar. **E3** Pigem vb suunavad kasutajat liikuma järjest sammudena programmis.	Videojuhendid konkreetsete modalite juurde.	Must do (Id 10)
Information is not easy to find.	Major	**E1** Äkki peaks panema Koolitused/Videod või Koolituse tekst eraldi ning videod praegu kohe videod alla nagu TKA-s. Ma ilmselt ei oskaks praegu sealt videosi otsida. Videojuhendid. **E2** Pead spetsiifiliselt videojuhendite alla minema, et täpsemat abi Saada, väikest abi annavad infonupud, mis on kohe	Eraldi menüüribale ala-tab Videojuhendid ja sarnaselt TKA veebilehe lahendusega need sinna lisada.	Must do (Id 10)

		probleemi juures. **E3** Juhendeid kasutajad ei leia või ei viitsi otsidagi – saadavad meili.		
Information is not interpretive (why this happened).	Major	**E1** Kõik veateated ei anna teada, miks midagi juhtus. **E2** Kõik error sõnumid ei ole piisavalt täpsed, et nende järgi parandusi sisse viia.	See, miks juhtus ei ole ehk alati kõige olulisem. Liigselt suurt veateadet lugeda raske. Olulisem on teada anda, mida kasutaja teistmoodi tegema peab.	Nice to have
Some tooltips do not provide helpful information.	Minor	**E2** Mõnel juhul tuleb tooltip, aga mõnel juhul see tooltip ei anna lisainfot (nt lisa kaust tooltip on lisa kaust, seal võiks siis olla kuhu või mis kausta sa lisad).	Eemaldada tooltipid millel on sama sisu kui nupu nimetusel või vajadusel muuta selgitavamaks.	Must do (Id 5)
The help function is not visible enough.	Minor	**E1** KKK võibolla ümber nimetada ABI? Aga siis selle sisu võiks olla ka teine, et ei ole küsimused vaid nagu teemablokid mille alla siis täpsemalt saad vaadata. KKK maha võtta? **E2** Menüüs on ainult KKK, mingisugust teistsugust abi nuppu ei ole (on muidugi sinised tooltipid, aga need vist ei käi siia alla). **E3** Vanas programmis oli Abi? nupp, aga enamasti kasutajaid neid vist ei kasuta – vb kuidagi teistmoodi nimetada, et silma paistaks.	Kindlasti tasuks muuta KKK fonti, aga üldse on mõte see leht maha võtta. Pole enam selline koht, kuhu inimesed vaataks. Lisaks ei ole seal otsingu võimalust.	Future
Information is not complete sometimes.	Minor	**E1** Kahjuks kindlasti mõned asjad tunduvad rasked mulle aru saamiseks, nagu retseptis liigne veekadu või kui nt toiduaine lisamisel alamkomponentide summa on suurem. Aga seda muuta ka ei ole kerge. **E3** Nt kuumtöötluskao % ma alati loen üle infonupust.	Harva esinev probleem, ideaalis sobiks ehk videojuhend sinna.	Nice to have
Information is not procedural (How do I do this task).	Minor	**E1** Videojuhendid paremini esitada. **E2** Videojuhendid paremini nähtavaks + kas peaks juurde kirjutama tekstilisi juhendeid step-by-step juhistega. **E3** Sama.	Modalitesse videojuhendid ja uus TAB.	Must do (Id 10)
Context-sensitive help needs to be included.	Minor	**E1** Tooltipid on, aga ilmselt osad puudu. Samuti ei ole otsest juhendit mida ja kuidas teha. **E2** Tooltipid ja videojuhendid, aga videojuhised võiksid olla kohe seal, kus probleem tekib. **E3** Juhendid on, aga vb	Modalitesse videojuhendid ja uus TAB.	Must do (Id 10)

		kasutajad ise ei leia neid.		
The user can not switch easily between help and their work.	Minor	**E1** Kui lisada videod et klikates avaneks uus tab. **E2** Kui avab youtubes video siis jah; kui otsib KKK-st siis peab olema avanud teises aknas selle, muidu ei ole abi ja töö tegemise vahel klikkimine mugav. **E3** Kasutusjuhendi/videod peavad nad eraldi avama – neile otsest ligipääsu programmist pole.	Kasutaja saab alati avada uues aknas asju crtl kasutades.	Future
Recognition Rather Than Recall				
GUI menus do not make it obvious where selection is possible.	Major	**E1** Ma arvan see menüüde ja toitude funktsioonide teke päisesse ei ole nähtav. Soovitaks seda gmaili lahendust. Pean oluliseks, aga mõjutab vähem kasutajaid. **E2** Kui oled sisse loginud, siis on avalehe graafikas segadusse ajav punane loo konto nupu laadne graafika osa, tundub et sinna saaks nagu klikata, aga tegelikult ei saa (tegelikult loo konto peaks olema roheline, mitte punane ja logi sisse samamoodi roheline)	Gmaili lahendus on hea idee, kuid ilmselt ajamahukas muudatus. Eelarve võimalusel hinnapakkumine võtta.	Nice to have
Not all data a user needs is displayed at each transaction sequence step.	Minor	**E1** Sama teema mis üleval, et toidupäeviku sisestatu ei paista välja ja menüü ja retsepti sisu. **E2** Pead meelde jätma toidupäevikusse sisestatu.	Muuta koos kujundusmuudatustega (eelnevalt läbi käinud idee).	Must do (Id 1, 3)
Error messages are not placed where the eye is likely to be looking.	Minor	**E1** Veateated all paremal ehk ei panda alati tähele. Aga katsetasime ka mujal ja siis segas nt kinni panemise nuppu. **E2** Toidupäeviku/menüüanalüüsi puhul on tagasi nupp all paremal nurgas kuigi silm otsiks tagasi tegevust üleval vasakul nurgast. **E3** Need tegevuste kirjeldajad, nt kollasena „Väljad pole täidetud” all paremas nurgas, võib kahe silma vahele jääda – vb värvi muuta tumedamaks?	Asukoha katsetus natukene kõrgemale.	Nice to have
There is no apparent visual distinction between the "choose one" and the "choose many" menus.	Minor	**E2** Visuaalne erisus on nagu olemas, et kui ühte tegevust teen on meil nupud ja kui mingit mitut asja tahan valida on meil võimalus linnukesi panna, aga mulle tegelikult tundub, et kasutajad ei ole sellele pihta saanud, vb peaks kuidagi paremini välja paistma (just	Lahendus on tüüpiline ka mujal, pöörduda teema juurde tagasi tulevikus.	Future

		see linnukeste valimine menüü sees. vb selleks et päevad valida võiksid jääda linnukesed, aga siis kogu menüü nimetuse ees võiks olla nupp,, mitte see linnuke, mis seda valib).		
Design flaw with white space.	Minor	**E2** Kui avad menüüdes ühe menüü ja selle päevad, siis valge ja hall värvus on vaheldumisi, aga võiks nii olla, et 'menüü päevad' on ühte värvi ja kõik selle all olevad päevad teist värvi, või kõik hoopis sama värvi ja kui liigud päeva peale või valid selle, siis muudab värvi, hetkel on see suhteliselt sigrimigri.	Kujundus ühtlustada, hiire liikumisega tekkivad visuaalsed muutused ühtlustada.	Must do (Id 14)
Zone width and height are inappropriate.	Minor	**E2** Minu toitude ja minu menüüde all on otsinguaknad väga laiad ja sp ei pane neid hästi tähele.	Otsinguaknad tuleks muuta väiksemaks.	Must do (Id 14)
The contrast between the image and background is not good in some places.	Minor	**E1** Peaks sealt auditist üle vaatama, seal oli küll välja toodud kohad, kus contrast ei olnud piisav.	Kontrastivead tuleb lahendada.	Must do (Id 14)
Some items are outside the logical zone.	Minor	**E1** Toidupäevikus see analüüsi päeva menüüd ja kalendri all olevad kaks nuppu. Nende asukoht on koht läbi mõtlemiseks juba eelnevalt.	Analüüsi nupp mis kaasas käiks kas ülemisel või alumisel ribal.	Nice to have
Some frequently confused data pairs are used together.	Minor	**E2** Analüüsi valitud menüüsid ja koosta valitud menüüd kokkuvõte on väga sarnased nupud ja alati peab kontrollima tooltipi et teaks, et vajutad õiget variant. Sõnastuse poolest on loobu ja sulge segadusttekitavad, tunnen seda ise ja nägin koolitusel ka kasutajate pealt. Kui neid sõnu inglise keeles mõtlen, siis kõik selge, aga eesti keeles on mingil põhjusel segadusse ajav.	Tooltip „Koosta prinditav menüü „. Modali nuppude nimetused muuta, jah, ei , loobu.	Must do (Id 5)
Some action buttons need to be arranged logically.	Minor	**E1** Minu menüüd ja Minu toidu puhul korra seda järjestust mõelda. **E2** Minu menüüdes ja minu toitudes tumehallil taustal olevad toimingud ei ole just kõige loogilisemas järjestuses ning seal all helehallidena kaustad, kaustad võiksid kuidagi paremini arusaadavamad olla et kuuluvad kaustade alla ja seal all/üleval et lisa kaust + siis lisa retsept/toiduaine/vaheta	Muudatus võib tuua harjunud kasutajates segadust, pigem teha ja mõelda eelarve olemasolul.	Nice to have

		koostisosa võiksid kuidagi eraldi olla.		
Aesthetic and minimalist design				
There is more information than essential to decision-making displayed on the screen.	Major	**E1** Toidu otsinguaken, retsepti ja toiduaine loomise aknad ei peaks siis näitama ilmselt välju mis on vabatahtlikult täidetavad. Saaks neid lahti klikata ja vajadusel täita, jätta see valik meelde.	Rakendada eelnevalt välja toodud kujunduse muutused.	Must do (Id 1, 2, 3)
Not all icons are set visually and conceptually distinct.	Minor	**E1** Minu meelest see menüü kokkuvõte ja analüüs väga sarnased ikoonid. **E2** Menüüde kaustas kui tekib valik 'analüüsi valitud päevi' ja 'koosta valitud päevade kokkuvõte' on ikoonid väga sarnased ja neil on keeruline vahet teha. **E3** Menüü kaustade ikoonid võiksid selgemad olla, aga valikute seas polnud paremaid.	Menüü kaustade ikoone on raske paremaid leida, aga eelarve tekkimisel võib proovida otsida.	Nice to have
Some field labels are not familiar.	Minor	**E1** See soovitusgrupi teema on vajalik üle vaadata. **E2** Kasutajatega rääkides jääb mulje, et kõikide lahtrite pealkirjad ei ole arusaadavad. **E3** Portsjonid vs nt 1 banaan (tükki).	Lahtri nimetuse muutusi katsetada koos uue kujunduse variantidega. Variant nt ainult tk kaalu kõrvale panna see portsjoni lahter, kui tk kaalu ei ole, ei kuvataks.	Must do (Id 6)
Recognise, diagnose, and recover from errors				
Error messages are not precise.	Major	**E1** Mind ehk jääb see häirima, et võiks anda ka veateate kui analüüs ketrama jääb vms. **E2** Osade errorite puhul tuleb suhteliselt üldine 'väljad ei ole täidetud' aga siis läheb tavaliselt väli punaseks, seega peaks olema arusaadav, milline väli ei ole täidetud **E3** Kui analüüs jääb ketrama, võiks anda märku, et kas protsess on veel pooleli või jooksis kokku.	Tuleb lahendada ajaliselt, kui ei ole mingi kindla ajaga tegevus lõppenud, öeldakse et ei õnnestunud, proovi uuesti.	Must do (Id 16)
Error messages do not indicate what the user needs to do.	Major	**E1** Tuleb üle vaadata, sama kommentaar, mis üleval. Pigem ei ole täpselt väljendatud, mida tegema peab. **E2** Kui ei määra retseptil töötlusastet, siis tuleb 'väljad on valesti täidetud' aga kuidagi ei indikeerita, et peaks töötlusastme valima (nt määra töötlusaste vms). **E3** Kui analüüs jääb ketrama vms, siis ei anta	Arendajalt väljavõte veateadetest ja need korrigeerida sobivaks.	Must do (Id 5)

		kasutajale juhiseid. Kui väljad on täitmata, siis näidatakse, mis väli on täitmata – vb juhendav tekst on jälle liiga palju? Samas e-posti aadressi puhul oleks vajalik lisada, et kontrolli suurt-väikest tähte, automaatset salvestust vms.		
Prompts do not imply that the user is in Control.	Minor	**E1** Võib-olla peaks retsepti/menüü loomisel selle asemel et öelda, väljad pole täidetud, väljad on valesti täidetud. Nt täida puuduolevad väljad. Muuda valesti täietud väljade sisu? **E2** Osad veateated on liiga üldised ja nende põhjal ei saa viga parandada.	Täpsustada tekste.	Must do (Id 5)
Error messages are not in a consistent style.	Minor	**E1** Ma arvan, et peaks küsima veateated välja, et vaadata kas on ikka kõik kokku langev ja kus neid parandada saaks. **E2** Nende põhjal mida suutsin tekitada oli kõigis umbisikuline tegumood. **E3** Meenub fibre vs fiber.	Arendajalt väljavõte veateadetest ja need korrigeerida sobivaks.	Must do (Id 5)
The messages do not place the user in control in every case.	Minor	**E1** Ainult ühel juhul, veekadu liiga suur retseptis. Muul juhul ei ole otsesest selgitust, mida teha. **E2** Veateated on suhteliselt üldised, nt väljad ei ole täidetud.	Arendajalt väljavõte veateadetest ja need korrigeerida sobivaks.	Must do (Id 5)
Match Between System and the Real World				
The terminology is not familiar to the users in data entry modals.	Major	**E1** Toiduotsinguaknas on kindlasti segane, mis on toiduaine või retsept või koostisosa või beebitoit vms. Peaks äkki need olema tegelikkuses peidetud ja võimalus lisa filtrid kuskil vms. Nagu poodides. Kindlasti siis infonupud sinna. Samuti oli viimasel koolitusel inimese jaoks menüüs keeruline toidu koguse lisamisel küsimus – Palju sõid grammides? Peaks need muutma järjekordselt. Äkki nt Portsjonite arv ja Toidu kogus grammides. Siis sobib igasse modalisse. **E2** Nt menüü lisamisel ei saa paljud kasutad aru, et peab lisama kas soovituse või täpsustatud energiavajaduse, mitte mõlema. **E3** Pole kindel, kui palju toidu otsinguaknas kasutatakse Minu toidud, Minu	Infonuppude lisamine, selgem menüü soovitusgrupi valimine - infonupp. Panna grammid taha tk kaal ja serveerimiskogus.	Must do (Id 1, 2, 3)

		enimkasutatud sektsioone. Lisaks on mulle alati segadust tekitanud „Palju portsjone sõid?" – ma tean nüüd, mis see tähendab, aga ikka on väike segadus ajus. Kui valikus on x TK, siis äkki muuta sõnastust.		
Not all icons are concrete and familiar.	Minor	**E1** Andmebaasi soovitamise ikoon ei ole kindlasti arusaadav, aga milleks seda muuta. Analüüs ja kokkuvõtte ikoon ehk on liiga sarnane. **E2** Osad ikoonid ei ole mujal kasutuses ja seega ei ole kasutajatele tuttavad. Lisaks, osad ikoonid on väga sarnased, nt menüü analüüsi ja kokkuvõtte tegemise ikoonid on mõlemad ruudulised lehed. Soovita menüüd andmebaasi on sama ikoon mis Kõik toidud toitude otsingu aknas – segadusttekitav. **E3** Vasakpoolse menüü ikoonid on valitud võimaluste piires mitte sellised, mis kirjeldaks lehe pealkirja.	Samad ikoonid ümber muuta, sarnastele proovida paremad leida.	Must do (Id 6)
Menu choice order is only sometimes logical.	Minor	**E1** Aga kui valida ka menüü või toidud, siis mul on küsimus kas tegevuste järjekord on loogiline. Nt et esimene võimalus on toitu/menüüd kopeerida, siis jagada, siis soovitada, siis analüüsida, siis kokkuvõte teha , muuta, otsida ja kustutada. Et äkki see järjestus võiks olla teine. **E2** Ma ei tea, kas see käib siia punkti alla, aga kui analüüsid mitut menüü päeva ja oled päeva kokkuvõtte peal, kus saad avada kõik päevad ükshaaval. Tagasi nupp on seal lehe kõige all, vahest tahad aga kohe tagasi minna ja mitte lehe alla kerida. **E3** Äkki toidupäevikus muuta Lisa toit, Kopeeri, Tühjenda nuppude järjestust. Samamoodi menüüdes ja toitudes äkki Lisa menüü/toit, Lisa kaust, Vaheta koostisosa/toit.	Pigem teha eelarve võimalusel, kuna kasutajaid olemasolevaid võib muudatus segadusse ajada.	Nice to have
Some shapes do not match cultural conventions.	Minor	**E2** Esiteks on meil palju ikoone mida tavaliselt üldse ei kasutata, teiseks, osad ikoonid ei ole päris selle tähendusega, mis and mujal on (nt süda toidu otsingus – sa ei saa sinna ise lisada toite vaid need on toidud,	Eksimusi on harva ja vähe, võimalusel proovida vahetada.	Nice to have

		mida oled kõige rohkem kasutanud), lisaks osad ikoonid on kasutusel erinevates kohtades, seega neil tegelikult ei olegi tähendust taga, aga samas võib kasutaja ajada segadusse, sest ta eeldab samasugust tegevust.		
Selected colors do not correspond to common expectations about color codes.	Minor	**E2** Väga paljudes kohtades on punast kasutatud tavalise tekstina, kuigi punane kiri eeldaks nagu viga või midagi negatiivset. Ka rohelist värvi on kasutatud tavalise tekstina, kuigi see eeldaks millegagi nõustumist.	Kujundaja peab eri versioonid pakkuma, hetkel tulevikku.	Future
The wording of the prompt message could be more consistent with the action sometimes.	Minor	**E1** Kuumtöötlusekao infonupu puhul on tekst hoopis massikadu. Peaks vist muutma Kuumtöötluse kadu nimetusega kuumtöötluse massikadu. Äkki toidukorra tühjendamine on segane ja võiks olla tooltip pikem või teine., Nt Eemalda/Kustuta kõik toidud toidukorrast.	Tuleb muuta samaks nimetus, lisada tühjendamisele uus tooltip.	Must do (Id 5)
The help text for the log in is not sufficient.	Minor	**E3** Juhul, kui kasutaja ei suuda registreeruda, siis infost „vale e-posti aadress või parool" on vähe abi – nad ei saa aru, mis valesti läks. Kui seda saaks kuidagi eraldada, et ainult e-post on vale või ainult parool, siis oleks abiks.	Küsida üle kui keeruline lihtne see on arendajalt ja eelarve võimalusel muudatus sisse viia.	Nice to have
Not all menu titles are linguistically in the same grammar case.	Minor	**E2** Nt minu menüüdes on toidu vahetamine aga lisa menüü ja lisa kaust, sellisel juhul peaks olema kas menüü lisamine või vaheta toit	Hetkel otseselt ei häiri, mõtleb tulevikus.	Future
Activation is not always offered.	Minor	**E2** Analüüsi ja salvestamise nuppe saab pidevalt vajutada, aga kui nt kõik väljad on täidetud, siis pead ise teadma, et seda teha, selle kohta ei tule mingisugust meeldetuletust	Kuna küsib lahkumisel kinnitusmodaliga, siis ei ole otseselt põletav teema.	Future
Consistency and Standards				
There are some inconsistencies in formatting standards.	Minor	**E1** Lisatud toitude punane värv ei vasta standardile. Seal oli hea näide toodud, et sinine font ja alla joonitud on automaatselt see, et inimene teab, et seda asja saab klikata. Meil on kõik toiudud klikatavad, äkki	Tulevikus kujundajalt tellida erinevad visoonid.	Future

		punase asemel Sinise peale minna üle? Teiseks, ilmselt alla joonimine liigne, praegu lähed hiirega üle tuleb joon alla. Aga nt otsinguaknas see info nupp võiks olla alla joonitud, siis ilmselt oleks arusaadav, et sealt saab infot. Nüüd kuidas otsinguaknas kuvada tulemusi? Jätta tagataust ikka roheline ja oranž ja sinine font, vajaks mõtlemist. **E2** Toidupäevikus olevad toidud on punased (standardite kohaselt oleks nagu tegu veaga), loo konto ja logi sisse on punased, kuigi tegevus on positiivne ja võiksid hoopis olla rohelised		
There are more than twenty icon types.	Minor	**E2** Sain koos menüü ikoonidega 34 erinevat, lisaks ei ole kõik ikoonid läbivalt ühtselt kasutatud – mõni ikoon on erinevate funktsioonide / tegevuste taga (nt sinuga jagatud menüüd ja Saada e-postiga on sama ümbriku ikoon).	Ülesanne jääb E2-le, otsida uued ikoonid, leida mis kust vahetada.	Must do (Id 5)
Vertical scrolling is difficult in some cases.	Minor	**E2** Pop-up aknaid ei saa horisontaalselt scrollida. **E3** Mobiilses versioonis on vertikaalne liigutamine raskendatud, nt kaustades, menüüdes liikumine (vb minu telefonis asi). Horisontaalset liikumist on vaja arvutis ainult graafikul.	Mobiilis ilmselt ei kasutata kasutade loomist jms, seetõttu tulevikuks.	Future
Field labels are inconsistent in some cases.	Minor	**E1** Menüü seaded all, siis süvatasandil on analüüsis nimetus vanusegrupp, siis põhitasandil on nimetuseks toitumissoovitus. See võiks küll korda teha. **E2** Toidupäevikus ühte moodi, liikumispäevikus teistmoodi, ja minu toidud/menüüd avalehtedel kolmandat moodi. **E3** Põhitasandi päeva/menüü analüüsis Toitumissoovitus süvatasandi menüü analüüsis Vanusegrupp.	Muudame nimetused.	Must do (Id 13)
Field-level prompt does not give proper amountof information.	Minor	**E2** Lisaenergiavajadus ja seal olev tooltip – minu meelest võiks see olla ringi sõnastatud või midagi juurde lisatud, sest see ei ole arusaadav, et lisaenergia ei ole nt trenni tegemiseks kuluv energia, vaid kui oled rase.	Muudame infosisu.	Must do (Id 5)
The multipage data entry	Minor	**E1** Vaheta koostisosa ja vaheta toit puhul võiks	Eelnevas otsustasime mitme eri	Future

modal does not have a sequential page number.		modal pealkirjas ehk olla ½ ja 2/2.	asjaga seoses, et nice to have, konkreetselt ei ole kindel et siin see vajalik on, mõtleb tulevikus.	
Error Prevention				
The system does not prevent the user from making errors whenever possible.	Minor	**E1** Iga kord ei küsi kustutamisel kinnitust, üle mõelda. Aga üldjoontes tõsiste asjade puhul küsitakse kustutamine üle. **E2** Vahepeal laseb pop-up akna sulgeda ilma et küsiks, kas tahan salvestada või sulgeda. **E3** Nt menüü päeva sees.	Lisada kinnitusmodalid igale kustutamise tegevusele.	Must do (Id 5)
Some action buttons that can cause the most severe consequences are located close to low-consequences and high-use buttons.	Minor	**E1** Ma olen nii harjunud et lisa toit nupp on vasakul, aga äkki peaks olema natukene rohkem keskel? Et toidu kustumaise nupp ei oleks kõrval. Või tegelikult on pigem küsimus, kas peaks toidu kustutamisel üle küsima? Samas see ei ole nii hull viga saad uuesti sisestada. **E2** Toidupäevikus/menüüs on toidu kustutamise nupp täpselt toidu lisamise nupu all. **E3** Äkki sättida igal pool kustutamise nupp järjekorra lõppu?	Hetkel ei tundu kasutajatele probleeme tekitavat ja võibolla nuppude asukoha muutmine just tekitab segadust. Tulevikuks mõtlemiseks.	Future
Flexibility and efficiency of use				
Adding extra keyboard shortcuts might be helpful.	Minor	**E3** CTRL+S võiks küll olla kasutuses, nt menüüde puhul.	Loogiline shortcut, teha.	Must do (Id 15)

III. Usability testing tasks in Estonian and in English

OSALEJA NR … ÜLESANDED

Enne alustamist: Ava link https://tap.nutridata.ee/et/ ning logi sisse toitumisprogrammi. Ava toidupäevik.

ÜLESANNE 1

Meenuta oma viimast söögikorda (ükskõik, kas selleks oli hommikusöök, lõuna või õhtusöök) ja lisa see toidukord toidupäevikusse. Toidukogused sisesta hinnanguliselt, selliselt mis need sinu meelest võisid kaaluda.

ÜLESANNE 2

Kujuta ette, et sa oled kohvikus ja sööd lõunat. Samal ajal on sul avatud sülearvuti ja sa sisestad söömise ajal on toidud toidupäevikusse. Sa võtsid joogiks ühe tassi teed, kuhu panid 1 tl suhkrut. Sa tellisid endale praeks kartulid sealiha guljaššiga. Pool taldrikust oli keedetud kartulid, neljandik taldrikust oli sealiha guljašš porgandiga ning neljandik taldrikust oli tomati-kurgi-sibula salat. Kõrvale sõid sa ühe viilu musta leiba.

ÜLESANNE 3

Sa ostsid kohvikust kaasa vahepalaks ühe banaani ja Nestle müslibatooni banaani ja šokolaadiga (35 g). Kodus sa kaalusid banaani üle ja see kaalus 190 g. Lisa need toiduained toidupäevikusse ootena.

ÜLESANNE 4

See ülesanne on retspeti loomisest. Juhul kui sa ÜLESANDE 1 või ÜLESANDE 2 raames juba retsepti ise lõid, siis võid selle ülesande vahele jätta. Juhul kui sa veel ei ole ise loonud oma retsepti, siis palun loo järgnev retsept:

Hakklihakaste seentega:

- 500 g segahakkliha
- 250 g šampinjonid
- 50 g sibul
- 35 g nisujahu
- 300 g vesi
- 200 g hapukoor

Lisa 200 g loodud hakklihakastet toidupäeviku õhtusöögi toidukorda.

ÜLESANNE 5

Peale toitude lisamist toidupäevikusse, soovid sa teada saada, milliseid toitaineid sa toiduga juba saanud oled. Analüüsi oma päeva sisestust ning tutvu tulemustega.

Peale lõpetamist:

Palun täida süsteemi kasutatavuse skaala küsimustik järgmisel anonüümsel lingil:

Toitumisuuringute küsitlusprogramm (nutridata.ee)

Peal seda, me viime läbi intervjuu, et paremini mõista sinu programmi kasutamise kogemust.

PARTICIPANT NO … TASKS

Before tasks: Open a link https://tap.NutriData.ee/et/ and log in. Find your way to food diary.

TASK 1

Recall your last meal (whether it was a breakfast, lunch, or dinner) and insert it in food diary. Amounts of foods insert based on your opinion how much they might have weighed.

TASK 2

Imagine that you are in a cafeteria eating lunch and using at the same time your laptop to insert the foods you are consuming into the food diary. You took a cup of tea and added 1 tbs of sugar. You ordered potatoes and pork goulash with carrots. Half of your plate consisted of boiled potatoes, quarter of pork goulash with carrots and quarter of cucumber-tomato-onion salad. You ate a slice of black bread with the meal.

TASK 3

You also bought a banana and Nestle muesli bar with banana and chocolate (35 g) as the snack to consume later before dinner. At home you weighed the banana, and its weight was 190 g. You add these items to your food diary.

TASK 4

This task is about creating a recipe. If you already have created recipe organically during TASK 1 or TASK 2, this step can be skipped. If you did not create your own recipe this far, please create a following recipe:

Minced meat sauce with mushrooms

- 500 g mixed minced meat (beef-pork)
- 250 g champignons
- 50 g onion
- 35 g wheat flour
- 300 g water
- 200 g sour cream

Add 200 grams of created recipe to your dinner.

TASK 5

After inserting these foods, you would like to see what kind of nutrients you have consumed. Analyse your meals and see what kind of information is presented to you.

After tasks:

Please fulfill the overall system usability scale questionnaire on the following link:

Toitumisuuringute küsitlusprogramm (nutridata.ee)

After that, we will conduct follow-up interview to better understand your experience using the program.

IV. Consent form in Estonian and in English

Nõusolek ”NutriData toitumisprogrammi kasutatavuse testimine” uuringus osalemiseks

Siit vormist leiate teavet uuringus osalemise kohta. Palun lugege nõusoleku vorm hoolikalt läbi. Kui Teil tekib küsimusi, siis uuringu läbiviija on valmis Teile vastama.

Eesmärk: Uuringut teostatakse selleks, et saada informatsiooni toitumisprogrammi kasutusmugavuse probleemide kohta. Uuringu raames testime peamiselt toitumisprogrammi kõige kasutatavamat funktsionaalsust – toidupäevikut. Infot kogutakse selleks, et muuta paremaks programmi kasutatavust ja vaadelda programmi reaalset kasutust. Nii mõistame oma kasutajaid paremini tulevikus arendusi planeerides.

Osalemine on **vabatahtlik** ja **tasustamata**. Vajadusel võite uuringus osalemist igal ajal katkestada ka peale oma nõusoleku andmist. Osalemisest keeldumine või hilisem loobumine ei too Teile kaasa mingeid negatiivseid tagajärgi.

Kogutud andmeid hoitakse ja avalikustatakse **isikustamata** kujul. Teie poolt antud informatsiooni ei seostata Teie isikuga ning keegi ei saa teada, et just Teie selle info andsite. Kogutud andmete põhjal koostatakse soovitused toitumisprogrammi muutmiseks.

Mis uuringus osalemisega kaasneb?

Uuringu raames viime läbi toitumisprogrammi kasutatavuse testi, mille raames te teostate programmis ette antud ülesandeid. Teie tegevus ekraanil salvestatakse. Testi aitab läbi viia uuringu moderaator, kes on kogu aeg kättesaadav. Peale ülesannete täitmist küsib moderaator Teie käest erinevaid testiga seotud küsimusi. Kogu protsess kestab kokku umbes kaks tundi.

Kui Te olete aru saanud, mida uuringus osalemine tähendab, ning olete nõus osalema, palun allkirjastage nõusolekuleht.

OSALEJA NIMI

Kuupäev _____

Osaleja allkiri: _____

Allkirjastatud paberil/digitaalselt

Consent to participate in the study "Usability testing of the NutriData dietary analysis program"

In this form you will find information on how to participate in the survey. Please read the consent form carefully. If you have any questions, the person conducting the survey is ready to answer you.

Purpose: The study is carried out to obtain information about the usability problems of dietary analysis program**.** As part of the study, we test mainly the most used functionality of the dietary analysis program – the food diary. Information is collected to improve the usability of the program and to look at the actual use of the program. It allows us to understand our users better and take this knowledge into account when planning developments in the future.

Participation is **voluntary** and **unpaid**. If necessary, you can discontinue participation in the survey at any time even after you have given your consent. Refusal or subsequent withdrawal will not lead to any negative consequences for you.

The collected data is stored and disclosed in a **non-personalized** form. The information you provide will not be linked to your person and no one will know that it was you who provided the information. Based on the collected data, recommendations are drawn up for changing the dietary analysis program.

What does participation in the study entail?

As part of the study, we will conduct a dietary analysis program usability test, in the framework of which you will perform the tasks provided for in the program. Your activity on the screen will be recorded. The test will be carried out by the facilitator of the study, who will be always available. After completing the tasks, the facilitator will ask you various questions related to the test. The whole process takes about two hours in total.

Once you understand what participating in the survey means and you are willing to participate, please sign the consent form.

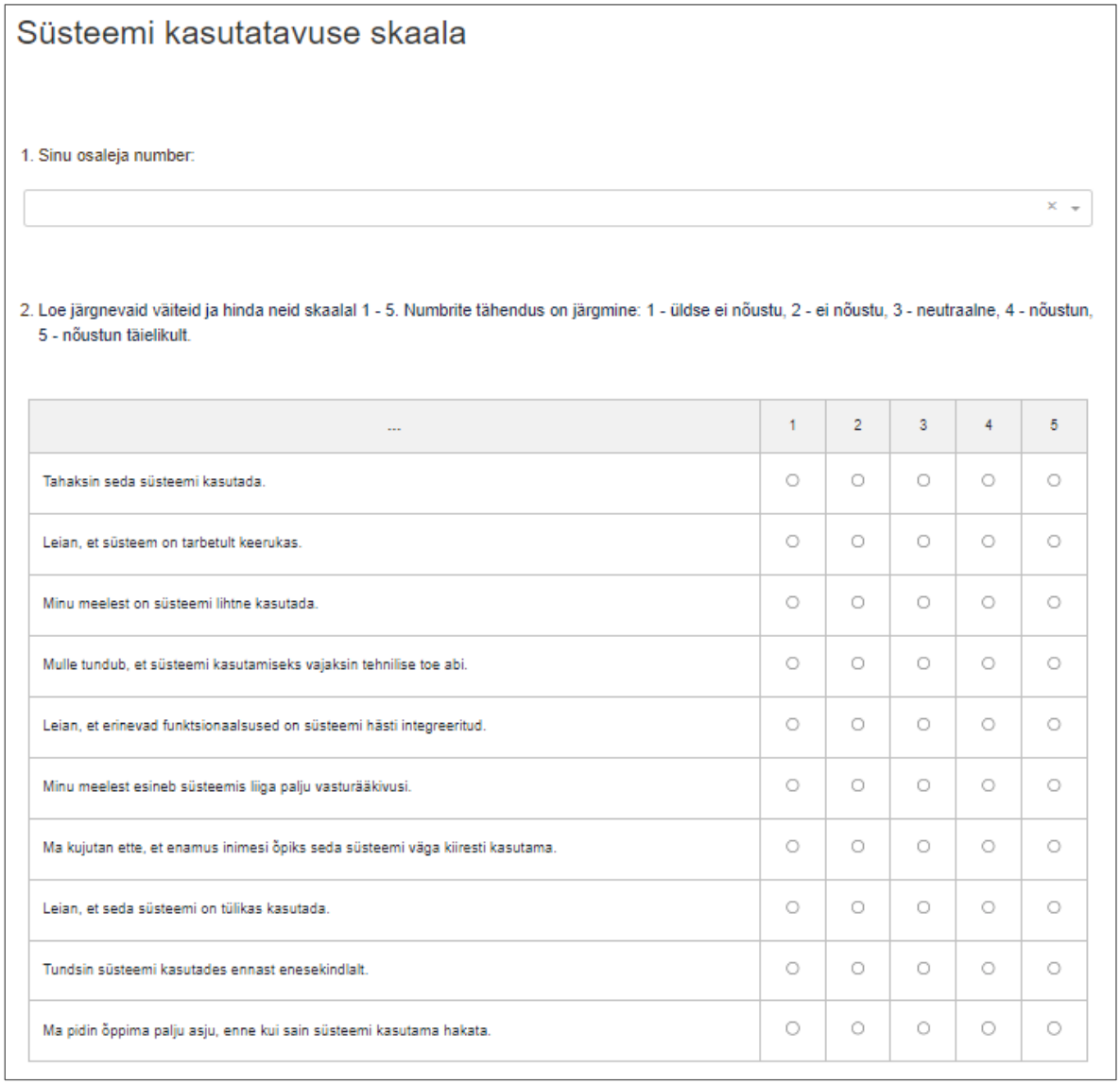
PARTICIPANT'S NAME

Date _____

Signature of the participant: _____

Signed on paper/digitally

V. The SUS questionnaire in English and in Estonian



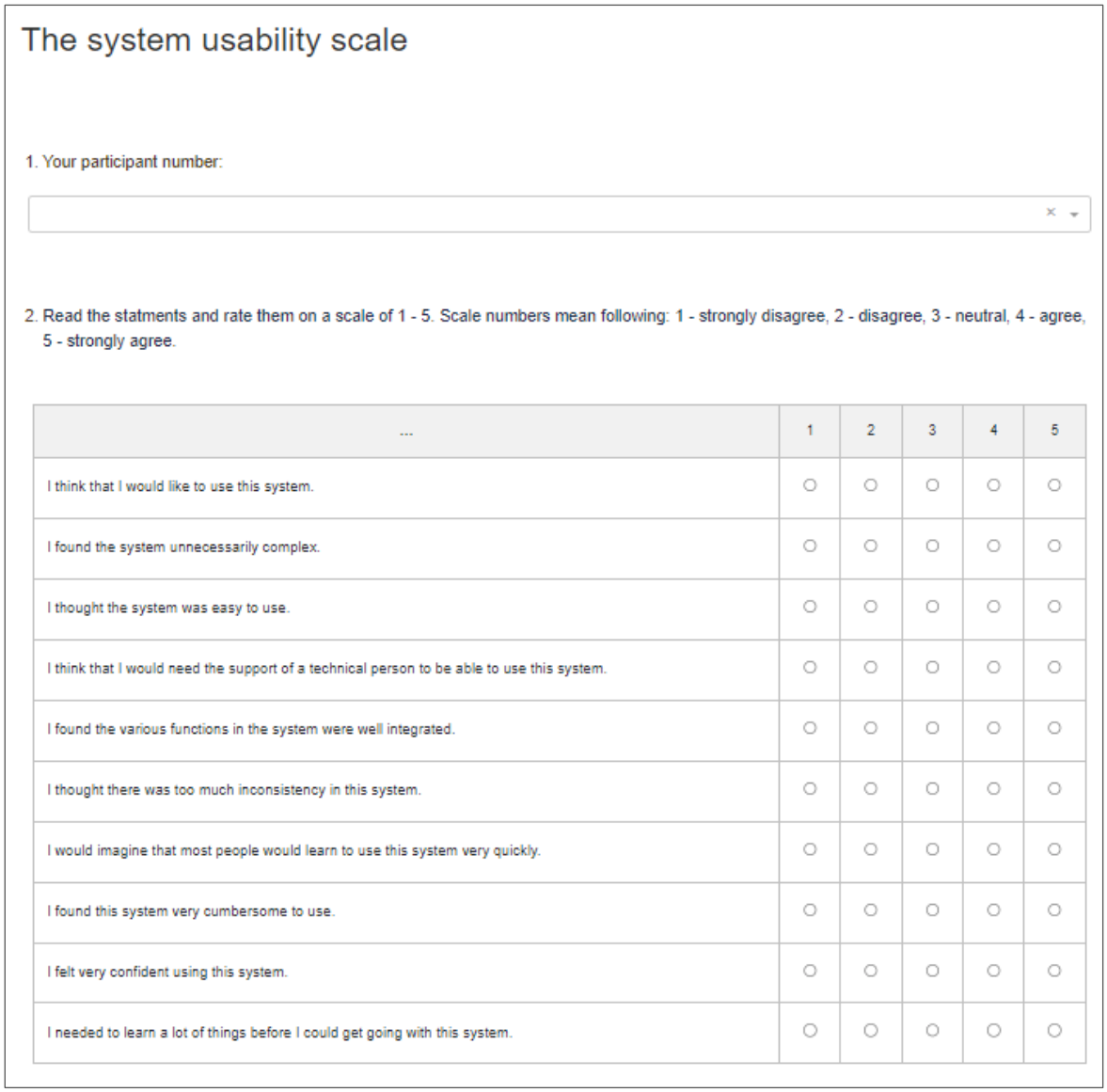
Süsteemi kasutatavuse skaala

1. Sinu osaleja number:

2. Loe järgnevaid väiteid ja hinda neid skaalal 1 - 5. Numbrite tähendus on järgmine: 1 - üldse ei nõustu, 2 - ei nõustu, 3 - neutraalne, 4 - nõustun, 5 - nõustun täielikult.

...	1	2	3	4	5
Tahaksin seda süsteemi kasutada.					
Leian, et süsteem on tarbetult keerukas.					
Minu meelest on süsteemi lihtne kasutada.					
Mulle tundub, et süsteemi kasutamiseks vajaksin tehnilise toe abi.					
Leian, et erinevad funktsionaalsused on süsteemi hästi integreeritud.					
Minu meelest esineb süsteemis liiga palju vasturääkivusi.					
Ma kujutan ette, et enamus inimesi õpiks seda süsteemi väga kiiresti kasutama.					
Leian, et seda süsteemi on tülikas kasutada.					
Tundsin süsteemi kasutades ennast enesekindlalt.					
Ma pidin õppima palju asju, enne kui sain süsteemi kasutama hakata.					

Figure 15. Snipping from the created online survey in Estonian.



The system usability scale

1. Your participant number:

2. Read the statments and rate them on a scale of 1 - 5. Scale numbers mean following: 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.					
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 the 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 this system very cumbersome to use.					
I felt very confident using this system.					
I needed to learn a lot of things before I could get going with this system.					

Figure 16. Snipping from the created online survey in English.

VI. Post-test interview questionnaire in Estonian and in English

INTERVJUU

1. Mis on sinu kõrgeim lõpetatud haridustase ?
2. Milleks ja kui tihti sa kasutad arvutit?
3. Kui enesekindlalt sa tunned ennast kui kasutad erinevaid veebipõhiseid programme?
4. Kas sa olid enne kuulnud toitumisprogrammist?
5. Kui sa oled programmi kasutanud:
    a. Kui tihti ja kui kaua sa oled TAP-I kasutanud?
    b. Miks sa hakkasid ja valisid kasutamiseks TAP-i?
    c. Mis põhjustel sa jätkaksid TAP-i kasutamist? Mis põhjustel lõpetaksid?
    d. Milliste seadmetega sa TAP-i kasutad?
    e. Milliseid funktsioone sa kasutad enim?
    f. Milliseid küsimusi või raskusi on sul tekkinud eelnevalt TAP-I kasutades?
6. Kas sa oled eelnevalt kasutanud mõnda toitumisprogrammi? Milliseid? Võrdle neid kogemusi ja too välja mis on kehvem ja mis on parem TAP-is?
7. Kui rahul või rahulolematu oled testitud ülesannete täitmise protsessidega?
8. Kas on mõni põhjus, mis paneks sind TAP-i kasutamist lõpetama?
9. Kui tõenäoliselt sa soovitaksid TAP-i oma sõbrale?
10. Mis oli kõige segasem või tüütum nende ülesannete täitmisel?
11. Mis toimis väga hästi nende ülesannete täitmisel?
12. Mis oli ülesannete kõige keerulisem osa ja miks?
13. Ma märkasin, et sul oli raskusi ... ülesandega, palun selgita mis juhtus? Mida sa ootasid, et peaks juhtuma?
14. Mis oli kerge või raske kui sa otsisid toite?
15. Kuidas sa lahendaksid olukorra, kus sa sõid midagi, mida sa ei leia meie andmebaasist, aga sa tahad seda toidupäevikusse lisada?
16. Kas sa märkasid/tead, kuidas pildiseeriate abil toidupäevikusse toite lisada?
17. Kas sa märkasid/tead serveerimiskoguse ja tüki kaalu nuppe? Mis on nende sisuline erinevus ja millal sa neid kasutaksid?
18. Kas sa märkasid andmeid majapidamismõõtude kohta? Millal sa neid kasutaksid?
19. Ava palun toidu otsinguaken ja vaatame seda koos. Kirjelda mulle, mida sa näed. Mida märkasid kõige esimesena? Kas sa saad aru erinevate nuppude taga olevatest funktsionaalsustest?
20. Teeme koos otsingu toidule kartul. Mida märkad tulemuste puhul esimesena? Kas on midagi ebaselget?
21. Mis oli kerge ja mis oli raske retsepti loomisel?
22. Teeme koos uuesti sinu päeva analüüsi ja vaatame, mida sa kõigepealt märkad? Kas siin on midagi ebaselget? Kas informatsiooni on sinu jaoks piisavalt?

INTERVIEW

1. What is the highest level of education you've completed?
2. How often do you use computer and for what?
3. How confident are you with different online programs?
4. Have you heard about our program before?
5. If you have used our program:
    a. How often and for how long have you used it?
    b. Why did you choose to use this program?
    c. Why will you keep using this app? Why will you not?
    d. Which device(s) do you usually use for TAP?
    e. Which features do you use most?
    f. What kinds of questions or difficulties have you had when using TAP in the past?
6. Have you used some other food diary programs before? Which ones? Compare the experience and bring out what was better/worse in TAP?
7. How satisfied or dissatisfied are you with the tested tasks' processes?
8. Is there any reason that'll make you stop using TAP?
9. How likely are you to refer TAP to your friends?
10. What's most confusing or annoying about fulfilling these tasks?
11. What worked well for you when fulfilling these tasks?
12. What was the most difficult part of these tasks and why?
13. I noticed you struggled performing ... task, can you tell me what happened? What did you expect that should happen?
14. I noticed you did …. Can you tell me why?
15. What was easy or difficult about finding foods?
16. How would you solve the problem, that you did not find exact match of the food you ate, and you want to add it to food diary?
17. Did you notice/knew how to add a food item in your food diary by using an image?
18. Did you notice the buttons with small, medium, large amounts and piece weight? What is the difference between them and when would you use these?
19. Did you notice household measurements, when would you use this information?
20. Let's open a food search window and look at it together. Describe what you see. What did you notice first in food search window? Do you understand the functionality behind different buttons?
21. Let's search for the word potatoes. What information do you notice first, when getting the result? Is anything unclear?
22. What was easy or difficult about creating a recipe?
23. Let's do the day analysis again and see what you notice first? Is anything unclear here? Is the information presented enough for your needs?

VII. Usability testing task flows

Green – user fulfills a task as expected.

Orange – minor usability issue, user fulfills task in acceptable way.

Red – major usability issue, user fulfills task in unacceptable way.

Figure 17. Participants flows of task 1 compared to an ideal flow.

Figure 18. Participants flows of task 2 compared to an ideal flow.

Figure 19. Participants flows of task 3 compared to an ideal flow.

Figure 20. Participants flows of task 4 compared to an ideal flow.

Figure 21. Participants flows of task 5 compared to an ideal flow.

VIII. Summary of interviews translated in English

Question	Answers
How likely are you to refer TAP to your friends?	**P1** Yes, I would recommend. **P2** I would recommend it if you needed to check the exact amount of calories. **P3** I would recommend TAP but would say that take time to learn it first. **P4** I have recommended TAP, because some of my acquaintances used foreign solutions and did not know that Estonia also has its own solution. **P6** It is a great program, I like it and of course I would recommend it.
Compare the experience of using some other food diary app and bring out what was better/worse in TAP?	**P1** I have used Fitlap before but the system is based on diet plans. I have stopped using Fitlap and TAP both because I am not a consistent person, and it is too much trouble to add all the foods. **P2** I have not used food diary apps, only calculated in my head the sum of calories based on package information. **P3** The French app had a footprint section, in Denmark it is better that at first you choose a generic food name and then you can proceed to the exact one and if you can't find it then you are able to search the USDA or Canadian database. Data quality strength label is also present. In TAP the minerals and vitamins are presented in bar chart which is better but macros I like better in pie chart like in Denmark. Also, I liked that you could add weight yield n recipe calculation, I have not seen this feature before. **P4** I use it because TAP is based on Estonian recommendations and database includes foods that are eaten in this region. I would use it even more if there would be a bar-code reader. I use it with computer, with phone it is not so usable. I liked in chronometer that you can see the proportion of amino acid, as vegetarian I check the quality of protein. **P5** I liked that in MyFitnessPal I could use a bar-code reader. **P6** I haven't used different food diary app.
What's most confusing or annoying about fulfilling these tasks?	**P1** To understand weight yield. **P2** That I was uncertain what to add if there is no exact match. And sometimes I did not really know what to do (weight yield for example). **P3** I created a recipe in My foods, but did not find it in the food diary search window. I also did not understand what for I needed to add processing types and what is a short and long processing difference. **P4** If there are no store products in the database (this Nestle bar). It is difficult to evaluate if the similar product is similar enough. **P5** That I did not find all the items that I have consumed.

	P6 Recommended energy intake numbers in Food diary and in search window. What they are based on and what they exactly mean.
What worked well for you when fulfilling these tasks?	**P1** Overall experience to see all foods and nutrients. **P2** I really liked that program is really detailed. **P3** I liked the analyze was so detailed and even cholesterol and fibre was presented separately. **P4** I like that I can change the meal time inside the food search window. **P5** That I can create if necessary foods and recipes. **P6** I really love the food image series.
How would you solve the problem, that you did not find exact match of the food you ate, and you want to add it to food diary?	**P1** It feels for me easier to create recipe than to search for the correct item. **P2** Create a recipe but first I would learn more what this program allows me to do. Maybe there is a better way that I don't know yet. **P3** I would choose the most similar food item or would add ingredients separately. One option would be to google similar items and compare the energy content and add most similar. **P4** I choose the similar item or on rare occasions add recipe based on the ingredients. **P5** I would choose something that is similar in energy content. **P6** I would do the recipe inb my best knowledge.
Search window comments	**P1** I did not think that serving size or piece weight are like buttons. I did not read the blue text. I thought that empty plates meant some error. **P2** Info is there but I just didn't concentrate. My flow of learning is to learn a bit more in every time I use a program and start very rapidly. I did not notice the color meanings etc. **P3** I thought My foods tab will open my created recipe. I saw the info tab, also saw that there are recipes and raw foods. I did not understand the image feature, I thought there is a potato picture not that you could use it for an adding amount. If there is default 1 portion, I expected the amount also to be fulfilled. **P4** The serving size is confusing as I don't know what they are based on. Sometimes findings foods are difficult as I don't know how they are named in database. I don't understand the meaning of baby foods filter and I have wondered why My foods does not show foods. **P5** It is hard to find foods from long lists. **P6** I don't understand the difference between food and recipe, there should be an info button.
Creating a recipe comments	**P1** In weight yield pop-up window, there should be an explanation why I need to add this. Why there are empty fields for serving sizes and piece weight? **P2** I didn't see the info button for weight yield. I added minced meat sauce as ingredient but thought it was a raw minced meat. I thought that saving a recipe means it goes to my account and not food diary directly. **P3** Piece weight and serving size fields were confusing to me. I saw the question mark but thought this tells that it is compulsory to add

	process type and does not give help. It was confusing to me why I need to add process type or weight yield. Also, how to know whether a process is short-term or long-term cooking. **P4** I would be confused about what is short and what is long processing time, but in one lecture was said that short is less than 15 and long is more than 15 minutes. **P6** Button „Set processing type for all" should be
Analyzing a day comments	**P1** I did not see that there are drop-down buttons in „Nutrients in foods", I thought it is kind of broken. Did not understand that consumption buttons are possible to switch on and off. **P2** I just found the first word with analyze and used this button, but I really didn't concentrate with this task or did not think to look it thoroughly. **P3** I did not find where the content is for protein. After seeing the consumption buttons recommends adding info button there. **P4** Difference between percentage of the energy intake and percentage of the national recommended energy intake is not clear.
Recommendations	**P1** Food search window should go aside or something, so I could see what I have added already. **P2** Make a tutorial video. **P3** There could be a short introductory video on the main page. **P4** I wish there would be food pyramid analysis and that the energy need calculator in menus would keep the data I entered.

IX. Solutions and their assigned categories from workshop based on usability testing

User flow discussion point number or interview suggestion number	User task flow discussion point solutions, Interview suggestions in Estonian	Workshop category: must do (development plan Id number from Table 10), nice to have, future.
Point 1	Kasutajad olid segadused keedetud kartuli lisamisega. Lahendasid erinevalt seda, kui ei leitud täpset vastet. Kasutaja ei tulnud selle peale et barbeque asemel otsida burger. Tasuks mõelda, et lisada videojuhend selle jaoks. Luua andmebaasi keskmised toidud. Vahetada sünonüümide ja nimetused EuroFiri järgi omavahel (praktikandi töö). Kõik muudatused väga mahukad.	Future
Point 2	Kogust ei tohi saada lisada 0-ga- Vähemasti toidupäevikus, kas kuskil oli see vajadus, nt retsept – siis vb tuleb küsimus kas soovid lisada 0-ga ja siis vastad jah või ei tagasi kogust lisama. – Taglilt üle, põhitasandis ei peaks saama lisada. Ainult Toidupäevik või mis muu? Retseptis menüüs küsib üle? Kas soovid 0-ga.	Must do (Id 4)
Point 3	Rasvaine praadimise töötlusaste kasutus oli vale. Peab muutma nimetust – Töötlusaste rasvainele praadimisel.	Must do (Id 1)
Point 4	Enamus kasutajaid ei leidnud pildi abil koguse lisamist üles. Tuua nupp tagasi alla lisa toit nupu juurde on üks variant. Tuleb kujundusega katsetada, kas intervjuu ettepanekud juba aiatavad või peaks ka nupu asukohta muutma.	Must do (Id 2)
Point 5	Jäägiga toidud muuta äkki nimetus, banaan, kaalutud koorega? Aga kuna seda muutust võetakse kasutusele uue toidu koostise andmebaasi avaldamisega, siis tulevikuks läbi mõtlemiseks.	Future
Point 6	Pooltele kasutajatele ei olnud arusaadav, et lisaks esimesele analüüsi tasandile on ka teisi analüüsitabe. Lisada videojuhend, muuta kujundust. Kuna paljud üldse ei jälgi seda analüüsi osa, siis hetkel kujundusmuutus võib olla keeruline ise mõelda või tellida.	Nice to have
Suggestion 1	Tutvustusvideo avalehele	Must do (Id 9)
Suggestion 2	Programmisisesed videojuhendid	Must do (Id
Suggestion 3	Sektordiagramm analüüsis makrotele	Future
Suggestion 4	Minu toidud filter eeldad, et avab sinu loodud toidud aga on tühi. Toidu otsinguaknas peaks olema minu toidud, et kuvatakse kõik sinu toidud (nagu minu enim kasutatud).	Must do (Id 3)
Suggestion 5	Muuta vali kogus pildilt nimetust ja ilmselt ikka ka seda välimust – panna sama ikoon mis on päevas endas,	Must do (Id 2)

	muuta see ka värvi muutvaks, panna nimetus Lisa kogus pildi järgi, Võrdle taldriku pealt vms – Edasi nupp vali taldriku suurus (1/1 ja 2/2).	
Suggestion 6	Kui portsjon 1 on olemas, siis peaks nt see 30g ka olema juba sisse pandud. Mind ennast on see, et tahan nagu mitu korda seda nuppu vajutada oleks mulle loogiline. Kas seda üldse maha võtta et portsjonit?	Future
Suggestion 7	Analüüsis infonupu panemine normal ja ületarbimise juurde (kas üldse vaikimis ikkagi kõik sisse lülitada?) On/off rippmenüüde juurde. Normaaltarbimisel puhul kuidagi visuaalsemalt et nupp on nt hall taust, ikoon et sees väljas.	Must do (Id 11)
Suggestion 8	Toidupüramiidi analüüs	Future
Suggestion 9	Osakaal tarbitud energiast ja osakaal riiklikust soovituslikust energiast, nende vahest ei saa aru. Panna näidis arvutuskäik sinna (info nupuna ja pop-up aken), sõnastada tooltp-id paremini.	Must do (Id 12)
Suggestion 10	Ei saanud sellest aru, et kas nüüd lõunasöögi soovituslik energia on 2000 kcal, peaks muutma sõnastusi, päeva soovituslik, toiduga saadud (tarbitud segane) ja alla soovituse või üle. Kust soovitus tuleb. Soovituslik asemel päevane soovituslik, tarbitud asemel toiduga saadud, üle ja alla soovitusliku.	Must do (Id 17)
Suggestion 11	Tahaks näha sisestatud toite, otsinguaken varjab ära, sama retseptide puhul.	Must do (Id 1, 3)
Suggestion 12	Pildiseeria tühjad taldrikud tekitasid segadust, nagu tunne et viga ja seal pole toite edasi.	Must do (Id 2)
Suggestion 13	Päeva analüüsi nuppu ei leitud, valiti perioodi oma. Ei leidnud analüüsinuppu.	Nice to have
Suggestion 14	Retsepti loomisel alla 15 minuti kuumtöötlus, üle 15 minuti kuumtöötlus.	Must do (Id 1)
Suggestion 15	Ma ei saanud aru, miks ma seda täitma pean. Täitsin kuna ei lasknud muidu salvestada. Oleks hea kui tooltip ütleks, miks ma seda täitma pean.	Must do (Id 1)
Suggestion 16	Ma ei saanud küll täpselt aru, mis see serveerimise kogus tähendab. Võiks olla infonupud ja tüki kaal ka.	Must do (Id 2)
Suggestion 17	Määra töötlusastmega korraga nupp üles tõsta.	Must do (Id 1)
Suggestion 18	Menüüdes energia kalkulaatori andmete säilitamine (ebamugav minu andmed kuvatakse kui näitan sellele keda nõustan).	Must do (Id 18)
Suggestion 19	Menüü analüüsi ei saadud aru/ nähtud rippmenüü nuppe, et sisu avada. Vaikimisi üks lahti jätta.	Must do (Id 19)

X. License

Non-exclusive licence to reproduce the thesis and make the thesis public

I, Änn Jõgi

1. grant the University of Tartu a free permit (non-exclusive licence) to

reproduce, for the purpose of preservation, including for adding to the DSpace digital archives until the expiry of the term of copyright, my thesis

Usability Evaluation of NutriData Dietary Analysis Program,

supervised by Dietmar Pfahl, PhD.

2. I grant the University of Tartu a permit to make the thesis specified in point 1 available to the public via the web environment of the University of Tartu, including via the DSpace digital archives, under the Creative Commons licence CC BY NC ND 4.0, which allows, by giving appropriate credit to the author, to reproduce, distribute the work and communicate it to the public, and prohibits the creation of derivative works and any commercial use of the work until the expiry of the term of copyright.

3. I am aware of the fact that the author retains the rights specified in points 1 and 2.

4. I confirm that granting the non-exclusive licence does not infringe other persons' intellectual property rights or rights arising from the personal data protection legislation.

Änn Jõgi

09/05/2023