

Usability Study and Usability Tests for CheapSleep Finland Oy Website

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<p>Friendly usability of the website is indispensable. Although companies understand the importance of usability, there are only small numbers of companies conducting usability tests on their business websites. CheapSleep Finland Oy requested to test usability of its business website. Thus one objective of this thesis is to carry out usability tests for business website of CheapSleep Finland Oy.</p> <p>The thesis consists of two parts. The first part contains the theoretical background, which produces a study research for definitions of usability, user experience and usability test methods: Discount Usability Engineering. The first part provides strong theoretical background for the second part: usability tests conduction and results analysis. In the second part, two important usability test techniques, Heuristic Evaluation and Simplified Thinking Aloud from Discount Usability Engineering, are used for usability tests of CheapSleep Finland Oy's business website. These two usability tests are only conducted on website's English version with Google Chrome by using laptop.</p> <p>The study gives constructive knowledge about what usability is and what Discount Usability Engineering is. Two different usability tests techniques from Discount Usability Engineering, Heuristic Evaluation and Simplified Thinking Aloud, are presented at the second part. Results of usability tests can be used for future website modification of CheapSleep Finland Oy.</p>	
<p>Keywords Usability, usability test, Discount Usability Engineering, Heuristic Evaluation, Simplified Thinking Aloud, User Experience</p>	

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Terminology

Discount Usability Engineering

Discount Usability Engineering is a usability test method created by Jakob Nielsen. It is a relatively fast, simple and cheap usability method. The “Discount Usability Engineering” includes four techniques: user and task observation, scenarios, Simplified Thinking Aloud, and Heuristic Evaluation.

Google Analytics

Google Analytics is a service offered by Google. It collects detailed statistics of a website traffic, traffic sources, and measures conversions and sales.

Human-computer interaction (HCI)

HCI is the study and planned design for computer and human activities. It indicates if computers are developed successfully for interaction with human beings or not.

Heuristic Evaluation

Heuristic Evaluation is the usability engineering method including one or more usability specialist follows the heuristic usability principles to examine system.

ISO 9241-11

It is a draft international standard for the ergonomic requirements in office works with visual display terminals. Part 11 describes the purposes of usability in product requirement specifications and product evaluation.

Observation

Observation is one method of Discount Usability Engineering. Observation can be achieved by visiting customer locations, let the users work as normal and without interruption.

Usability

Usability refers to ease of use and learnability of a human-made object, such as software application and website.

User-centered design (UCD)

UCD is a design approach that grounds the development processes in information or requirements of end users.

Usability engineering

It is a field that pays much attention to human-computer interaction. The purpose is to make human-computer interfaces with high usability or user friendliness.

User experience

User experience involves all aspects of interaction of the end-user with the company, its services, and its products.

User interface (UI)

UI is the connection between a user and a computer program. The interface provides a set of commands or menus for a user to communicate with a program.

Scenarios

Scenarios are stories of why specific users or user groups visiting the website.

Session

Session in Google Analytics indicates a group of interactions that take place on the website with a given time frame.

Simplified Thinking Aloud

In Discount Usability Engineering, Simplified Thinking Aloud is a technique to capture what participant is thinking while doing the work.

1 Introduction

Nowadays, websites are the fundamental mediums for companies to give services, gain customers and do business promotion. Websites enable to make information easily available to customers. A quality business website provides huge benefits, such as growth opportunity, offer convenience and market expansion, to the company. Most companies realize the benefits brought by the qualified websites, but not a lot of companies tested their business websites. Survey made by Econsultancy Digital Marketing Excellence (Figure 1) shows only 71% of companies tested their websites; 7% of organizations surveyed didn't test their websites at all in 2013. Many companies see usability test as a luxury which requires expensive technical labs and costs weeks to implement. However, usability tests can be both fast and relatively cheap.

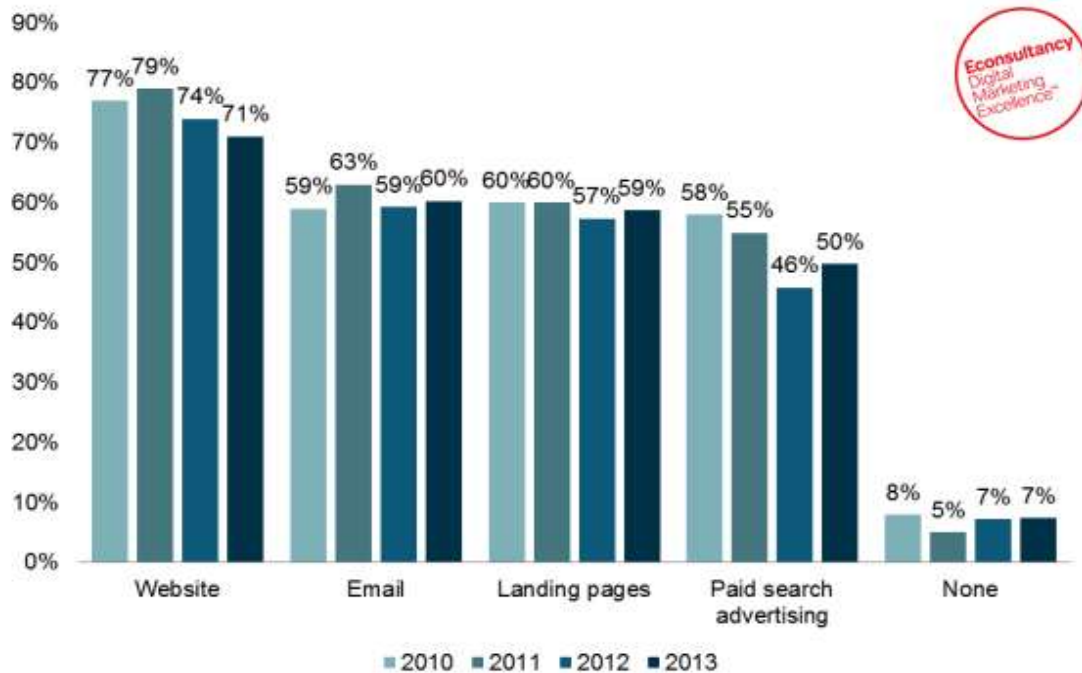


Figure 1: Areas of testing by company respondents (Ratcliff November 2013)

CheapSleep Finland Oy is a new and small company running hostel business in Helsinki. The business website (www.cheapsleep.fi) has being launched for about two years. The company takes its website seriously. Because of the company development, the website requires to be updated and modified a lot in the future. In order to increase the usability, functionality and acceptability of the website, CheapSleep Finland Oy wants to test its website usability. The company also wants to know if its business website is a quality website.

There are numerous usability definitions and usability terms, which make usability complicated and difficult to understand. Usability test methods are also various. For example, the book *Usability Engineering* (Nielsen 2008, 223) gives nine methods of usability conduction: Heuristic Evaluation, performance measure, thinking aloud, observation, questionnaires, interviews, focus groups, logging actual use and user feedback. In order to carry out appropriate usability tests for CheapSleep business website, a deep research of usability definitions and usability test techniques is significant.

In this thesis, four usability definitions given by Shackel (1986), Nielsen (1993), Eason (1984) and ISO 9241-11 (1998) are chosen for theoretical study. Since CheapSleep Finland Oy is a small and budget-limited company, relatedly cheap and easy usability test methods are more suitable for it. Two usability test methods, Heuristic Evaluation and Simplified Thinking Aloud from *Discount Usability Engineering*, are used for usability tests of CheapSleep business website.

This research topic is chosen because the author worked at CheapSleep Finland Oy for website maintenance and development. During daily work, the author realized some usability problems of the website. Some customers also said they met difficulties by using the website sometimes. The interest of usability investigation to CheapSleep business website was raised. CheapSleep Finland Oy also has a plan to make a huge modification of the website.

This thesis research helps the author to deepen the knowledge in usability and usability test techniques; gives an opportunity to conduct official usability tests; and provides a widely understanding of website development. Test results of this thesis can be used for future modification of CheapSleep business website.

2 Research Methodology

Research methodologies used in the creation of this thesis are qualitative research. It consists of theoretical research and usability experiments (constructive research).

The research scope of this theoretical research includes definitions of usability, why usability is important, relationship between usability and user experience, and usability test methods. A study research of Discount Usability Engineering is conducted, which provides strong theoretical support for usability experiments. In constructive research, two usability test techniques from Discount Usability Engineering, Heuristic Evaluation and Simplified Thinking Aloud, are implemented.

The objectives of this thesis is to gain deep understanding of usability and conduct usability tests to CheapSleep Finland Oy business website. All of the research performance is based on research questions loosely set before the thesis creation. In this thesis, the following research questions will be answered:

- What is usability?
- What terms are including in the usability?
- What are the usability test methods? The advantages and disadvantages, comparison?
- What is user experience? How and why it related to usability?
- What are the benefits of usability or usability test?
- How to conduct a usability test?
- What are usability problems of the CheapSleep Finland Oy business website?

3 Usability

Before conducting usability tests for CheapSleep Oy business website, there is an essential need of understanding what usability is and its related terminologies and frameworks. This chapter includes three parts. It starts with definitions of usability, which provides an overview of terms and concepts related to usability. The second part talks about the importance of usability. Definitions of user experience and why it related to usability are presented at the end of this chapter.

3.1 Definitions of usability

Simply, usability refers to ease of use and user friendliness of system or services. This definition is easy to understand, but it is not a precise definition. The terms, ease of use and user friendliness, are too narrow. They only focus on novice users' needs, such as quick learnability and easy of use; the advanced users' needs are neglected, such as efficiency (Matias 2008, 4). Usability is a dynamic, multiple-dimensional attributes of the user interface.

Usability is not just the user interface that comes out with product at end of development process. Usable systems are typically the results of a careful process which is called usability engineering (Leventhal&Barnes 2008, 22). According to Turkka Keinonen (2000), usability is the concept that establishes its position on the link between a human angle to information and communication technology. He (Keinonen 2007) also points out usability can be seen as a design approach, a product attribute and measurement.

Usability is a design approach for improvement and ease of use design. Such design approaches include usability engineering (UE), user-centered design (UCD), and human-computer interaction (HCI). In this case, usability increases the activity in software development process. It also can be seen as a part of the software development process. Usability as a design approach is recognized as a significant attribute of the idea of usability. Usability is important in participatory design. In consequence, applying the right usability approaches from the early concept definition phase, enlightening

results with affordable costs and effort which have been in the focus of interest are given. (Keinonen 2007a) In short, usability as a design approach can bring benefits to bind users into the process and lowers their resistance changing in organizations.

Usability as a product attribute specifies features and attributes needed to create a usable product, and measure if these features and attributes are delivered in the created product (Bevan & Macleod 1994, 4). Many guidelines and usability style standards of system development are discussing these features and attributes. Lists of general usability principles are also various (Figure 2). These usability principles focus on goals of design. They can be seen as design objectives, general discipline, the common ground of usability designers' thinking, and even can be seen as product properties (Keinonen 2007b). However, from users' aspect, these principles are more emphasized on product characteristics. Nielsen's Heuristic Evaluation principles are introduced on chapter 4.3 in this thesis.

1. Shneiderman (1986), 'Eight golden rules of dialogue design';
2. Apple Computer (1987), 'Human interface guidelines';
3. Donald A. Norman (1988), 'Seven principles that make difficult task easy';
4. Polson and Lewis (1990), 'Design for successful guessing';
5. Nielsen (1993), 'Usability heuristics';
6. Raviden and Johnson (1989), 'Evaluation check list for software inspection';
7. ISO 9241-10, 'Dialogue principles' and
8. Holcomb and Tharp (1991), 'Design for successful guessing'.

Source no:	1	2	3	4	5	6	7	8
consistency	x	x	x		x	x	x	x
user control	x	x				x	x	
appropriate presentation	x	x	x	x	x	x	x	x
error handling and recovery	x	x	x	x	x	x	x	x
memory-load reduction	x	x	x		x			x
task match			x	x	x	x	x	x
flexibility	x		x		x	x	x	
guidance, help					x	x		x

Figure 2: Principles and the guidelines are presented most frequently that link them (marked as x). (Keinonen 2007c)

Usability has been recognized as an indispensable measurement for interactive software systems. Jakob Nielsen (Introduction to usability 2009, 4) pinpoints usability is a measurement of quality that user is experiencing when interacting with a system. There are various standards or conceptual models for usability. These standards or models are not all talk about the same operational definitions and measures. In these standards or conceptual models, they indicate usability characteristics of the user interface, meanings of these characteristics, and also provide how they work together. In order to

illustrate these standards or models, this thesis presents existing usability definitions given by Brian Shackel (1991), Jacob Nielsen (1993), Eason (1984) and ISO 9241-11 (1998).

3.1.1 Shackel's definition of usability (1991)

Shackel provides a significant concept of usability. He points out usability can be set by the interaction among user, task and environment; usability is a 'key concept' (Harvey&Stanton 2013, 20). In Shackel's concept (Figure 3), it begins with a product perception model. Acceptance is the highest level concept, which is also the functional part of perceived. Usability is presented in the context of Acceptance. **Acceptance** consists of **Utility/Usefulness, Usability, Pleasantness and Cost**. Shackel gives the definition of Usability in short: "the capability to be used by humans easily and effectively" (Rigutti, Paoletti&Morandini 233).

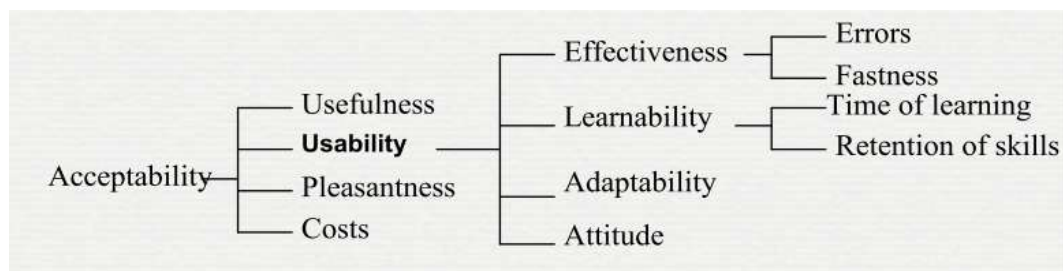


Figure 3: Dimensions and concrete measurements of usability in Shackel (1991). (Introduction to usability 2009, 6)

In Shackel's definition, there are four important characteristics of **Usability: effectiveness, learnability, flexibility, and attitude**. Shackel gives the explanation of each characteristic (Leventhal & Barnes 2008, 27a) as follow:

- **Effectiveness:** It means system performance is better than some required level, within some required percentage of usage environments range, by some required portion of the specific target users range.
- **Learnability:** It is the user training after installation in specific time, which needs specified amount of training and user support. And it also includes re-learning time for intermittent users.
- **Flexibility:** The adaptation to tasks and environments are acceptable beyond those first specified.
- **Attitude:** It is the acceptable levels of users within terms of discomfort, tiredness, frustration and personal effort.

Shackel’s definition is very practical. The elements in this definition are relatively abstract concept. It doesn’t weight the characteristics, because the importance of each characteristic maybe different among various projects. Shackel’s definition measures the usability of a system in use, not during development. Turkka Keinonen (2007d) considers Sackel’s definition: “It provides a descriptive definition of the concept that refers to the complex framework of evaluation and finally suggests concrete measurable usability criteria.”

3.1.2 Nielsen’s definition of usability (1993)

In Nielsen’s framework (Figure 4), the combination of system’s social acceptability and its practical acceptability contribute to the system acceptability. In practical acceptability, it is affected by various categories, such as usefulness, cost, compatibility, reliability, etc. **Usefulness** contains **usability** and **utility**. From Nielsen’s framework, usability is set under a large context of software engineering concept.

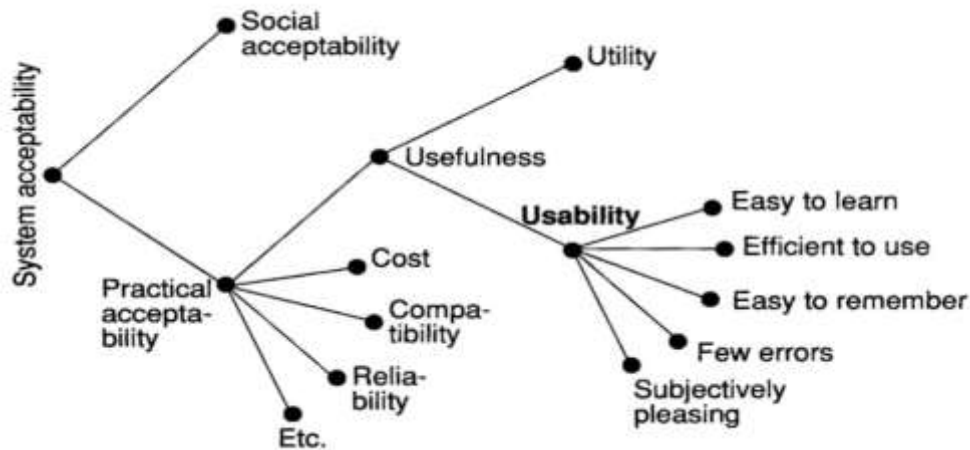


Figure 4: Usability as a component of system acceptability. (Nielsen 1993, 25)

Utility and usability are sub-concepts of usefulness in Nielsen’s framework. **Utility** refers to questions whether the functionality of the system in principle can do what is needed; **usability** refers to situation of how well users are able to use the functionality (Nielsen 1993, 25). When the utility of a system is low, the usefulness will also be low. When the system is not useful, it doesn’t matter if it is usable or not, because users may

not accept it. Therefore, treating usability and utility as separate is typical in many definitions. It is an important step to define usability as a distinct concept. It demonstrates the change in focus from product-centered design to the functionality of a product (that is utility to user-centered design how well the user can use that functionality) (Harvey&Stanton 2013, 22).

Based on the usability definition given by Jakob Nielsen (1993, 26-36): **usability** is traditionally association with five usability attributes: **learnability, efficiency, memorability, error, satisfaction.**

Learnability means that system is easy to learn and understand. Users should be able to do the task easily by using the system. **Efficiency** is related to productivity which means it will be more efficient after users learnt the system. **Memorability** describes system should suit for intermittent users. Even a user return to system after a while; the user is still able to use the system again without learning from begin. **Errors** indicate the rate of error should be less, and system is able to recover it. Catastrophic errors must not occur at all. The last element: **satisfaction** means system is pleasant to use.

All these five attributes give more precise and measurable features to usability. In Nelsen's definition, usability is a limited aspect when compared with system acceptability, which consider if the system is good enough to meet all the needs and requirements of users and other stakeholders (Leventhal & Barnes 2008, 29). The usability is just one part of the software engineering system characteristics.

3.1.3 Eason's definition of usability (1984)

According to Eason's usability framework (Figure 5), a system's **usability** is determined by **the interaction of system, user characteristics and characteristics of target task**. In this definition, Eason emphasizes the purpose of using system and the abilities of users, because usability cannot be measured without consideration by users and their target tasks.

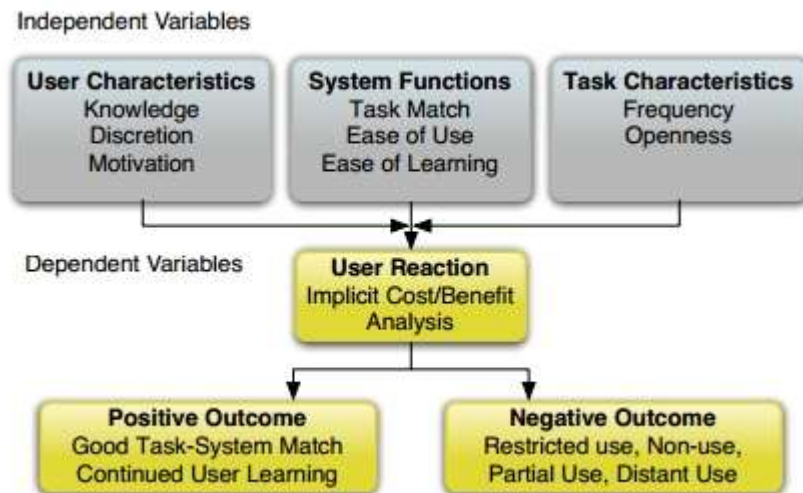


Figure 5: Eason's Framework of usability (Pietilä 2008, 8a.)

These three elements, system, user, and task are defined by various inputs or individual variables. The usability outcome can be changed because of inputs interaction with each other. In Eason's definition, the essential usability indicator is if the system is used. (Leventhal&Barnes 2008, 29) If the system is not be used, then the system is not usable.

The first dimension of Eason's usability definition is **system/user interface characteristics**. Eason points out **ease of use, ease of learning** and **task match of interface** are the critical attributes of usability. In these three attributes, ease of use and ease of learning are mentioned both in Nielsen and Shackel's usability definitions. **Ease of learning** indicates how fast a user is able to operate and get familiar with the new system. **Ease of use** means how easy a system can be understood and operated by the new user. For **task match** attribute, it means the information and function of system should match users' requirements for the target task. Eason indicates the system/user

interface components are the most flexible part to change and easy to measure. On other hand, variables of the task and the user are normally set and fixed in the context for work (Leventhal&Barnes 2008, 30).

Task is independent from the user interface. **Task characteristics** include two components: **frequency** and **openness**. **Frequency** describes how often the task is operated by the user; **Openness** means the nature of the task: if the task is open-ended and the number of options (Pietilä 2008, 8b). These two attributes are related and not opposite to each other. The particular case can be seen when HAAGA-HELIA students use Moodle to check homework/course information of an enrolled course as routine (not open) and do it frequently, students' requirements of system are speed and efficiency. However, if students do not use Moodle to check homework/course information frequently, they may want more guide or help from the Moodle user interface.

There are three important components in **User Characteristics: knowledge, motivation, and discretion**. The first user characteristic is **knowledge** which means the knowledge of the user to apply the task. It may be appropriate or inappropriate. **Motivation** describes how much the user wants to complete the task. **Discretion** refers to user capability to choose not to use some part of a system. (Leventhal&Barnes 2008, 31)

In summary, from Eason's point of view, usability can be seen as a relationship. With the change of inputs, usability outcomes will be different. Not like Nielson and Shaker's framework, Eason's usability of a system is determined by the quality of the user interface in the context of the people using it and the purposes using it. For this reason, in Eason's definition, usability cannot be measured without considering user and task.

3.1.4 ISO 9241-11 (1998)

ISO 9241 is a draft international standard for ergonomic requirements in office works with visual display terminals. Part 11 describes usability for the aims of product requirement specifications and product evaluation. (Matera, Rizzo&Carughi 2014, 4)

This standard provides definition of usability as: **usability** is the dimension which specified users are able to use the product to fulfill particular goals with **effectiveness**, **efficiency** and **satisfaction** in a specified context of use (Leventhal&Barnes 2008, 27).

In ISO-9241-11 (Figure 6), **effectiveness** indicates how accurate and complete users can achieve those specified goals. **Efficiency** refers to when using the product and how many resources involved, such as time, money and people. **Satisfaction** means how positive attitude of using the product and how freedom from discomfort. (Matias 2008, 5)



Figure 6: Usability attributes based on ISO 9241-11(Keinonen 2007e)

Bevan and Macleod (1994, 8) comment the usability in ISO 9241-11 as “a property of the overall system: it is the quality of use in a context”. ISO 9241-11 gives explanations of how to identify the necessary information for specifying or evaluating usability when measure user performance and satisfaction. It describes the context of product usage and usability measurements in an explicit way. (Bevan 2001, 5) Compared with three previous usability definitions given by Shackel, Nielsen and Eason, ISO 9241-11 is not the most user-centered one.

3.2 Why usability is important

Some computer software is quite hard to understand, difficult to learn and complicated to use. The poor usability software will waste users' time and cause frustration; the users will leave at the end. Thus poor usability products cause huge potential losses to the companies.

Usability is extremely essential for software. Some companies believe conducting usability test is very expensive and cost a lot of time. In fact, some usability tests are not expensive and can be conducted relatively easy and fast. Applying usability at the early stage in the product development process will save cost and decrease the rate of project failures. Klein Research (Figure 7) shows usability not only gives benefits to companies, but also brings positive effects to users.

Benefits to the User	Benefits to the Company
Increased ease of use	Simpler products / Fewer product iterations and revisions
Improved productivity (reduced time to complete a task and reduced errors)	Fewer customer service calls / Decreased support costs
Higher customer satisfaction	Increased traffic / More sales / Increased appeal
Higher customer retention	Reduced risk of abandoning the product
Increased trust in the product and company	More customer loyalty

Figure 7: Benefits bring by usability for user and company (Klein Research 2006)

According to Forrester Research, usability was the top requirement for commodities buyers to choose an e-Marketplace recently (Bevan 2005, 7). Because of good usability, user is able to utilize the website more easily, effectively and efficiently. The enjoyable interaction with website brings higher satisfaction and retention to the user. Usability also can decrease user errors. The user doesn't need any support; or only uses the website support instead of calling customer service. The increasing confidence and trust of the website prompt the user to make repeat purchases. A positive experience also gains the customer loyalty.

Compared with the user, usability is more important to the company. Usability is critical to the success of the website. As mentioned in the early chapter, usability reduces

time and costs of development by early defining user objectives and usability goals, and by identifying and solving usability issues during software development. The money spent on support and maintenance is decreased. Usability also reduces the cost of future redesign and makes future version more usable. A study case from MauroNewMedia (Bevan 2005, 4) involving an E-Com site selling consumer products, E-Com site didn't make official usability test early in development period. Later, the E-Com site found usability problems needed to be fixed. The cost would be more than \$1 million in redesign and programming. However, the early usability test only cost about \$25,000.

Usability also brings benefits to employers, for example, reducing training time and costs. Other merits include (Bevan 2005, 8-9):

- Reduce task time and increase productivity
- Reduce employee errors
- Reduce staff turnover as a result of higher satisfaction and motivation
- Reduce time spent by other staff providing assistance when users encounter difficulties

In general, conducting usability at the right time offers a better return on investment.

3.3 User experience (UX)

Recently, more and more companies take account of user experience when creating and maintaining their website. Talking about how to improve the user experience, usability is always the first thing to consider. User experience (UX) is a wide and complicated concept. Since this thesis is mainly about usability. This section only simply introduces definitions of UX, and the relationship between usability and user experience.

3.3.1 Definition of user experience

Users desire interactive products not only with useful and usable features, but also with fascinating and fashionable (Hassenzahl & Tractinsky 2006, 1). The definition of usability provides the system requirements of ease and friendly of use. Analyzing and evaluating how the user succeeded in completing tasks have been paid attention traditionally. But there is not addressing the satisfaction component explicitly. (Pietilä 2008, 10) Therefore, a question appears if effective interaction design is able to provide a successful and satisfying experience for users.

User experience (UX) is an extension to usability, which adds new requirements. Compared with usability, UX enables to satisfy experiences outside of work related activities. UX has been widely accepted, although ideas given by UX are barely new. UX is still theoretically incoherent and methodologically immature (Robert & Lesage 2010, 4). This thesis presents three UX definitions. One of the early UX definitions is created by Alben:

“All the aspects of how people use an interactive product: the way it feels in their hands, how well they understand how it works, how they feel about it while they’re using it, how well it serves their purposes, and how well it fits.” (Pietilä 2008, 9)

The Nielsen Norman Group gives the definition for User experience:

User experience contains all aspects of the end-user when interacting with the company, its services, and its products (Nielsen & Norman, 2014).

The UX definition given by Shedroff is also widely used. He also points out the difference between usability and UX:

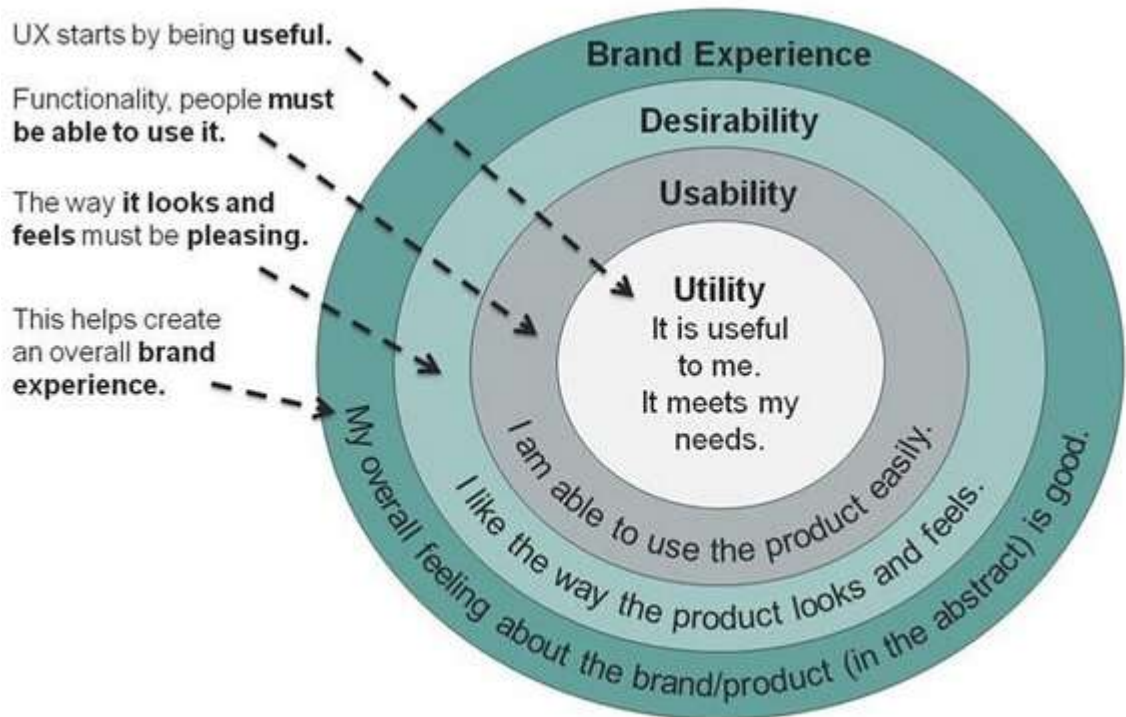
“The overall experience, in general or specifics, a user, customer, or audience member has with a product, service, or event. In the Usability field, this experience is usually defined in terms of ease-of-use. However, the experience encompasses more than merely function and flow, but the understanding compiled through all of the sense.”
(Roto 2010, 1)

Products used by people have the user experience. UX is not about how a product works on inside; it is about how the product works outside, where users can contact and work with it (Garett 2003, 10). The user is the center of the UX. It focuses on what users' need, their abilities, interest and even their limitations. UX is available to increase the quality of the user's interaction with a product. A quality user experience brings significant and sustainable competitive advantages. The benefits also include increase conversions rate, increase adoption, enhance customer satisfaction and key differentiator (Mireles 2006).

3.3.2 Usability vs. User Experience

Usability and user experience (UX) should be distinguished. UX is a wider perspective than usability. UX is a complex process influenced by various characteristics related to the user, the usage situation and the used interactive system (Mahlke 2007, 25).

Compared with usability and user experience definitions, definition of usability provided by ISO 9241-11 indicates usability focuses effectiveness, efficiency and satisfaction on specified users achieving specified goals in particular environments; Nielsen Norman Group delivers the User experience as considerations of all aspects of the end-user when interacting with the company, its services, and its products. The usability relates to the ease of use when a user completes the goal of interaction with a product. User experience, on other hand, relates to user perception of interaction with a product. User experience is more about feelings and to create happiness of using product. A particular case can be found in Apple products, which are particularly good at the total user experience.



Source: *User Experience 2008, nnGroup Conference Amsterdam*

Figure 8: The relationship between Usability and User Experience (NeoSpot 2014)

Usability is a narrower concept than user experience (Figure 8). User experience is a “consequence of the presentation, functionality, system performance, interactive behaviour, and assistive capabilities of the interactive system” (Mifsud 2011). In this case, user experience includes aspects such as human factors, design, ergonomics, HCI, accessibility, marketing and usability (Mifsud 2011a). With effectiveness, efficiency, and satisfaction results, usability answers the question of “Can the user accomplish their goal?” while UX answers the question “Did the user have as delightful an experience as possible doing so?” (NeoSpot 2014a). Overall, user experience is an even broader concept. It is more effective to do well and has better impact results.

4 Discount Usability Engineering for the Web

The usability tests carrying on CheapSleep business website are Heurist Evaluation and Simplified Thinking Aloud from Discount Usability Engineering. This chapter talks about what Discount Usability Engineering is and its related methods.

According to Nielsen (1993, 17), **Discount Usability Engineering** is based on the four techniques: **user and task observation, scenarios, Simplified Thinking Aloud, and Heuristic Evaluation**. Discount Usability Engineering is a relatively simple method that can be actually used in the practical situation. Discount Usability Engineering is the only hope which is simple enough that departments are able do their own usability task, fast enough that people is willing to take the time, and cheap enough that it is still worth to do it (Nielsen 1997).

4.1 User and task observation

The basic principle in the beginning focuses on users, which can simply achieve by visiting customer locations. In Discount Usability Engineering, the method is user and task observation. User and task observation is just let users work normally without interruption (Nielsen 1993, 17a).

User and task observation is very important and one of the simplest usability method. This method allows taking notes and even videotaping it in some environment. Observer should keep quiet during the observation. Only if some strange users' activities happen, the observer may interrupt and ask questions (Shneiderman &Plaisant 2005, 123). The purpose of observation is to observe users' activities under their normal working environment.

User and task observation brings to many benefits. By observing users' activities, unexpected ways of using the system can be found which would not have sought to test in a planned laboratory experiment (Nielsen 1993, 208). User and task observation is also a usability assessment method beyond testing. Recorded observations are a potential rich data source. They provide evaluative perception beyond simple performance

measurements of time and accuracy. However, the over-rich observation data sometimes makes data difficult to analyze. (Laura&Barnes 2008, 219)

4.2 Scenarios

Scenarios are the ultimate limitation of the level of functionality and of the number of features. They simulate the user interface if tester following a previously planned path. (Nielsen 1993, 18) Scenarios can carry as paper mock-ups or in an easy prototyping environment. They are small and easy to implement. Scenarios are the methods which are able to achieve fast and frequent feedback from users.

The term “scenario” is extensively used in the user interface community with lightly different meanings. Scenario can be used in website design or usability testing. In Discount Usability Engineering, scenario is seen as a usability test method. Usability testing scenario does not include the information of how to achieve a task. Scenario is a story, which includes a situation state, one or more actors with personal motivations, knowledge, and capabilities, and different tools and objects that the actors encounter and manipulate. (Carroll& Rosson 2002)

Nielsen gives the definition for scenario:

Scenario is an encapsulated description of a sole user by using a special set of computer facilities to accomplish a specific outcome in specified environment over a certain time interval (Nielsen 1993, 100).

Scenario as usability test method is a good tool at the early step of system design. Potential problems of usability will be explored before the user interface has been fully designed, such tools including paper mock-up or prototype. Scenario is cheap and easy to create. Scenario is story-based; it is very flexible and involves concrete and abstract ideas and information. Scenario can identify usability goals and approximated task completion times. It is also an approach that facilitates developer buy-in and promotes a user-centered design. (The Usability Body of Knowledge 2010) Scenario is able to reveal features of work environment, user interaction, or the problem influence of the final success or failure of design (Leventhal&Barnes 2008, 71). Scenario is also pushing

designers to consider more about characteristics of the target users, tasks and their work environment.

4.3 Heuristic Evaluation

Heuristic Evaluation is a discount method for quick, cheap, and easy way of system inspection. It is a useful and effective way to find out both major and minor problems. Especially for minor problems, they seem to be found more easily by Heuristic Evaluation. A case study shows Heuristic Evaluation identified a total of 59 major usability problems and 152 minor usability problems (Nielsen January 1995).

Rubin and Chisnell (2008, 16) expresses Heuristic Evaluation as a review of a system, usually by a usability specialist who has little or not involve in the project. He or she will perform the review based on accepted heuristic principles from the body of research, human factors literature, and previous professional experience.

Nielsen (1993, 20) gives the ten heuristic principles:

1. **Simple and natural dialogue.** Irrelevant and rarely needed information should not include into dialogues (Nielsen 1993, 20a). User interface should keep as simple as possible, which helps to increase users' learnability, efficiency, and also avoid misunderstanding.
2. **Speak the users' language.** The system uses words, phrases and concepts familiar to the user, instead of using system-oriented terms. The dialogue should comply with real-world conventions; information shows in a natural and logical order. (Nielsen 1995)
3. **Minimize user memory load.** Visibility of objects, actions, and options will reduce the memory load of user (Nielsen 1995a). Nielsen (1993, 20b) indicates that users do not need to memorize information from one part of the dialogue to another. Using instructions of the system should be visible or easily retrievable whenever needed.

4. **Consistency.** It is one of the most basic and important usability principles. Consistency is not just a screen design problem. It needs to consider about the task and functionality structure of the system (Nielsen 1993, 133). Whether different words, situations, or actions mean the same thing should not be wondered by users. Users just need to follow the platform conventions. (Nielsen 1995b)
5. **Feedback.** System should provide positive feedback. System should inform the user what it is doing and how it is interrupting the user's input consistently. The response time should be as fast as possible. But if the response time is too fast, it is possible the user cannot keep up with the feedback. (Nielsen 1993, 134-135) The system should also provide a feedback message if the system failure.
6. **Clearly marked exists.** In order to increase the comfort and freedom for users, system should provide easy ways to exist as much as possible. Sometimes, users make mistakes by choosing the unwanted functions. A clearly "emergency exit" sign of leaving the unwanted state may needed by users. Then the users does not need to through an extended dialogue. (Nielsen 1995c) Such as undo and redo support from system.
7. **Shortcut.** Using shortcut is able to increase flexibility and efficiency of use. Accelerators allow users to tailor frequent actions, such as jump directly to the desired place in a large information spaces (Nielsen 1993, 139-140). It is able to help both inexperienced and experienced users.
8. **Good error message.** Error situations are inevitable sometimes. The purposes for error message are to help users to recognize and recover from errors. Nielsen gives four simple rules for creation of good error message. First, phrase should be in clear language and not use obscure code. Second, it should describe in precise way instead of vague or general. Third, it needs to help users to solve problems constructively. Fourth, error messages should be expressed in a polite way and not intimate the user. (Nielsen 1993, 142-144)

9. **Prevent errors.** Compared with good error messages, it is better to avoid problems with careful design at beginning. Errors can be prevented by eliminating error-prone conditions or checking for them, and presenting users with a confirmation option before they commit to the action (Nielsen 1993, 145).

10. **Help and documentation.** Normally users do not read manual. It may better for system to be used without documentation; but it is possible to provide help and documentation necessarily sometimes. Help and documentation should have features like easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large (Nielsen 1993, 20c).

Heuristic Evaluation is able to find out the individual usability problem and address expert user problems. This technique requires few resources in the field of money, time or expertise. Heuristic Evaluation delivers quick and comparatively cheap feedbacks to designers. By distributing the correct heuristic principles, Heuristic Evaluation gives designers the suggestions of the best corrective measures. (Usability.gov 2014) The test results support valuable data and ideas to improve the user interface. Heuristic Evaluation is able to work with other usability testing methodologies to get more valid and valuable usability test results.

However, disadvantages of Heuristic Evaluation also exist. One of the biggest flaw is Heuristic Evaluation doesn't involve with real users. It doesn't find "surprises" relating to their needs. Heuristic Evaluation requires evaluator has the knowledge of user interface, usability and heuristic principles. It is better to use multiple experts and aggregate their results. Nielsen (1993, 156) indicates a single evaluator will miss most of the usability issues in a user interface. One evaluator only can find about 27% of the total usability problems. While the number of evaluators is over ten, the proportion of usability problems found will be over 80 % (Figure 9). It maybe hard to find so many experts; and the cost will be very expensive. The last disadvantage which mentioned before is the evaluation might identify more minor problems and fewer major problems.

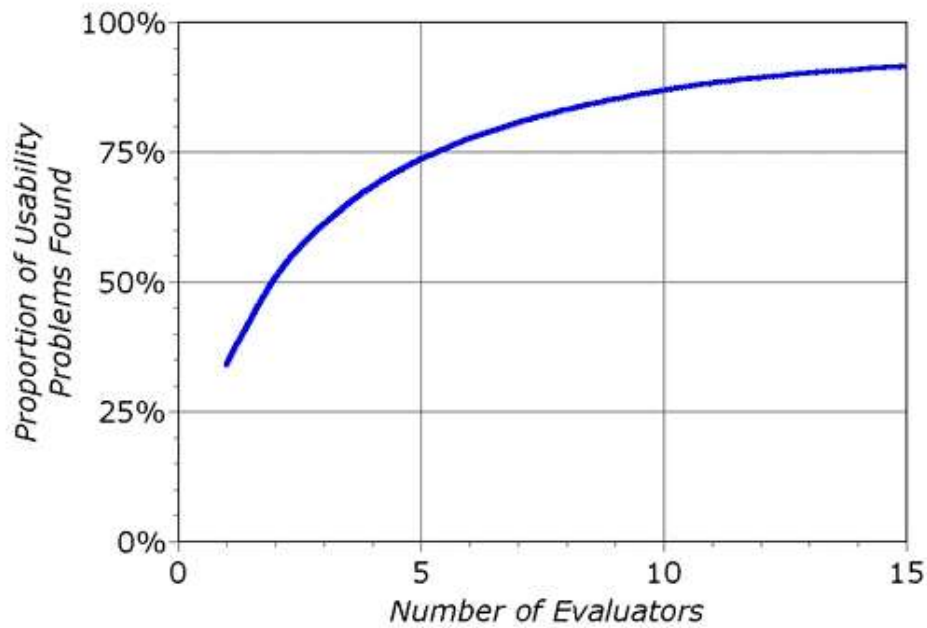


Figure 9: The proportion of usability problems found by heuristic evaluation by using different numbers of evaluators. The curve represents the average of six case studies of heuristic evaluation. (Nielsen 1993, 156)

Normally Heuristic Evaluation session will take at least one or two hours for a single evaluator. For large and completed user interface, it is better to divide into several smaller evolution sessions, each focus on one part of the UI (Nielsen 1993, 158a). In general, the evaluator can decide his or her own way to perform the session. During the evolution session, evaluator need go through the UI many times in order to inspect the different dialogue elements, and compare them with decided heuristic principles list (Nielsen 1993, 158b). The output of Heuristic Evaluation is a list of usability problems found in the evaluation with comments referring to those usability principles. These problems were violated by the usability principles in each case under evaluator's opinion. Heuristic Evaluation is not a technique to fix usability problems or assess how to redesign the interface.

4.4 Simplified Thinking Aloud

The method of verbalization working as cognition indicators is an old data collection technique (Nicole, Miller & Thompson 2006). Simplified Thinking Aloud is traditionally used in psychological research method; however it has been dramatically used for the practical evaluation of human computer interface (Nielsen 1993, 1995). Simplified Thinking Aloud is a technique intended to capture what participant is thinking while doing the work. To conduct this technique, participants need to provide a running explanation of their thought according to the process by thinking aloud when performing tasks of the test (Rubin & Chisnell 2008, 204). The participants should explain what they are doing with system, but also explain why they are doing it. In this way, problems and misunderstanding elements will be indicated, the system can be redesigned.

Through small number of participants, Simplified Thinking Aloud is able to collect a richness of data. The vivid and explicit commentary of participants expose existed misconception and confusion, and how participants work around it. With six participants, over 80% of usability problems were found by Simplified Thinking Aloud (Figure 10). This technique also can reveal the clues of how participants consider the system when they are using it; and if the way of working it matches with the way of its design. Simplified Thinking Aloud can get preference and performance information simultaneously (Rubin & Chisnell 2008, 54, 204).

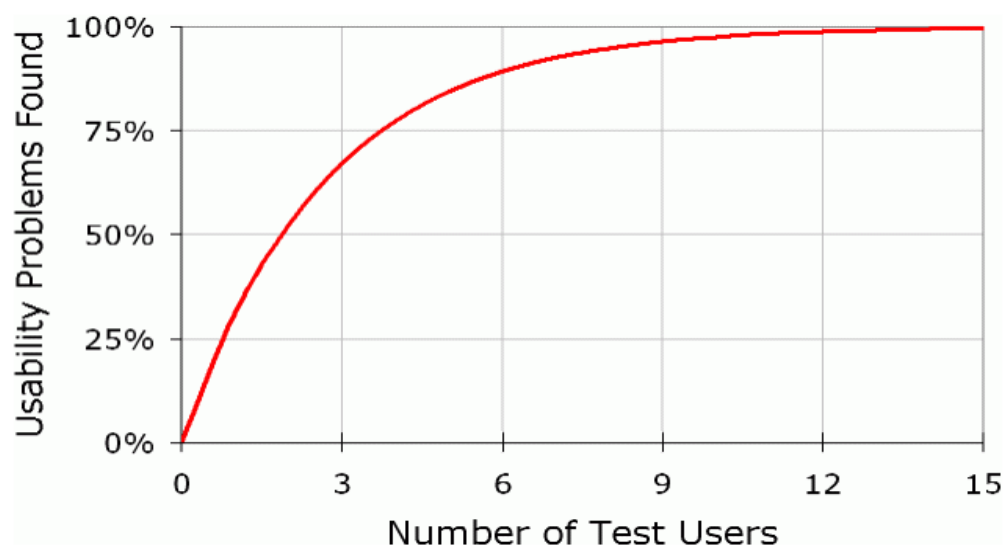


Figure 10: The proportion of usability problems found by using different numbers of testers (Schrag 2006, 8).

Simplified Thinking Aloud is a cheap, robust and easy to learn technique. It is very flexible that can be used at any stage in the development lifecycle, from early paper prototypes to fully implemented, running systems (Nielsen 2012). Simplified Thinking Aloud is an extremely effective and useful technique, even though it has some risks and doesn't solve all problems. Simplified Thinking Aloud doesn't lead itself well to most types of preference measurement. This technique may lead to a false impression of usability problems reason if it gives too much weight to user's own "theories" of what caused trouble and solutions. (Nielsen 1993, 195) Participants may not an expertise and they may speak in subjective way. The experimenter should observe and make notes. The data will show much higher validity than participants' claim.

Simplified Thinking Aloud method is under an unnatural situation. For participants, it maybe difficult to perform the system while expressing continuously. Experimenter needs to encourage them "think aloud" and keeping ask questions like, " what do you think right now?" and "what do you think will happen if you do it? ". However, this kind of interruptions may change user behavior easily, especially for untrained system. The result doesn't represent real use; the outcome cannot be used for design decisions.

In order to enhance effectiveness of Simplified Thinking Aloud, Rubin and Chisnell (2008, 205-206) give six advices:

- Simplified Thinking Aloud cannot be used for very short or pointed tests where unusual part of the method doesn't have time to wear off.
- It is better to illustrate the technique and perform some unrelated tasks first to participants, so they feel less feel-conscious.
- When encountering with strong resistance, it is better not to force the technique.
- When participants become quiet, it should be paid attention to and waiting patiently. They may try to solve the problems. It is better to observe and ask questions later.
- It is essential to let the participants know that their comments have been paid attention and written down.
- A different technique also can be considered early. For example, test two participants at the same time, and encourage them to think aloud to each other.

5 Usability tests for CheapSleep Business Website

Two individual usability tests were implemented on business website of CheapSleep Finland Oy. At the beginning, company background of CheapSleep Finland Oy, its business website and user analysis are introduced. Heuristic Evaluation and Simplified Thinking Aloud were the techniques used for usability tests. Detailed test documents and test results of each usability test are delivered in this chapter and Attachment.

5.1 CheapSleep Finland Oy and its website

CheapSleep Finland Oy is a hostel opened on May 2012 which is location in Vallila, Helsinki. It has a total 118 dorm beds, 10 private rooms and 3 apartments. For dorm rooms, it has dorm type from 10 to 26 people per room. 3 apartments locate in different areas of Helsinki city center. CheapSleep hostel has a common area and a kitchen that customers can use for free. Hostel also offers free WIFI, free usage of the kitchen utensil, TV and computer. CheapSleep hostel intends to offer an affordable, modern and relaxed atmosphere. In 2013, the net sales of CheapSleep hostel are around 650 000 € and it has approximately 25 000 overnights per year.

CheapSleep hostel focus its marketing efforts on the website www.cheapsleep.fi. The website has being launched since March 2013. Website contents are updated once or twice a month and when new products or services offered by the company. The website is quite important for CheapSleep hostel to do the mass marketing, gain new customers and do advertisement. In order to analyze the behavior of the website, company used the Google Analytics to track the website.

Right now, the website has English, Finnish, Swedish, Spanish, Russian and Chinese versions. On the website, customers are able to make a reservation from the booking system, and find related information about the hostel. In this thesis, usability tests were only conducted on the English version and laptop version.

The CheapSleep business website has five main pages. They are homepage, “Book A Bed”, “What’s on”, “Staying with us” and “Our Hostel”. From the homepage, users

can access to the main booking system and the main apartment booking system. The homepage also links to “Group Booking” page and some popular room types’ pages, such as “Superior Double Room” page, “20 Bed Dormitory” page and “10 Bed Female Dormitory” page. Form “Book A Bed” page, users can find out lists of all dormitory types, private room types and apartments the hostel has (Figure 11).

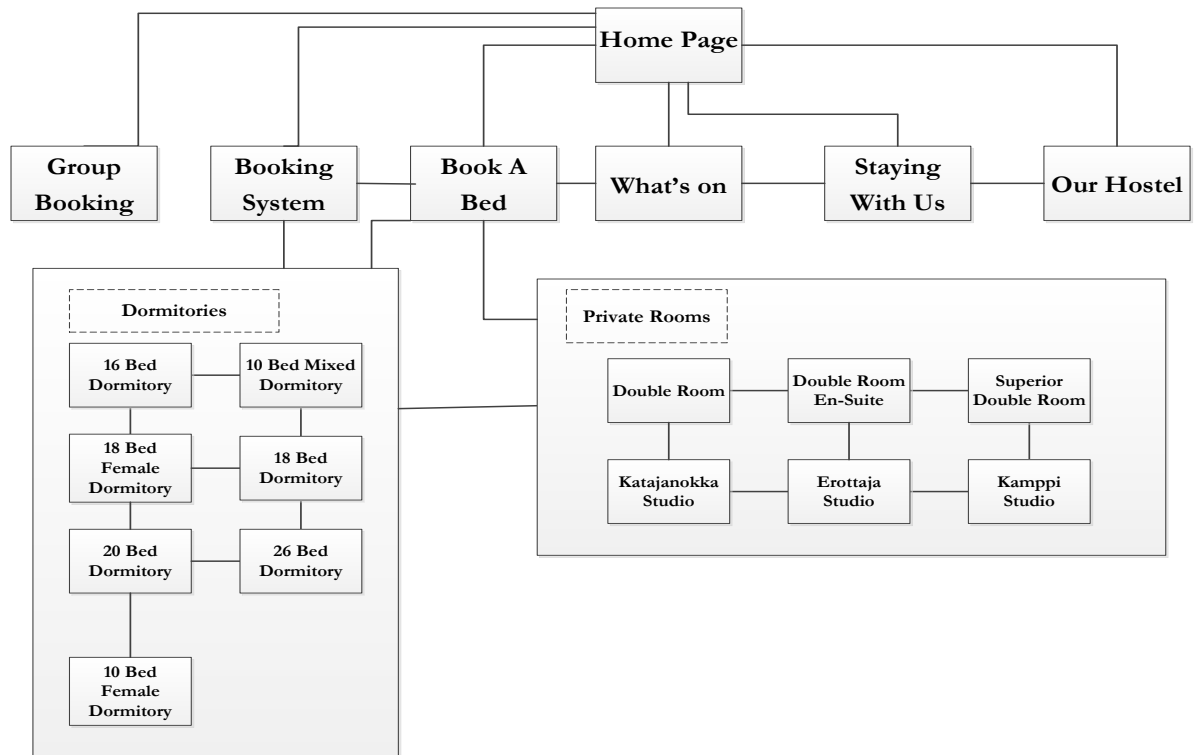


Figure 11: CheapSleep business website blueprint

5.2 User Analysis

The target customer groups of CheapSleep Finland Oy are young people age from 18 years old to 35 years old including foreign travellers, backpackers and students. Just like its slogan “Sleep cheap, stay rich” which is perfect suitable for travellers with low budget.

According to Google Analytics, the data from 1st January of 2013 to 1st January of 2014 showed that the total pageviews of the website were 61,483. The total session number and users were 30, 535 and 24,658 respectively. Based on the data given on Google Analytics (Figure 12), the biggest amount of users was from Finland (47.55%), following with Russia (13.97%) and Germany (4.03%). The most popular browser used

to view the website was Chrome. The Firefox and IE were the second and third widely-used browsers (Figure13). Figure 14 provides number of users viewing the website weekly from 1st January of 2013 to 1st January 2014.

Country / Territory	Sessions	% Sessions
1. Finland	14,520	47.55%
2. Russia	4,265	13.97%
3. Germany	1,232	4.03%
4. Estonia	1,065	3.49%
5. United Kingdom	1,015	3.32%
6. Spain	697	2.28%
7. Sweden	569	1.86%
8. France	544	1.78%
9. Italy	511	1.67%
10. Netherlands	427	1.40%

Figure 12: A list of top 10 countries viewing CheapSleep business website from 1st January of 2013 to 1st January 2014

Browser	Sessions	% Sessions
1. Chrome	12,716	41.64%
2. Firefox	7,399	24.23%
3. Safari	4,059	13.29%
4. Internet Explorer	3,745	12.26%
5. Android Browser	1,198	3.92%

Figure 13: A list of top 5 browsers used to view CheapSleep Finland Oy business website from 1st January of 2013 to 1st January 2014



Figure 14: Number of users viewing the CheapSleep Finland Oy business website weekly from 1st January of 2013 to 1st January 2014

5.3 Heuristic Evaluation Test

This session provides Heuristic Evaluation test objectives, methodology, and test results and analysis. A pre-defined list of heuristic usability principles and severity rankings were used for Heuristic Evaluation. The evaluator checked main pages of CheapSleep business website, and reported results and analysis.

5.3.1 Test methodology and objectives

Heuristic Evaluation for CheapSleep business website is conducted by only one evaluator. The evaluation focuses on main functionalities of the website, which include making a reservation, providing clear hostel information and making products promotion. The evaluator goes through main pages (Homepage, “Book A Bed”, “What’s on”, “Staying with us” and “Our Hostel”) and booking system pages; inspects each page based on the predefined Heuristic principles. Violated problems are compared and analyzed by predefined Heuristic usability principles and severity ranking.

The purposes of this evaluation are to conduct a primary usability test and identify both major and minor usability drawbacks of the website. The revealed usability problems are analyzed and ranked. Selected areas will be investigated further by Simplified Thinking Aloud test.

5.3.2 Evaluation criteria and severity rankings

Heuristic Evaluation is a relatively cheap and easy way to discover possible usability problems. It is quite suitable for a small and limited budget company, like CheapSleep Finland Oy. Heuristic Evaluation does not involve the “real user”. Therefore, Identified problems will be tested and assessed by extensive user testing later.

Heuristic evaluator can choose the wanted Heuristic usability principles. This Heuristic Evaluation is based on ten Heuristic Evaluation principles suggested by Jakob Nielsen. Table 1 gives the 10 Heuristic principles used in this Heuristic Evaluation:

Table 1: Ten Heuristic Evaluation principles

Number	Heuristic Evaluation principles
1	Simple and natural dialogue (Aesthetic and minimalist design)
2	Speak the users' language
3	Minimize user's memory load
4	Consistency
5	Feedback
6	Clearly marked exits
7	Shortcut
8	Good error message
9	Prevent errors
10	Help and document

In order to value and understand the impact of found problems, severity rankings are used in this process. According to Jakob Nielsen (1995), the severity of a usability problem is combinations with frequency of problems occurrence, impact of occurred problems and persistence of problems. The problems severity rankings are created on the basis of these three items on five levels (0-4). Show on the Table 2:

Table 2: Severity ranking with five levels (0-4)

Severity Ranking	
Ranking	Definition
0	It doesn't seem to be a usability problem.
1	Cosmetic usability problem: user can easily overcome it; or it happens extremely infrequently. Does not need to be fixed only if extra time is available on project.
2	Minor usability problem: has low priority to fix it. Happens more frequently or more difficult to overcome.
3	Major usability problem: has high priority, important to fix. Happens frequently and persistently or users are unable or unaware of fix the problem.
4	Usability catastrophe: must fix it before product released. Impairs use of product and users cannot overcome it.

5.3.3 Test results and analysis

Main pages (Homepage, “Book A Bed”, “What’s on”, “Staying with us” and “Our Hostel”) and booking system were checked for Heuristic Evaluation. 8 problem areas were identified that violated the predefined Heuristic usability principles. These problems are prioritized below in Table 3.

Table 3: Usability problems found in Heuristic Evaluation

No.	Problems	Severity Ranking	Heuristic Number	Heuristic Principles
1	“What’ on page” is not necessary	3	1, 2, 3	Simple and natural dialogue. Speak the users’ language. Minimize user’s memory load
2	Some description does not correspond with user’s language.	2	2	Speak the users’ language.
3	Apartment and Private room are in the same category, not clear information.	3	1,3	Simple and natural dialogue. Minimize user’s memory load
4	Using company logo as Homepage button. User may not realize it is the home button.	1	1,3,7	Simple and natural dialogue. Minimize user’s memory load. Shortcut
5	Color combination of links on homepage makes links not easy to found, not visual clearly for users.	1	1	Simple and natural dialogue
6	The change between booking system and main website cause inconsistency. The booking page has no clear button to return homepage	2	4,7	Consistency. Shortcut
7	There is no undo commands support in the booking process.	2	6	Clearly marked exits
8	There is no Validation for emails, letters and empty input textbox in boosing system	2	9	Prevent errors

Problems from 1 to 6 are discussed in this session. Problem 7 and 8 cannot be modified and fixed in-house; they belong to the booking system which is an outsourcing

system. Only the outsourcing company can modify and solve problem 7 and 8. The CheapSleep Finland Oy doesn't have the ability to solve these problems. Therefore, problem 7 and 8 are not discussed in this thesis.

Problem 1: “What’s on” page is not necessary.

The name of “What’s on” is quite confused. It does not clearly indicate what this page is and the functionality of this page. Problem 1 violated the principle of speak the users’ language.

“What’s on” page introduces scenic spots, museums, galleries, restaurants and saunas around in Helsinki. Most of these places are not near to the hostel. There is no directly business relationship between the hostel and most of these places. According to simple and natural dialogue, less is more and irrelevant or rarely needed information can be removed or hidden. The “What’s on” page is not necessary.

After having two new products, group booking and apartment, “What’s on” page appears more useless and holds an important seat on navigation bar. This page also increases user’s memory load on these information which is not related to the hostel.

In Severity Ranking, it marked as a major problem. This page can be replaced by “Group Booking” or “Apartment” on the navigation bar. This kind of replacement is available to enhance new products promotion and reduce user’s memory load.

Problem 2: Some description does not correspond with user’s language.

As “What’s on” mentioned above, there are some other unusual names utilized on CheapSleep business website. They are shown in Table 4. The names in compared group (normally used names) are found on other Helsinki hostels’ websites. The hostels’ websites include Euro hostel, Stadion Hostel, Hostel Erottajanpuisto, Vuokrahuone Design Accommodation and Hostel Suomenlinna.

Problem 2 is a minor usability problem. Users may confuse at the first place, but not hard to overcome it.

Table 4: Names comparison between CheapSleep website and other hostels' website

Names used by CheapSleep website	Normally used names
Staying with us	FAQ, Services
24 hour check-in	24 hour open
Get social	Social media, follow us on social media
Getting there	Find your way, public transport to hostel
Book a bed	Rooms, Our Rooms

Problem 3: Apartment and Private room are in the same category, not clear information.

CheapSleep Hostel has three different room types (products), which are Dorm Room, Private Room and Apartment. Apartment is a relatively new product in CheapSleep which has three apartments located in different places in central area of Helsinki. Apartment includes Kamppi studio, Katajanokka Studio and Erottaja Studio. The other product - Private Room includes Double Room, Double Room En-Suite, and Superior Double Room. Private Room and Apartment are two different and independent products. Their information should be separated.



Figure 15: Apartment information under private room list

However, Private Room and Apartment information are under the same category (Private room) right now (Figure 15). All information lists on an alphabetical order.

Apartment information mixes with Private Room information which is quite messy and confused.

Problem 3 violated simple and natural dialogue. The information should appear in natural order and matches user's expectations. Related information is graphically clustered. Problem 3 is a major usability problem; users may be unable or unaware of fix the problem. This problem leads to a huge potential lost to CheapSleep hostel. Customers may confuse about products' information and leave the website.

Problem 4: Using company logo as Homepage button. User may not realize it is the home button.

On navigation bar, there is no clear homepage button; the website uses company logo as homepage button (Figure 16). User may not realize it is the home button. Although Problem 4 is against three Heuristic principles, it is only a cosmetic usability problem. Problem 4 can easily overcome by user or occurs extremely infrequently.



Figure 16: Navigation bar of CheapSleep Hostel website

Problem 5: Color combination of links on homepage makes links not easy to found, not visual clearly for users.

The homepage provides links to other pages (Figure 17). Some links are only available on the homepage, such as "Group Booking" page and main Apartment booking system page (Special Offer for City Center Apartment). The color combinations, light green background color and white font, make the link "Read more" and even the link's name are not apparent enough to read, particularly for people with color weakness.

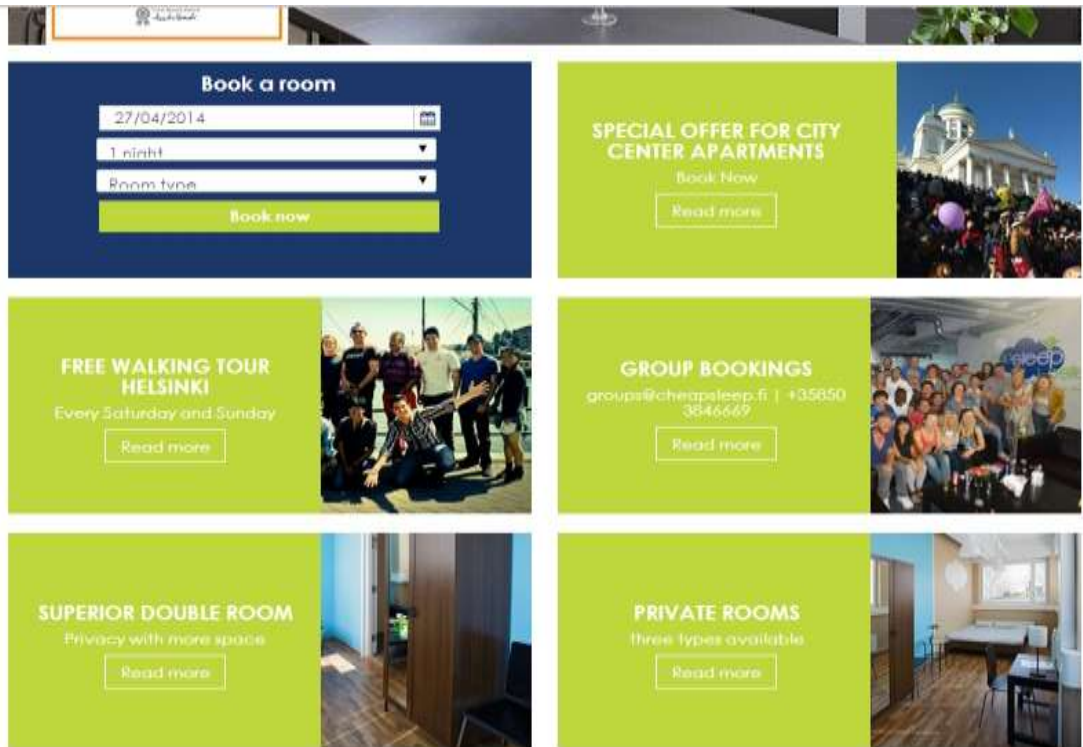


Figure 17: Main Apartment booking system page and group booking on Homepage

Problem 5 is against simple and natural dialogue. It is a cosmetic usability problem. This problem may cause a difficulty of reading the website.

Problem 6: The change between booking system and main website cause inconsistency. The booking page has no clear button to return homepage

Consistency between website and booking system is the code problem on CheapSleep business website. The booking function is the key function for business. There are at least 15 pages link to the booking system pages in various ways.

The evaluator found out the inconsistency among homepage, hostel booking system page and apartment booking system page (Figure18, 19, 20). The consistency in Heuristic principle indicates that vocabulary, labeling, and functionality need be consistent as a whole with specific tasks and across the interface.

Among homepage, hostel booking system page and apartment booking system page, they use different background colors and company logos. Functions of company logo on each page are also distinct. On Figure 18, the company logo works as a homepage button. However, the company logo on Figure 19 and 20 has no function. Customers

may confuse about the functions of company logo and wonder if they are still in the same website or not.

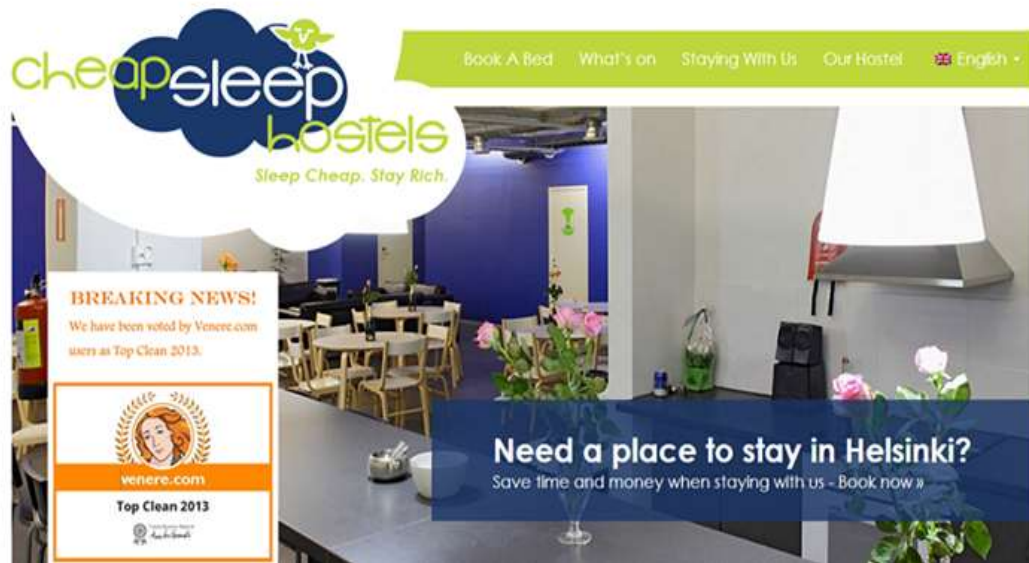


Figure 18: The homepage of the CheapSleep business website



Figure 19: Hostel booking system page of the CheapSleep business website



Figure 20: Apartment booking system page of the CheapSleep business website

Besides on some booking system pages, there is no or no apparent “go back homepage” link/sign. The shortcut principle was violated in this case. Figure 19 and Figure 20 give examples on main hostel booking system pages and main apartment booking system pages. The “Return to main website” link is too small and unimpressive to find. Problem 6 is marked as level 2, a minor usability problem. Because plenty of hostel customers gave positive comments to the hostel booking system, they are able to overcome this problem easily.

5.4 Simplified Thinking Aloud Test

Simplified Thinking Aloud test was implemented after the Heuristic Evaluation. Seven participants joined into the Simplified Thinking Aloud test. All necessary information and test documents are presented in this thesis. This session introduces test objectives, research questions, test methodology, test timetable, participant characteristics, test design, and test environment. A detailed test results and analysis are provided at the end of this session. All documents used in the test are listed on Attachment part. Attached documents (Attachment 1-5) include participants' background questionnaire, test introduction paper, task list paper, data collection form, and process models of each participant.

5.4.1 The objectives of the test

There are two objectives of Simplified Thinking Aloud test. The first purpose is to inspect the overall functions and booking effectiveness of CheapSleep Finland Oy business website (www.cheapsleep.fi). The second purpose is to investigate usability problems (problem 1-6) found in Heuristic Evaluation.

5.4.2 Research questions

A list of research questions are defined before the Simplified Thinking Aloud test. Test plan and test design are created according to these research questions. The research questions are as follows:

- Can users find information about the bed or room they are looking for? (problem 3,5)
- Do the users go directly to the page where they can find information about the bed or room? If they don't, why not? (problem 3,5)
- Can users return from other pages back to the home page? (problem 4)
- Can users book a bed or room? (problem 6)
- What paths do the users use to make a bed or room reservation?
- Does the website support the users when they are looking for the bed or room?
Can user find the support from the page?

- Does the user feel comfortable in the site?
- What problems do the users have when they make a reservation on the website?

5.4.3 Methodology

Simplified Thinking Aloud test aims at aggregating assessment data about the effectiveness of CheapSleep business website (www.cheapsleep.fi) from “real” users, and investigating results from the previous Heuristic Evaluation. There are six participants divided into two groups. One group is three participants with IT background; the other group is three participants without IT background. Each participant need to finish a series of tasks while thinking aloud. The test of each participant is recorded by video camera at the HAAGA-HELIA lab room.

Each participant obtains three pieces of paper before starting the official test. Participant fills the background questionnaire paper (Attachment 1) first. Then the participant gets the introduction paper (Attachment 2). He or she needs to read and know what Simplified Thinking Aloud test is, and what he or she will do during the test. The participant signs the paper to approve that he or she is agree to take a video record for the test.

Participant receives the task paper (Attachment 3). Cameras start to record. When the participant says “I am ready to start”, the official test starts. At the end of the last task, when the participant says “I am done”, the test is officially end. The observer makes a post-test interview after the official test. The observer asks questions about general ideas of the CheapSleep business website from each participant.

The purpose of this test is to observe participants using CheapSleep hostel website to make reservations and find necessary hostel information. During the test, participant is working on his or her own. The participant tells what he or she is doing and why he or she is doing it. At the same time the observer makes notes and records the test. The observer may ask questions while the participant is doing the task. The observer sets in the observation room. All equipment in the lab room is to make sure the observer’s notes are accurate. The test video is only used for thesis study.

Performance Data and Preference Data are collected and used for test results analysis. Successful Completion Criteria are defined before the test, which use to cooperate with the Performance Data and Preference Data for tasks evaluation.

5.4.4 Test design

Each participant takes approximately 30 to 45 minutes to finish Simplified Thinking Aloud test. The test consists of three parts, which are pre-task introduction, tasks conduction and post-test interview. Each participant must finish all three parts. Tasks conduction and post-test interview are recorded by video cameras.

Pre-task introduction

Pre-task introduction uses approximately 10 to 15 minutes. The pre-task introduction helps participants to understand what Simplified Thinking Aloud test is, what he or she will do during the test, and also get participant's personal background. It is essential for participants to feel relaxed, so he or she can present as natural as usual for tasks. The observer can get relatively reliable data for participants' reactions. The missions need to be finished including:

- Participant fills out the background questionnaire (Attachment 1)
- Participant reads the Introduction paper (Attachment 2) and signs the paper for recording permission.
- Participant can ask questions to observer about the test.
- The observer can show a sample of how to do the Simplified Thinking Aloud test or give an explanation of what Simplified Thinking Aloud test is.

Tasks conduction

Task conduction takes about 20 to 30 minutes. Task list paper (Attachment 3) shows a list of specific tasks on www.cheapsleep.fi that participants need to finish. Participant is asked to perform these tasks in the way he or she is used to do a hotel booking in the daily practice. The participant must say aloud everything that he or she thinks or does when tasks are finished. Tasks must be done one by one and cannot be skipped. Each

task starts with the participant says aloud task number and “I am ready to start” and end with he or she says “I am done”.

Post-test interview

A post-test interview is arranged after task conduction. It takes 5 to 10 minutes. The observer asks broad questions for preference and other qualitative data collection. The post-test interview questions are as follow:

- Could you complete the tasks that were given to you? Was it easy for you?
- Was it easy to do the reservation?
- What do you think about the website?
- Did everything work as you expected?
- Was it easy to find the button to the home page?
- What do you think about the hostel information? Is it clear and easy to understand?

5.4.5 Test environment

Simplified Thinking Aloud test was took place at HAAGA-HALIA computer lab room 4005, Ratapihantie 13, Helsinki. The lab room 4005 has a testing room with two-way window to an observation room. (Figure 21)

In the testing room, participants use a laptop with Window 7 system and Google Chrome with a high-speed connection to the HAAGA-HELIA internet. The testing room has two video cameras that used to capture how participants are doing the test. Video camera 1 uses to capture the participants’ face; Video camera 3 records what is happening on the screen and collects other data. A microphone is set beside the laptop in order to record the participants’ voice.

The observation room includes monitors for video camera 1 and video camera 3, DVD burner and all other control equipment. The observer sets in the observation room and observes participants through monitors and the window.

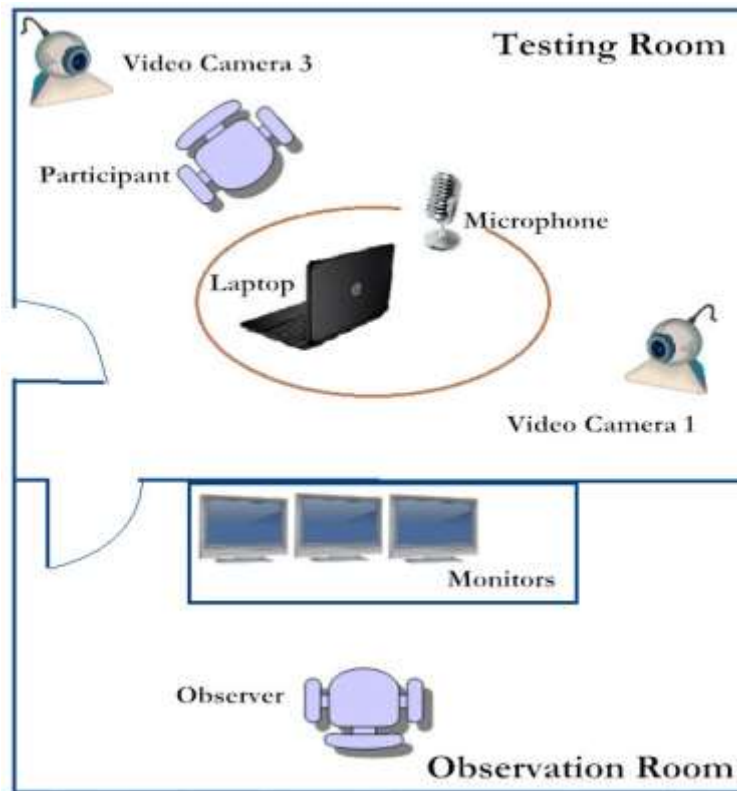


Figure 21: Lab environment for Simplified Thinking Aloud test

5.4.6 Data collection methods and Successful Completion Criteria

In Simplified Thinking Aloud test, both Performance and Preference Data are collected. All elements of Performance and Preference Data are defined before the test creation.

Performance Data are reviewed and collected by video record (DVD) and data collection form. The elements considered in the Simplified Thinking Aloud test include:

- Counts and rates
 - Number of errors(incorrect selection) and types
 - Percentage of tasks completed successfully
 - Count of call for helps
 - Number of omitted steps and types
- Time duration
 - Time to complete a task

Preference Data are mainly aggregated from the post-test interview. The considered Preference Data elements include as follows:

- Ease of use over all
- Ease of learning overall
- Appropriateness of Website Functions to user’ tasks
- Usefulness of terms and labeling
- Count of negative comments

Successful Completion Criteria (SCC) is used to measure and view tasks. It defines the boundaries of tasks and clarifies the test scoring. Table 5 lists the SCC for Performance Data. For Preference Data, SCC is based on comments in tasks conduction and post-test interview.

Table 5: Successful Completion Criteria (SCC) for Performance Data

Time duration	Individual task accuracy	Maximum number of errors	Maximum number of call for help	Maximum number of give up tasks	Maximum number of omitted steps
Less than 30 minutes	60%	6	3 times	3	4

Acceptable omitted steps are “Go back to homepage” on Task 1 and Task 2. They are not mark as errors, if participants neglect these requests. Some participants may mix up with dorm room and private room. In some hostels, private room belongs to dorm room type. This ambiguous understanding may affect the task accuracy on Task 3 (Attachment 3).

5.4.7 Timetable of the Simplified Thinking Aloud test

Simplified Thinking Aloud test was carried out from 02 June to 05 June and 09 June (Table 6). There were 7 testers participated in the usability test. The testers’ names are not published in the thesis. In order to distinguish different testers, their names are used as “Tester” adding the fist letter of their fist names. Although there were 7 participants, only 6 participants’ test data are used in this thesis.

Table 6: Schedule of conducting Simplified Thinking Aloud test

Day	Time	Participant name
02. June	10:00 -12:00	Set up the lab for usability lab
	12:00-14:00	Tester D (unofficial) Tester N
03. June	10:00-11:00	Tester T
	12:00-13:00	Tester A
04. June	12:00-13:00	Tester B
05. June	9:00-10:00	Tester F
09. June	10:00-11:00	Tester X

Tester D was the first participant. His mission was to test the primary task list paper used for task conduction in Simplified Thinking Aloud test. The purpose for this mission was to test if questions on the task list paper were clear and easy to understand, and to find if there were any errors on the task list paper. Task list paper was updated on the basis of Tester D's performance and suggestions. Task 3.1 and Task 4.1 were modified. The original Task 3.1 and Task 4.1 questions were:

- Task 3.1 Choose the one dorm type you like/want to stay and find **more detailed information** about that dorm.
- Task 4.1 Choose one apartment hotel or studio you want to book and find **more detailed information** about that room.

The sentence “more detailed information” is too abstract, testers might confuse about what kinds of information they need to find. The questions need to be more precise. Task 3.1 and Task 4.1 had been modified to:

- Task 3.1 Choose the one dorm type you like/want to stay and find **a group of photo images** about that dorm.
- 4.1 Choose one apartment or studio you want to book and find **a group of photo images** about that room.

The objective and mission of Tester D in task conduction session are distinct with other test participants. Tester D used the different task list paper. In order to ensure the validity and reliability of test results, Tester D's test data doesn't include in the official test data.

5.4.8 Participants characteristics and questionnaire summary

There are two groups of participants in Simplified Thinking Aloud test; three people in each group. In Group 1, participants are students from Business Information Technology major of University of Applied Science in Finland. Participants from Group 2 are without IT educational background. They are chosen based on the user analysis results.

Simplified Thinking Aloud only tested the English version of CheapSleep business website. The English version is the main and the most modified version. The user analysis (Chapter 5.2) indicates non-native English speakers are the biggest user group of the website. Therefore, all chosen participants are non-native English speakers.

A questionnaire is used to collect participants' personal background. Two tables below present the summary of participants' background questionnaire:

Table 7: Group 1 - IT background group

Name	Age	Gender	Trips per years	Experiences of staying in hostel	Using hotel/hostel booking system
Tester N	21-25	Male	1-3	No	No
Tester A	21-25	Male	1-3	Yes	No
Tester F	26-30	Female	1-3	No	Yes

Table 8: Group 2-No IT background group

Name	Age	Gender	Trips per years	Experiences of staying in hostel	Using hotel/hostel booking system
Tester T	21-25	Female	1-3	No	No
Tester B	21-25	Male	4-6	Yes	Yes
Tester X	21-25	Female	1-3	Yes	Yes

Participants' background affects many elements in the usability test, particularly the success rate. Participants' background may explain why the success rate is so high or so low. Hostel is a relatively new product in Finland. A large number of customers have difficulties to identify the different between hotel and hostel. They don't have a lot,

even no experience of staying in hostel. The participants' background questionnaire proved this phenomenon. For instance, Tester N said "Yes, I heard of hostel. It is a much cheaper than hotel. But I have never stayed in hostel before." In this case, the ambiguous understanding of hostel definition may affect the success rate of test for some participant.

5.4.9 Results analysis and findings

Simplified Thinking Aloud test discovered 8 findings. Collection summary of Performance Data for each participant and each task are listed. Preference Data analysis and usability findings are discussed at the end of this session.

Two groups of participants joined in the test: Group A with IT background and Group B without IT background. Table 9 and Table 10 show the summarized data of individual participant collected from the video record (DVD) and data collection form.

Table 9: Data of individual participant for all tasks in Group A (IT background)

	Time duration (minutes)	Task accuracy (percentage)	Errors number (times)	Call for helps (times)	Negative comments (times)	Omitted steps (times)
Tester N	21	58%	4	0	5	0
Tester A	15	50%	6	0	2	2
Tester F	18	92%	1	0	8	0

Table 10: Data of individual participant for all tasks in Group B (No-IT background)

	Time duration (minutes)	Task accuracy (percentage)	Errors number (times)	Call for helps (times)	Negative comments (times)	Omitted steps (times)
Tester T	19	67%	4	1	6	1
Tester B	22	42%	6	1	8	0
Tester X	20	83%	3	0	3	2

Omitted steps of all participants were "Go back to homepage" on Task 1 and Task 2. Call for help of Tester T happened on Task 2, who said "There is too much information. So I lost." Tester B called for help because he couldn't find apartment details.

Task accuracy rate is low on Tester N, A and B with 58%, 50% and 42% respectively. The reason for the low rate is because the ambiguous description of hostel products. Process models (Attachment 5) indicate Tester N was confused about the products between Private room and Apartment on Task 4. Tester A and Tester B were mess with all products the CheapSleep Hostel had. Tester B had big difficulty to find Apartment information.

Among negative comments from tasks conduction, the most mentioned comments were “too much information”. Hostel is new in Finland. CheapSleep hostel has many different products. Description should be present as simple as possible. Sometimes, too much and detailed information does not appeal to users. Less is more.

Table 11 presents percentage of each task’s accuracy, mean time to finish each task, and standard deviation of completion times. Standard deviation is used for data comparison. It is an indicator more accurately than using the longest and shortest completion times. According to Successful Completion Criteria (SCC) predefined before, the tasks with Bold Font and light grey background color in Table 11 did not meet the SCC.

Table 11: Performance Data of individual task for all participants

Tasks	Percentage of participants performing correctly	Mean time (minutes)	Standard deviation (minutes)
Task 1	100	2	0.4
Task 2	100	2	0.49
Task 3	50	1.5	0.24
Task 3.1	67	2	0.56
Task 3.2	83	1.83	0.34
Task 3.3	20	1	0
Task 4	33	1.5	0.24
Task 4.1	67	1.83	0.69
Task 4.2	67	1.33	0.23
Task 4.3	20	1	0
Task 5	100	2.2	0.44
Task 6	100	1.33	0.23

Task 3: How many dorm types does the Hostel have?

The success rate of Task 3 is only 50%. In fact, all participants found places that can check the number (Attachment 5). Some of them chose private room instead of dorm room. The ambiguous understanding of hostel products leads to the low success rate. The unclear description is another reason. “Book A bed” page has clear category of dorm and private room. However, only two participants checked on that page. Most participants thought it was a booking page that they could make a reservation.

Task 4: How many apartment or studios does the Hostel have in Helsinki?

This is a major problem for CheapSleep business website. Most participants had difficulties on this task. Process models (Attachment 5) show that participants went to each page in order to find out the answer. The possible reasons include:

- Hostel uses multiple names on this product. The company named this product as “apartment” and used this name at many places. For example, on the homepage, the product’s name is apartment at “apartment” booking box. On the booking system page, product’s name is studio (Kamppi studio, Erottaja studio, Katajanokka Studio).
- There is no category of Apartment on “Book A bed” page. Apartment products are list under Private Room category. Tester F gave a comment in post-test interview “there should be a separate category for apartment and private room on “Book A book” page”.
- The color combination of word and background of the Apartment link is not apparent and hard to make users’ attention on homepage.
- Some participants went to “Our Hostel” page and wanted to find apartment information. However, there is no word for apartment on hostel description part. This part only mentions about dorm room and private room. (Figure 22)

Our Hostel

When you think of a cheap hostel in Helsinki, think of us! CheapSleep Helsinki is a relaxed, affordable and modern hostel located in the historic Vallila district of Helsinki.

Completely renovated before opening in May 2012, all of our private rooms, dormitories, and common areas, are fresh, clean and modern.

With a total 118 dorm beds and 10 private rooms, we offer a relaxed and social atmosphere, great access to local sights and services, in addition to good night's sleep. We never ask you to make your bed or strip the sheets afterwards, just arrive, drop your bags and relax.

Figure 22: Hostel description on Our Hostel page

Task 3.3 and Task 4.3: Go back home page from booking system page.

There is no homepage button on the booking system pages (Figure 23). At main booking pages the “return to main website” link is too small to read. There was only one participant found right paths going back from booking system pages to homepage.

The screenshot displays the 'Kampppi Studio' booking page on the CheapSleep Apartments website. The page includes a description of the studio, a 'Step 1' instruction to select the number of apartments and stay dates, and a search form. The search form shows 1 apartment selected for a stay from August 2nd to August 5th, 2014. Below the form is a calendar grid for August 2014. The grid shows prices for 'Kampppi Studio' for each day: €70 (Sat 02), €68 (Sun 03), €69 (Mon 04), €69 (Tue 05), €69 (Wed 06), Sold (Thu 07), Sold (Fri 08), Sold (Sat 09), Sold (Sun 10), Sold (Mon 11), Sold (Tue 12), €99 (Wed 13), Sold (Thu 14), and Sold (Fri 15). A note at the bottom of the grid says 'Move the mouse over the price for inclusions, occupancy and minimum stay'.

Figure 23: Booking system page for CheapSleep business website

Preference Data was collected in post-test interview and tasks conduction. Four Preference Data elements: ease of use over all, ease of learning overall, appropriateness of website functions to user' tasks and usefulness of terms and labeling are considered in Successful Completion Criteria (SCC).

In the post-test interview, all participants agreed the website were easy to use; the learnability was good. The negative comments given by four participants on “Staying with us” page, which had too much information and the font was not easy to read.

Participants gave high grade on booking system. They mentioned that the booking system was quite easy to use, and gave clear and overall information. They particularly liked the “Book a room” box on the Homepage. But participants had problems to go back to homepage from booking system pages. They used return function from browser, because they didn’t find the button for returning to the homepage.

For standard of usefulness of terms and labeling, Group A gave the comments of useless for “What’s on” page; Group B also said they didn’t know what “What’s on” page for. Some participants misunderstood the “Book A bed” page was a page that they could make a reservation instead of finding all hostel room information. They believed the detailed hostel room information could be found on “Staying with us” or “Our Hostel” page.

The biggest problem is the ambiguous description of apartment. All participants gave negative comments about Apartment description; and still quite confused even after finished all tasks. Tester B even said “I couldn’t find it. It is too difficult, I want to give up.”

In brief, findings of usability problems in Simplified Thinking Aloud test are summarized below:

- **Finding 1**, shortcuts between Homepage and booking system pages are difficult to find. The word font and color are not apparent.
- **Finding 2**, too much information is on “Staying with us” page.
- **Finding 3**, the function and meaning of “What’s on” page is not obvious. The “What’s on” page can be removed.
- **Finding 4**, name of “Book A bed” page is ambiguous. Customers may misunderstand the page’s function.
- **Finding 5**, description of Apartment is messy and not clear. On the “Book A bed” page, Apartment mixed with Private Room category.
- **Finding 6**, there is no description about Apartment on “Our Hostel” page.

- **Finding 7**, the color combination of word color, font and website background color is not apparent to read and hard to catch their attention, particularly on Homepage and booking system pages (Figure 24).
- **Finding 8**, the chosen date on “Book a room” box is not match with the date shown on the system page. The booking system page only shows prices that start from the current date. For example, one customer wants to make a reservation on 30.08.2014. He chooses the date and room type on the “Book a room” box, clicks “Book now” going to the booking page. The page shows the prices from the current date instead of the chosen date (Figure 24). Customers need to search again for the chosen date on the booking page. This error was found by all participants in Group A.



Figure 24: Booking system error found by Group A

5.5 Summary of two usability tests and recommendations

Two usability tests, Heuristic Evaluation and Simplified Thinking Aloud, were conducted on CheapSleep business website. Both tests found 8 problems. Simplified Thinking Aloud test was successfully investigated usability problems (Problem 1 to Problem 6) found in Heuristic Evaluation as well as tested the overall functions and effectiveness of the website. Results comparison shows usability problems found in both tests are:

- Shortcuts between Homepage and booking system pages are difficult to find. (Problem 6, Finding 1)
- “What’ on page” is not necessary (Problem 1, Finding 3)
- Some description does not correspond with user’s language. (Problem 2, Finding 4)
- Apartment description is ambiguous. (Problem 3, Finding 5)
- The color combination of word color, font and website background color on Homepage and booking system page is not clear to read. (Problem 5, Finding 7)

The overall function and effectiveness of CheapSleep business website is good. The website satisfies users’ requirements for looking hostel information and making a reservation. Test participants gave positive comments and high grade for the booking system. Easy of use and good learnability of the website were mentioned several times in the post-test interview. However, major usability problems should be highlighted. The major usability problems are classified on the basis of usage overcoming and impact of website function and effectiveness. There are two major usability problems.

Major Problem 1: Apartment ambiguous description.

As an important product of the company, unclear Apartment information in Homepage, “Book A Bed” page and “Our Hostel” page cause difficulties for users. It was found in Heuristic Evaluation and proved in Simplified Thinking Aloud. This situation seriously influences usability and user experience to the website, which leads to lose of customers and sale.

Major Problem 2: “What’s on” page can be removed.

The function of “What’s on” page is not directly related to company’s business needs. It violated the Heuristic principles. Simplified Thinking Aloud test also proved the inutility of this page.

Other usability problem mentioned here is color combination of word color, font and website background color on Homepage and booking system page. It does not belong to a major usability problem. This usability problem may cause difficulty of reading, particularly to user groups like color amblyopia, middle-aged and aged people.

Recommendations are given based on usability tests results. In Figure 25, words with underline are modified aspects. “What’s on” page is replaced by “Our Apartment” page. Apartment is separate from Private Room categories. Names of apartments, Kamppi studio, Katajanokka Studio and Erottaja Studio, are changed to Kamppi Apartment, Katajanokka Apartment and Erottaja Apartment. Name of “Book A Bed” changes to “Our Rooms”. Apartment description adds in “Our Hostel” page. The change of color combination of word color, font and website background color on website needs to be considered, but with deeper investigation.

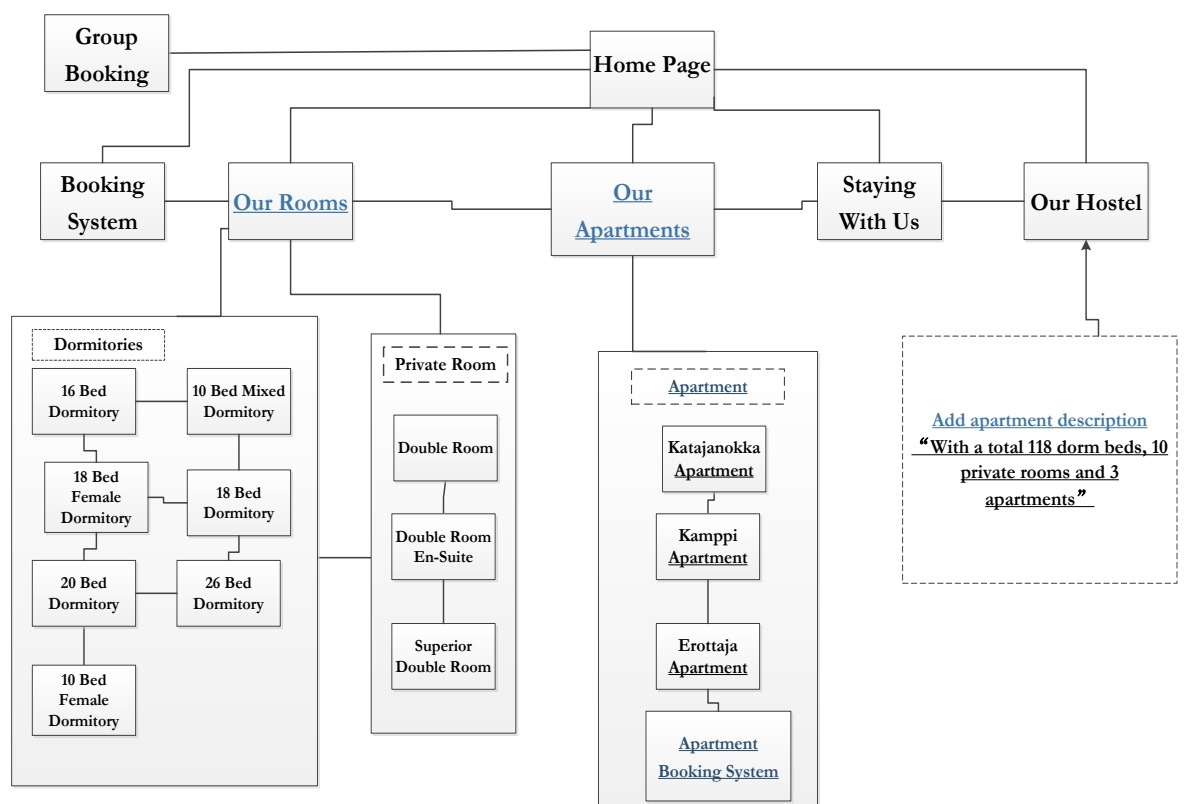


Figure 25: Recommendation of updated CheapSleep business website blueprint

On the whole, usability of the CheapSleep business website is not bad. The main functionality: booking system is pretty good and favorite to users. Some descriptions are not appropriate and confuse to users. With deeper investigations of these usability problems and user-centered solutions implementation, CheapSleep Finland Oy’s website maintainer will be able to make a well-designed website with even better usability and user experience.

6 Conclusion

More companies are using website as a window to communicate with their customers. A quality website is the key factor for business. Usability is a concept helps the company to establish an effective and efficient website in software development process. Adopting right usability approaches increase the project success rate. Usability test, on other hand, investigates whether the business website is qualified or not. Results of usability test provide evidence for if the website is useable for costumers and satisfy the business requirements of company.

Usability is a complicated concept. It can be seen as a design approach, a product attribute and measurement. There are many usability definitions and usability test techniques. Usability is also related to other concepts, such as user experience. Usability test can be cheap and easy to conduct. It is not a luxury that only big and international companies can afford. This thesis proved small and budget-limited company was also able to conduct a usability test. Discount Usability Engineering is the appropriate usability methods for small and budget-limit companies. Heuristic Evaluation and Simplified Thinking Aloud are two usability methods form Discount Usability Engineering. These two usability test methods were implemented on the CheapSleep business website. Plenty of usability problems were found and listed in this thesis.

Heuristic Evaluation requests usability evaluator to test the website by following heuristic usability principles. It is a relatively quick, cheap, and easy evaluation method. But Heuristic Evaluation doesn't involve "real user". One evaluator will miss some usability problems. It is better to use multiple evaluators and aggregate results. Heuristic Evaluation in this thesis only used one evaluator, who was the author. In order to provide the valid usability test results, Simplified Thinking Aloud was implemented after Heuristic Evaluation for deeper inspection.

The purposes for this Simplified Thinking Aloud were to investigate usability problems found in Heuristic Evaluation and inspect the overall website by "real users". Simplified Thinking Aloud provides how participants work around the website. The vivid and explicit commentaries given by participants reveal misconception and confusion.

However, Simplified Thinking Aloud test environment is under an unnatural situation. Participants maybe have difficulties to test and speak as the same time. The observer need to courage participants to speak if necessary sometimes.

Usability test delivers numerous benefits, particularly for E-commerce sales.

CheapSleep business website can be improved on the basis of the test results. Potential benefits brought by usability tests for CheapSleep Finland Oy are:

- Improving the competitive edge because of easy to use
- Customers find products that they want easily
- Satisfy with website and make repeat reservations
- Not need any support
- Trust the website
- Recommend to others

In short, the author believes the research project satisfies the objectives and goals created in the project plan. All research questions asked in Research Methodology chapter have been answered.

6.1 Test validly and reliability

The CheapSleep Finland Oy's business website has six language versions, which are English, Finnish, Swedish, Spanish, Russian and Chinese. All language versions are updated or modified on the basis of English version. Because of time limitation, usability tests (Heuristic Evaluation and Simplified Thinking Aloud) were conducted on the English version only.

Heuristic Evaluation was carried out by only one evaluator in this thesis. According to the data mentioned before (Chapter 4.3, Figure 9), the proportion of usability problems found by one evaluator was only about 27%. In order to provide valid and reliable data, the second usability test, Simplified Thinking Aloud, was created. In the second test, six official testers involved. Over 85% of the problems should be found based on Nielsen's data (Chapter 4.4, Figure 10).

There were no “real users” involved in Heuristic Evaluation. Simplified Thinking Aloud made a deeper investigation by using “real users”. The second test results proved findings from the Heuristic Evaluation, and found more user related usability problems. In Simplified Thinking Aloud test, the video record of Tester N was lost due to the DVD damage. The process model and test data were collected based on data collection form, and memory recall from the Tester N after finishing the tasks conduction. The tester N’s result can be used and has little influence to the whole test results of the Simplified Thinking Aloud.

The devices used in two usability tests were limited. Both usability tests were conducted on laptop only. The website working on PC, mobile phone and tablet were not tested in usability tests. The browser used to conduct both usability tests was Chrome only. Firefox and IE were not included in usability tests devices. These two usability tests can be seen as a part of the whole usability test project for CheapSleep Finland Oy business website, because of the devices limitation and language version limitation.

The tests’ results from Heuristic Evaluation and Simplified Thinking Aloud are valid and reliable. They indicate usability problems on website’s English version by using Google Chrome with laptop. The usability tests for other language version and devices can be considered for further usability research.

6.2 Further research

Usability tests results can be used for CheapSleep Finland Oy’s business website modification. Usability tests for modified website can be implemented. The old and new tests results can be compared to show if the old usability tests helped to improve the website usability. Usability tests for website’s other language versions can be conducted. The usability tests on other devices, such as mobile phone, PC or tablet, also can be planned for further research.

User Experience is related to usability and important to website. In this research, there is only a very brief introduction. The further research can be carried out on User Experience. There are also many usability test methods available right now. It is also inter-

esting to conduct a research on other usability test methods and the comparison among different methods.

6.3 Personal leanings

The research was carried out because I worked for website maintenance and development at CheapSleep Finland Oy. I understood the website was quite important for company business. During the daily work, I realized the website had usability issues and wanted to investigate.

A study research for usability, its related items and usability test methods was implemented. Appropriate usability test methods, Heuristic Evaluation and Simplified Thinking Aloud, were used for usability tests of CheapSleep business website. After this research, I think I can find more to learn in this field. For instance, I am interested about User Experience and wanted to make deeper research. I also wanted to conduct a User and Task Observation for usability test. But they couldn't be done because of time limitation.

Through this research, my knowledge and interest of usability and usability test methods have been improved. I had the experiences to design and conduct official usability tests, and analyze test results. More importantly, I had the opportunity to use the official and professional HAAGA-HELIA test lab to conduct my Simplified Thinking Aloud test. It was a great and valuable experience to me.

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Attachments

Attachment 1. Background questionnaire for Simplified Thinking Aloud test

Name:

Background questionnaire

1. What is your age?
 - a) Under 20
 - b) 21-25
 - c) 26-30
 - d) 31-35
 - e) Over 35
2. What is your gender?
 - a) Female
 - b) Male
3. In the last 3 years, how many trips did you take each year in average, and you stayed at least one night?
 - a) 1-3 trips per year
 - b) 4-6 trips per year
 - c) 7-10 trips per year
 - d) Over 10 trips per year
4. Did you have any experiences of staying in a hostel before?
 - a) Yes
 - b) No
5. Do you book the hotel/hostel by yourself or someone else?
 - a) Myself
 - b) Someone else
6. How did you book the hotel/hostel usually?
 - a) Online
 - b) On phone
 - c) Email
 - d) Others

Attachment 2. Introduction paper of Simplified Thinking Aloud test

Introduction of usability test

Thank you for agreeing to participate in the thinking aloud usability test today. This script is to provide information of what you are going to in the test.

The purpose of this test is to observe you using the CheapSleep Hostel website (www.cheapsellp.fi) to make reservations and find necessary hostel information. During the test, you will be working on your own and tell what you are doing and why you are doing it. At the same time I observe you and may ask questions while you doing it. I will set just on your left/right.

The test will be recorded. And I will take notes. All of the equipment in the room is to make sure that my notes are accurate. The test video is only used for thesis study. It will not be published on public social media, such as YouTube.

Guidelines for the test:

- The tasks are on the paper.
- You will in a moment receive a booking task. You are asked to perform this task in the way you are used to do a hotel booking in your daily practice. It is important that you say aloud everything that you think or do during the hotel booking.
- Do the tasks one by one. Please do not skip any tasks.
- Pick up the task paper and read the task number aloud. When you are ready to start, say "I am ready to start."
- When you have completed the task, please say aloud "I am done."
- When all tasks are done, I ask you some questions about the tasks.
Do you have any questions before we begin?

Please try to think out loud while you're working. Just tell me whatever is going through your mind. Please know that we're not testing you, and there is no such thing as wrong answer. Your doing this helps us understand what works or doesn't work about the site.

I have read the introduction of usability test, and agree to join the test.

Date / Month _____ Place _____ Signature _____

____ / ____ 2014 _____ (Participant)

____ / ____ 2014 _____ (Test organizer)

Attachment 3. Task list of Simplified Thinking Aloud test for participants

Task list:

The test starts when the user searches www.cheapsleep.fi from Google.

1 Are dogs allowed in CheapSleep Hostel? Where do you find information about it?

Go back to homepage.

Answer: _____

2 Are there any special offers for groups? Where do you find information about it? Go back to homepage.

Answer: _____

3 How many dorm types does the Hostel have? Answer: _____

3.1 Choose the one dorm type you like/want to stay and find a group of photo images about that dorm.

3.2 Check if the dorm room is available on 21 June. If it is available, write down the price.

Answer: _____

3.3 Go back to homepage.

4 How many apartment or studios does the Hostel have in Helsinki?

Answer: _____

4.1 Choose one apartment or studio you want to book and find a group of photo images about that room.

4.2 And check if the room is available on 21 June. If it is available, find the price.

Answer: _____

4.3 Go back to homepage.

5 Can you make a reservation for dorm several different paths from this website? If you can, how many paths can you find? Which one do you like best? And why?

Answer: _____

6 Can you make a reservation for apartment or studio several different paths from this website? If you can, how many paths can you find? Which one do you like best? And why?

Answer: _____

Attachment 4. Data collection form for Simplified Thinking Aloud test

Participant's name:

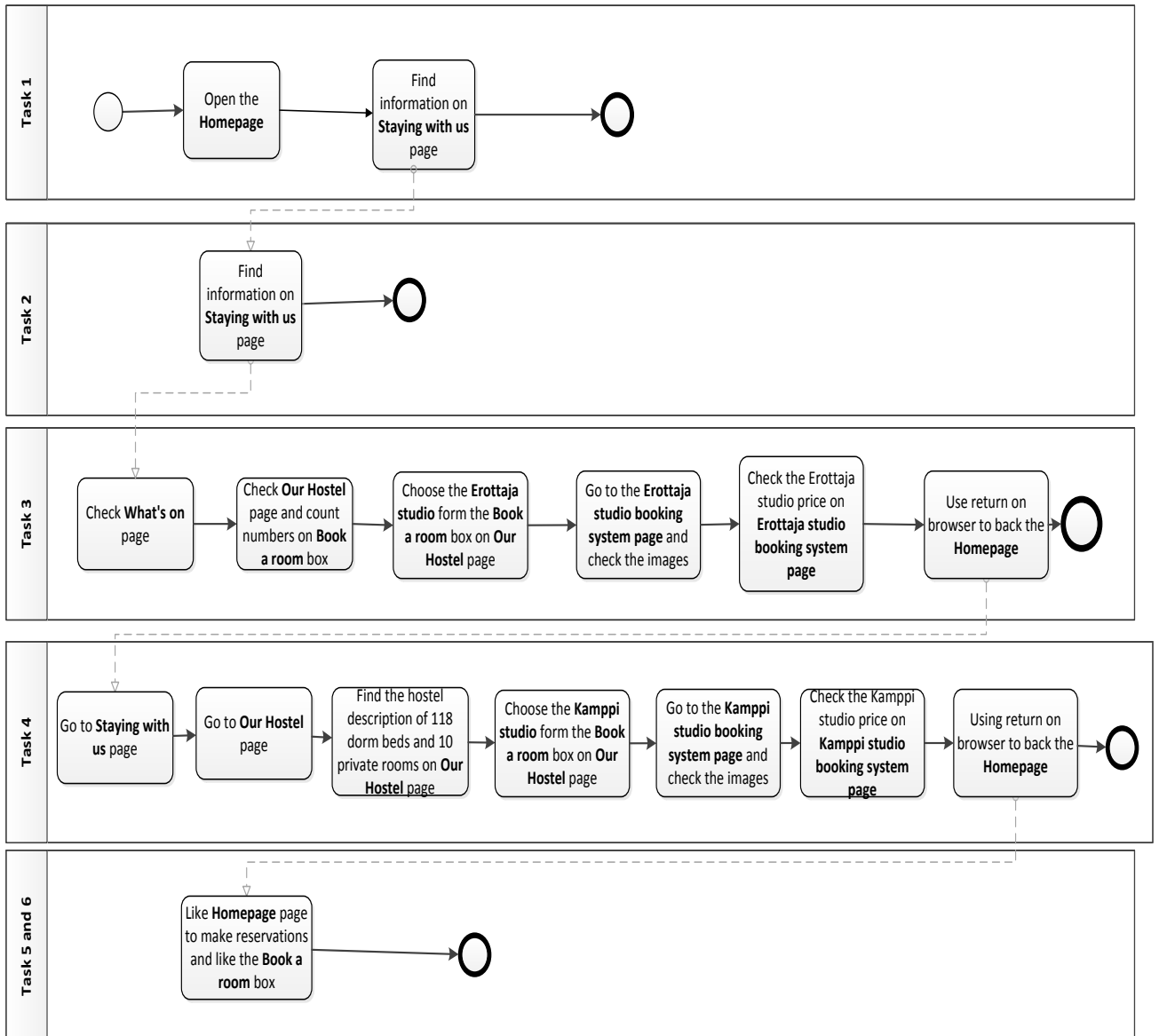
Start Time:

Task	Elapsed Time	Performance data		Notes	
1		Name	Number		
		negative comments			
		call for helps			
		Time to recover form an error:	Errors and types		
			omitted steps		
2		Name	Number		
		negative comments			
		Time to recover form an error:	call for helps		
			Errors and types		
			omitted steps		
3		Name	Number		
		negative comments			
		Time to recover form an error:	call for helps		
			Errors and types		
			omitted steps		
4		Name	Number		
		negative comments			
		Time to recover form an error:	call for helps		
			Errors and types		
			omitted steps		

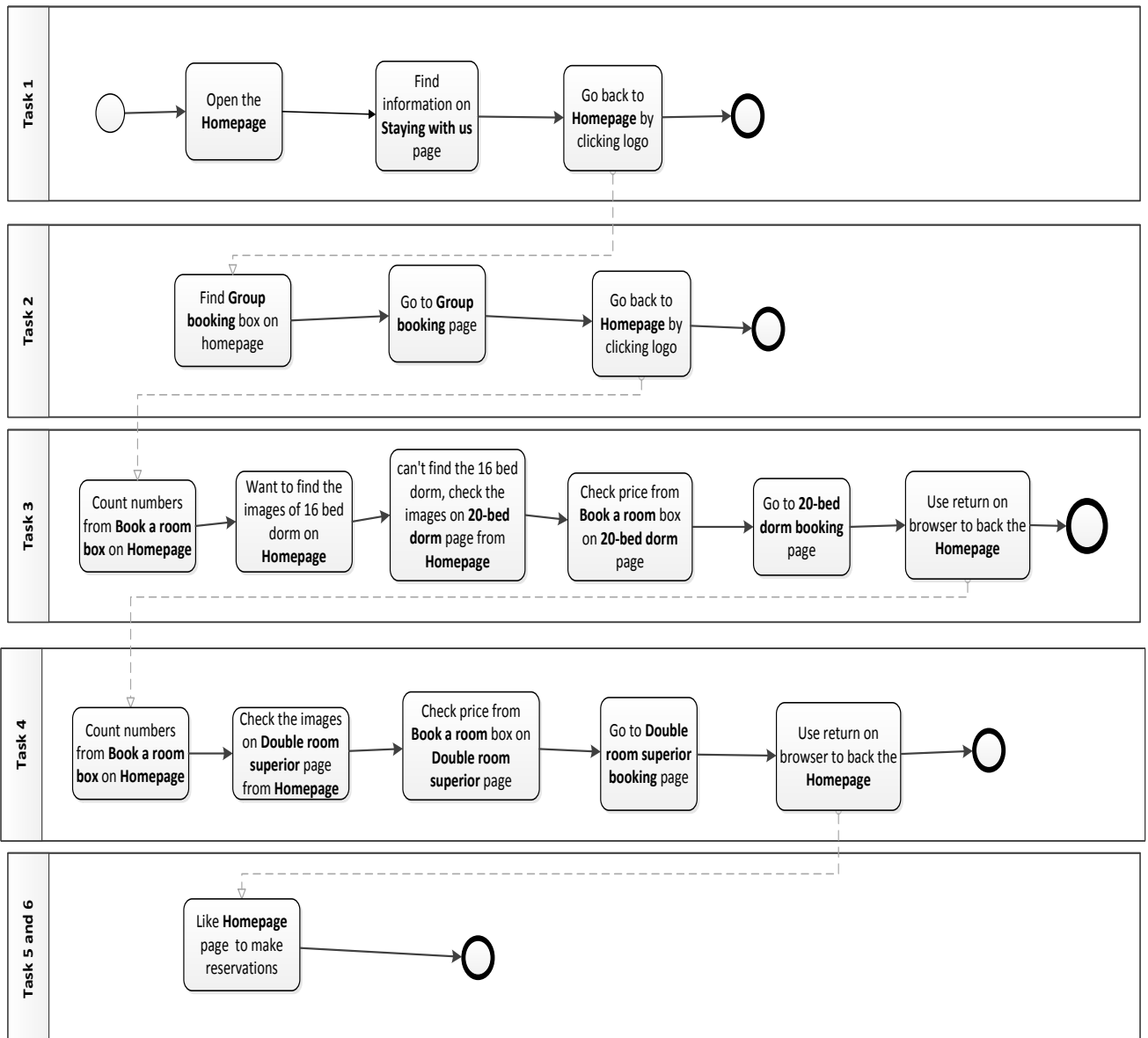
5		Name	Number	
		negative comments		
	Time to recover form an error:	call for helps		
		Errors and types		
		omitted steps		
6		Name	Number	
		negative comments		
	Time to recover form an error:	call for helps		
		Errors and types		
		omitted steps		

Attachment 5. Process models of Simplified Thinking Aloud test participants

Process Model for Tester A

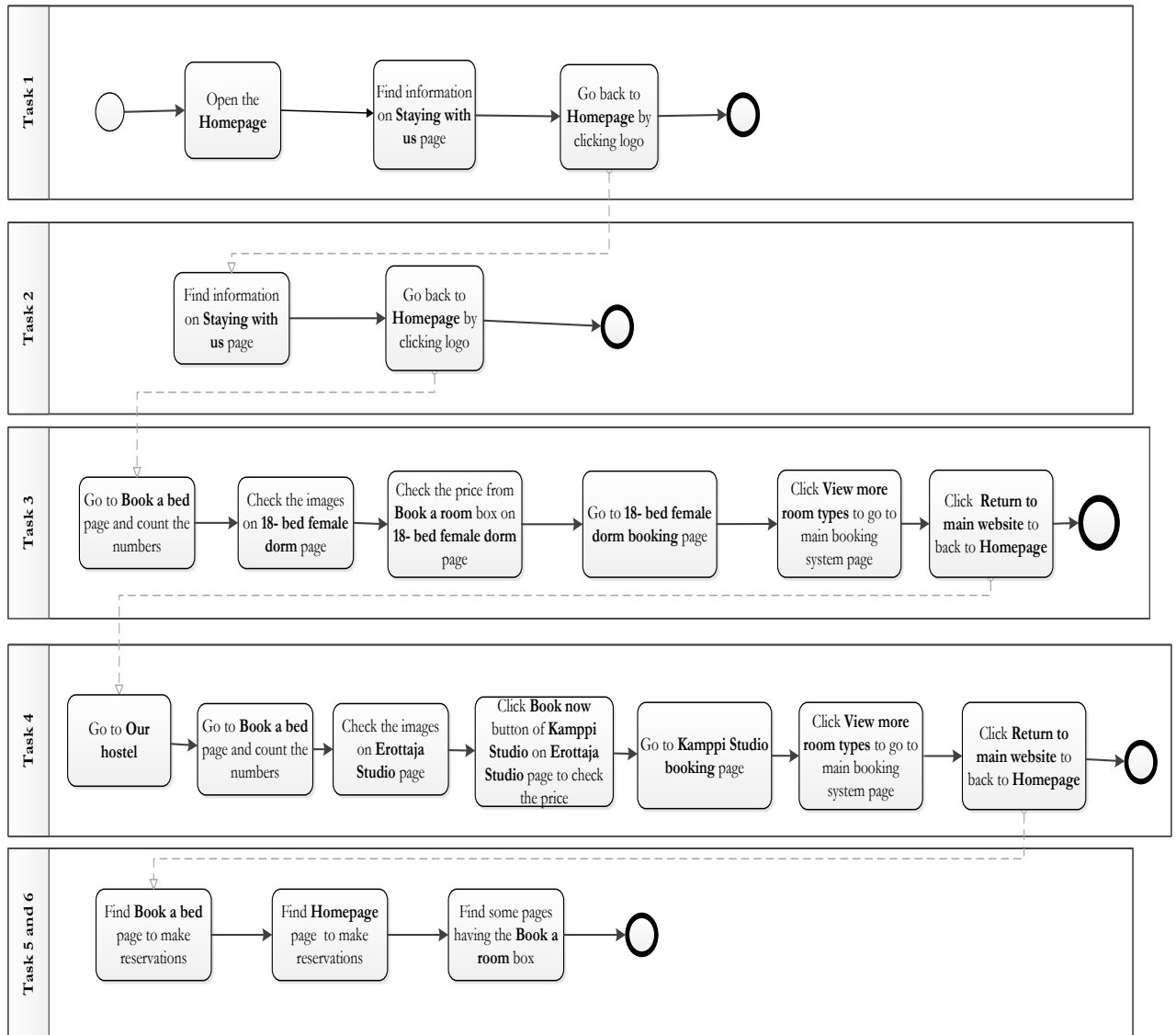


Process Model for Tester N

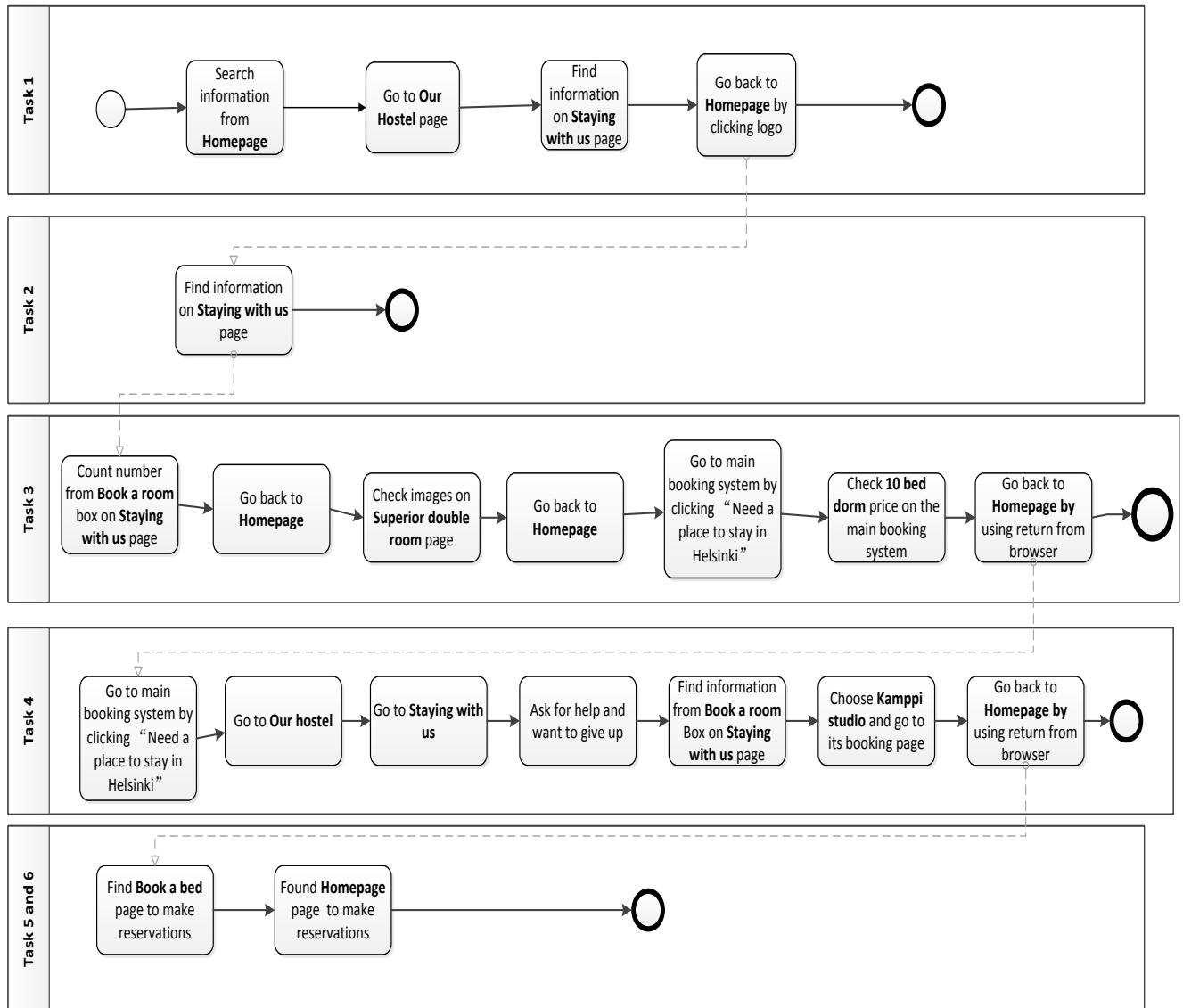


The video record of Tester N is lost due to the DVD damage. The process model is based on the data collection form, and the memory recall from the Tester N after finishing the tasks conduction.

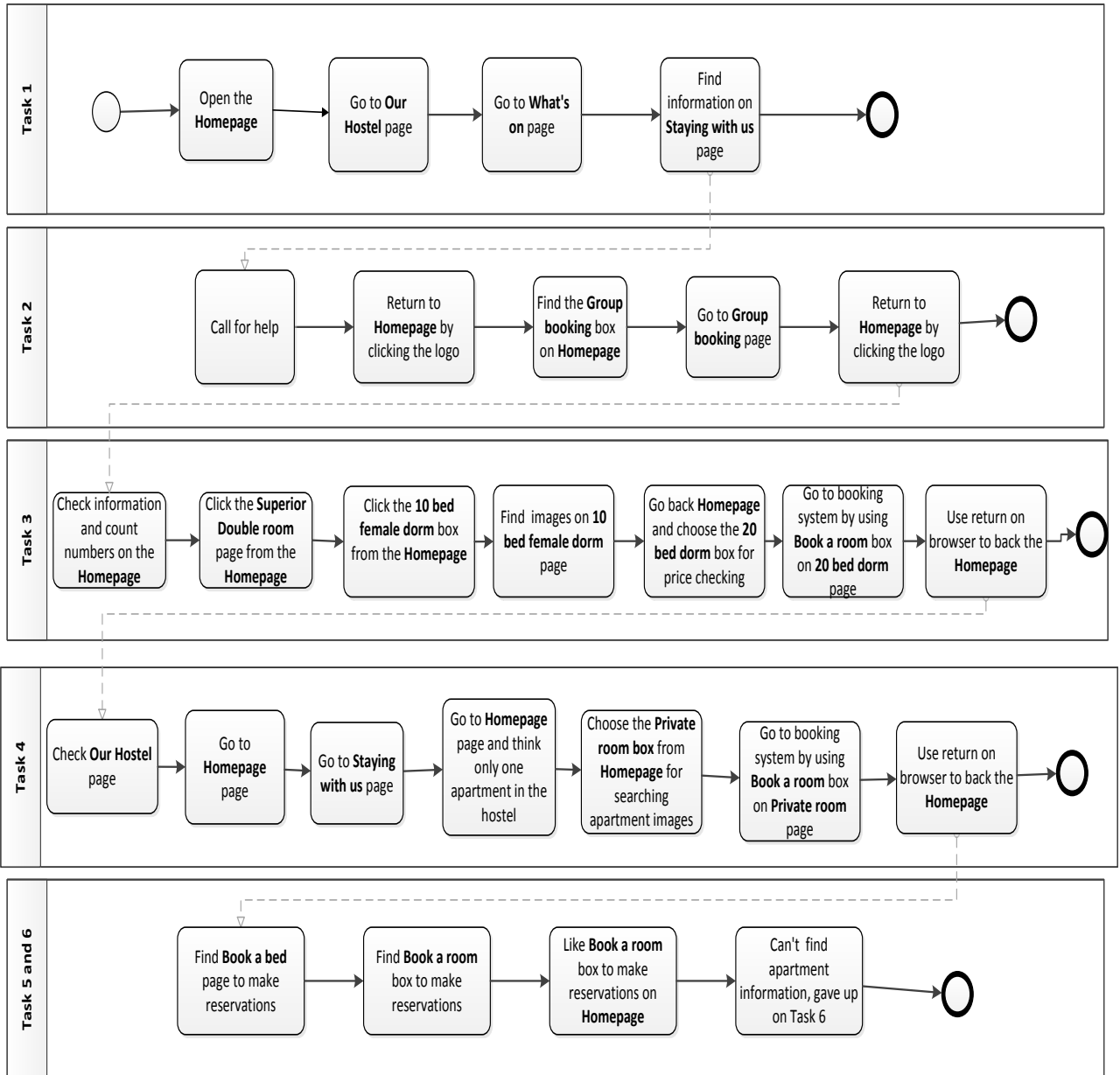
Process Model for Tester F



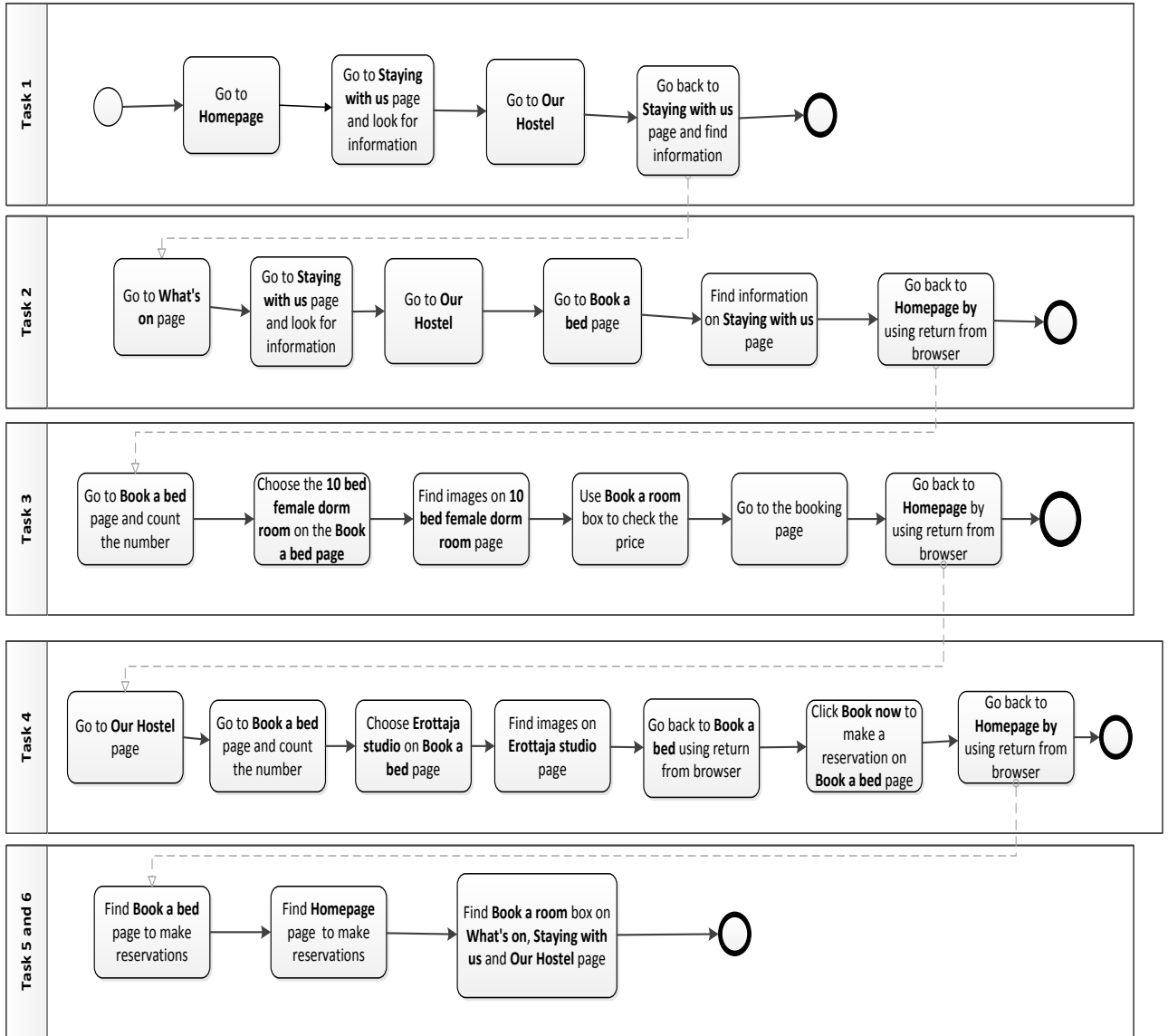
Process Model for Tester T



Process Model for Tester B



Process Model for Tester X



Attachment 6. The basic formula for calculating the standard deviation

Standard deviation reveals how closely the completion times are clustered around the mean time. The basic formula for calculating the standard deviation is (Rubin&Chisnell 2008, 253):

$$\text{Standard Deviation}(SD) = \frac{\sqrt{\sum x^2 - \frac{(\sum x)^2}{n}}}{n - 1}$$

$\sum x^2$ is the sum of the squares of each of the scores.

$\sum x$ is the sum of all the scores.

n is the total number of participants.