Analyzing the Work Process of a Web Content Management System

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Abstract

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In this master thesis possible usability problems in the user interface and the work process of a Web Content Management System are identified and analyzed. The problem identification has been done with both analytical usability evaluation methods and observations of real users. Although most of the participants had little or no previous experience with the system and the identified problems were especially hard for inexperienced users, it is likely that many of these have a negative impact also on the work of experienced, trained users. Based on the findings, resolutions to problems are suggested and an improved prototype is sketched. The resolutions are largely of a generalizable character while the improved prototype is targeted at a group of users who wish to create web pages but do not have a need to use the more advanced functionality of the system. This thesis will help define a role in the system to fill the gap between single page editing and full administration possibilities.
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1 Introduction

Web Content Management System (WCMS) is a relatively new concept, and while many people are still not familiar with it, it facilitates web content creation, editing, control and many essential web maintenance functions. For a user who has little or no knowledge of programming languages or markup languages, it is a way to create and manage content with relative ease. For organizations and companies, it helps release the workload of maintaining websites and intranets, and also by distributing the work. By using a WCMS, non-technical users only need to focus on their web content and not the appearance, since web templates can automatically be applied to new and existing web pages.

Uppsala University has decided to deploy a WCMS that is to be used within the whole university. The main incentive is to give visitors of the web page a uniform impression of Uppsala University - every department should have the same basic page and navigation structure. The current situation is that each department has independently decided what content management solution to use and the great diversity creates a somewhat split image of the university on the web.

The thesis project is carried out at the department of Information Technology. The needs at this department are somewhat unique in that the users are generally well experienced with computer-supported work and therefore also tend to have high requirements on functionality and transparency of systems. Currently the department is using a Wiki system for managing web pages. It allows freedom for how to lay out and manage pages at the same time as it efficiently limits the possibilities to deviate from a preset style. The staff has become used to the system, which might cause some resistance towards making the transition to a WCMS that is not specifically targeted at the department, unless it clearly provides better functionality and is easy to learn and use. Especially the latter two requirements are critical, since the staff has, this far, shown little interest in attending introductory training courses for any existing support software.

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2 Specification

My study will focus on usability aspects of the intended WCMS. The report shall identify and analyze possible usability problems in the user interface and the work process in the system. To give a clear presentation of the findings of the analysis, a visual (although non-functional) prototype of an improved interface will be constructed. To summarize, the following questions should be analyzed in the report:

General questions

1. How do WCMSs best support the work of the members of an organization?

2. What problems are there with providing increased and more advanced functionality in systems generally? Is there a limit for how much it is reasonable that a WCMS provides?

3. Is it possible to design a system so that it does not require introductory training?

Specific questions

1. How should the intended WCMS be designed so that the need for introductory education is reduced?

2. What different roles or permissions should a system provide in order to best support the work of the intended users and what functionality do these roles imply? The analysis should describe different types of users and their goals. What functionality do these users need from the WCMS to achieve their specific goals. How does the system best support the users in fulfilling their goals.

Delimitations

The project should end up in an analysis of the current user interface and a visual prototype of an improved interface – not a fully functioning system. The project will only evaluate parts of the system focusing mainly on the requirements of users at the Department of IT and generalizations of the results should be considered only with caution.
3 Background

In this chapter I will first briefly introduce the Wiki system which has been used by the Department of IT for managing web pages. Then I will introduce the intended WCMS – the InfoGlue system. After that I will list the two previous usability evaluations done on the InfoGlue system. In the final part, I will describe how I structured my report.

3.1 Web solutions

Wiki

Wiki is the current content management solution used by Department of IT. It is a system for creating web pages in a simplified markup language. All pages enable documents to be written collaboratively. It is sufficiently expressive for most simple web pages, but it limits the advanced functionality for most users, because the advanced functionality is hard to learn.

The primary goal in the Department of IT for the Wiki system is to make sure that the information on the web is up-to-date. However, it brings on a large amount of simplified web pages with different layout – every course/research homepage looks simple yet different from each other. The current situation could be improved by making the transition from the Wiki system to the intended WCMS – the InfoGlue system.

InfoGlue

InfoGlue is a WCMS and an open-source software written in Java. The InfoGlue project started in August 2002 and was officially released in its first version in April 2003. It has fast become one of the leading open-source WCMS alternatives available. InfoGlue provides both basic and advanced functionality for website creation and maintenance, and it has an architecture which differs the information itself from the layout and flow of the website presenting the information. Moreover, it supports reusing of resources between different websites.

Uppsala University has chosen the InfoGlue system as its web solution. However, a small range of people from the university who have used the system claimed that they have problems with using it. Thus, a solution came out which was making an improvement to the system from the usability point of view, in order to help people accept the system.
3.2 The previous usability evaluations on InfoGlue

A usability test has been done by the people at the IT support of Uppsala University in July, 2008. The evaluation focus on the usefulness of the most common services in InfoGlue. They wanted to find usability problems of the system, and get an indication if the university had chosen a right system for their web publishing. The test focused on the core functionality in the system, for instance, 1) creating pages; 2) writing text; 3) adding images; 4) creating links. Such basic tasks for the normal users were addressed. The method they used was usability testing with five potential users of the system. A guideline was presented to each user during the test session. After the testing, some usability problems were found. For instance, 1) menu select “edit text/article”; 2) “publish” available in the right-click menu; 3) uploaded image can not be saved; 4) “administration” button available in edit mode; 5) image size can not be changed. They reviewed in detail each of the problems and measured them with priority 1 or 2. 1 means that the problems should be fixed before the system is put into use. 2 means that they can be informed and educated to users. However, I noticed that those problems they found and ranked with priorities one year ago did not exist in the current WCMS anymore.

Another usability inspection was done by Åke Johansson in July, 2009. Åke Johansson is an expert in web publishing systems. He was responsible for making the requirement specification for the shared web publishing systems at Uppsala University. He performed an expert analysis of the InfoGlue system by himself, focusing on the Edit On Site mode, the navigation component, and the work process of creating/editing a site node. In summary, some usability problems were discovered. The problems which he found by analyzing the navigation component, mainly about the inheritance of navigation menus, were not discovered from my end-user testing, since those problems are not including in the work process of creating a course/research homepage and hence were not considered by me. However, by comparing the results of his expert analysis and my end-user testing, more than 90% of the problems found by him from his walkthrough the work process of creating/editing a site node as well as the Edit On Site mode were also found by me in my end-user testing. And those problems not found by him were mostly found by observing the users in my end-user testing.

1Contact Regina Ledung at regina.ledung@its.uu.se to receive the full document on their usability testing results for InfoGlue.

2Contact Åke Johansson at ake.johansson@uadm.uu.se to receive the full document on his analysis results for InfoGlue.
3.3 Disposition

The report has seven chapters: Introduction, Specification, Background, Theory, Methods, Results and Evaluation. The following list guides the reader through this report:

Chapter 1 In this chapter the readers can find a very brief introduction to WCMSs, the reason why Uppsala University deployed a new WCMS as its web publishing tool, and why this master thesis was carried out at the department of Information Technology.

Chapter 2 In this chapter the readers can read about the specification and delimitation of this thesis project.

Chapter 3 In this chapter some background knowledge of this thesis project are presented.

Chapter 4 In this chapter the underlying theory behind my evaluation on the WCMS is presented, and the references to some literature on the subject are given.

Chapter 5 In this chapter the methods that I have studied are presented. The reasons why I chose a method or not are explained.

Chapter 6 In this chapter I describe the methods that I used to implement my tasks.

Chapter 7 The results of my work are presented in this chapter, including the cognitive walkthrough results, the end-user testing results and an improved prototype.

Chapter 8 In this chapter the questions that arise in connection with my thesis specification in chapter 2 are discussed. Future work is listed. And conclusions in my thesis work are summarized.
4 Theory

In this chapter the underlying theory to my evaluation on the WCMS is introduced, and the references to some literature on the subject are given. In the first part, I will introduce usability, and in the second part, the definitions of User-Centered System Design are briefly explained. The goal here is to give references to the material I have studied, and to briefly explain my thoughts of them.

4.1 Usability

The international standard, [ISO’98], provides guidance on usability and defines it as:

\[ \text{The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.} \]

According to this definition, usability has three measurements: effectiveness, efficiency and satisfaction. Effectiveness is about whether users can complete their task and achieve their goals by using a system. Efficiency is usually measured by how much time and effort users require to complete their task. Satisfaction is about how users are satisfied when using the system and whether they find it easy or not to learn and use the system. These three measurements could be affected by the users, their goals and the usage situation. Users with different backgrounds, capabilities, experience within a system will influence the three measurements of usability. Users with different goals will influence the three measurements of usability as well. For instance, do they have to use a system for their work or not? At last, the context of use, for instance, where and how a system is being used will also affect usability.

There are many other definitions of usability as well. Usability consultant [Nielsen] has defined usability as:

\[ \text{Usability is a qualitative attribute that assesses how easy user interfaces are to use. The word “usability” also refers to methods for improving ease-of-use during the design process.} \]

There are five quality components which come up together with this definition:

- Learnability: How easy is it for users to accomplish basic tasks the first time they encounter the design?
• **Efficiency:** Once users have learned the design, how quickly can they perform tasks?

• **Memorability:** When users return to the design after a period of not using it, how easily can they reestablish proficiency?

• **Errors:** How many errors do users make, how severe are these errors, and how easily can they recover from the errors?

• **Satisfaction:** How pleasant is it to use the design?

The definition is easier to understand and apply compared to the international standard, [ISO'98]. It could be used as a guideline while performing usability evaluation to a system. [Nielsen] also mentions that there are many other important quality attributes, for instance, utility, which refers to the functionality of a design: If a system does what users need. However, we should always be careful when applying those usability measures, paying concern to the specific system and the context around it.

### 4.2 User-Centered System Design

_Innovation starts with people, not with enabling technologies or manufacturing plans or distributor preferences. If you forget this you risk delivering feature-rich rubbish into already over-crowded lives._

*(Richard Seymour, Design in Business Week, 2001)*

People might understand it – users are the key, and people might agree with it – a system should be designed with a user-centered approach. However, how to actually apply a user-centered approach to the system development is not easy. [Gulliksen et al.’03] defined User-Centered System Design (UCSD) as:

_User-Centered System Design is a process focusing on usability throughout the entire development process and further throughout the system life cycle._

They acquired this definition based on the following key principles:

_User focus; Active user involvement; Evolutionary system development; Simple design representations; Prototyping; Evaluate use in context; Explicit and conscious design activities; A professional attitude; Usability champion; Holistic design; Processes customization; A user-centered attitude should always be established._
This definition presents UCSD from a different point of view compared to many other definitions. It more clearly tells people how to implement UCSD practically to a system referring to those key principles – usability should be part of the entire development process and further throughout the system life cycle. However, according to their experience with attempting to apply usability throughout a pilot project, even with an explicit commitment to User-Centered Design and a usability focus, usability got lost in the system development process. What could be the reasons for that? There is a survey from [Rosenbaum et al. 00] highlighting the obstacles in applying strategic usability in User-Centered Design as following:

- **Resource constraints**: 28.6%
- **Resistance to User-Centered Design/usability**: 26.0%
- **Lack of understanding/knowledge about what usability is**: 17.3%
- **Better ways to communicate impact of work and results**: 13.3%
- **Lack of trained usability/HCI engineers**: 6.1%
- **Lack of early involvement**: 5.1%
- **No economic need - customers not asking for usability**: 3.6%

According to this survey, resource constraints and resistance to User-Centered Design/usability are most often cited as the top two obstacles to achieving usability in User-Centered Design. People will naturally be content with a lower priority on usability in order to finish the functional parts of a system when there is a resource constraint. People’s attitudes towards usability is a key factor for applying usability to a system. Moreover, according to the survey, the lack of understanding/knowledge about what usability is makes it even harder to introduce a usability focus into a software development process. How to overcome these obstacles and thereby let usability be part of the entire development process and further throughout the system life cycle is a very important question.
5 Methods

In this chapter I describe the methods that I have chosen to apply to my work. The task analysis is for analyzing the action sequences to achieve a task. The usability evaluation methods, including inspection methods, testing methods and inquiry methods, are for the usability evaluations. Finally the lo-fi prototypes are for making the final improved interface based on the results of the usability evaluation.

5.1 Scenario

A scenario is a narrative describing foreseeable interactions of types of users and the system. Scenarios include information about goals, expectations, motivations, actions and reactions. Scenarios are neither predictions nor forecasts, but rather attempts to reflect on or portray the way in which a system is used in the context of daily activity [Wikipedia3'09]. I used a scenario to portray interactions by a normal user in the Department of IT and the InfoGlue system, and the contexts in which the interactions occur.

5.2 Task analysis

A task analysis describes what are the necessary actions or cognitive processes that users are required to do to achieve a task [Benyon et al.'05]. It is an important part of a system development and can be undertaken at different times. It can be used during the early design stage of a system, in order to understand the essential nature of how people perform tasks [Benyon et al.'05]. At this stage the task analysis should aim to be as independent as possible from the system. Task analysis also can be used during the implementation and evaluation of a system, focuses on the achievement to work using a particular system and hence is system dependent [Benyon et al.'05]. I used task analysis for the later purpose – to analyze the necessary action sequences to achieve a task using the WCMS.

Hierarchical Task Analysis

Hierarchical Task Analysis is a structure chart representing a sequence of tasks, subtasks and actions as a hierarchy [Benyon et al.'05]. I decided to use it to decompose the high level tasks in the WCMS and break them down into atomic operations. Then these atomic operation sequences of a task will be used later on in the usability inspection, for instance, in cognitive walkthrough. The benefit from Hierarchical Task Analysis is that an overall
structure of tasks will be presented, and the necessary action sequences for tasks will be identified.

5.3 Inspection

Before analyzing the WCMS, I first spent some time on studying usability inspection methods. There are many usability inspection methods existing, and each of them has its own pros and cons. The crux for obtaining an effective and valid inspection result is to choose a suitable method for the WCMS, since the goal to inspection a WCMS is different compared with other web applications. The inspection to a WCMS should focus on the main work tasks rather than the whole system, which means some few tiny problems in a WCMS can be tolerated as long as they do not influence the users and their tasks. Furthermore, each inspection method requires a few prerequisites in order to obtain the most satisfaction, meaning that if the prerequisites of an evaluation cannot be reached, then the evaluation results could be bad. Therefore I have to make trade-offs according to the limitations of time and resources (I am the only evaluator). After a suitable evaluation method is chosen, inspection to the WCMS will be performed. And the obtained results will be used to develop hypotheses about what could be serious problems in the interface and work process in the WCMS.

Heuristic evaluation

Heuristic evaluation is an informal method of usability analysis where a small group of evaluators examine a software individually. A list of guidelines or heuristics is used to aid the evaluators in discovering usability problems. The output is presented as a list of usability problems with references to the guidelines or heuristics [Nielsen et al.’94].

The heuristic evaluation method is fast and cheap, and it is fairly good at identifying usability problems and finding serious problems. However, individual evaluators were mostly quite bad at doing such heuristic evaluations in that they only found between 20 and 51% of the usability problems in the interface they evaluated [Nielsen et al.’90]. Although individual evaluators will reduce the effectiveness and validity of the evaluation and the problems found will depend on the chosen evaluator, a real user testing will be performed after the inspection which will more or less make up for the defects. However, the guidelines for heuristic evaluation might be too strict to inspect a WCMS, since some tiny problems could be tolerated in a WCMS compared to other web applications. And my goal is to focus on evaluating the main work tasks for ease to learn and use, rather than finding problems
from the whole WCMS. Therefore this method is not chosen to perform the inspection.

**Pluralistic walkthrough**

Representative users, product developers, and human factor engineers participate in a pluralistic walkthrough, playing the role of a real user [Nielsen et al.'94]. Together they walk through a set of tasks, discuss and evaluate the usability problems. The interaction between those users during the walkthrough helps to settle usability problems. However, identifying and inviting the participants could be very time-consuming. This evaluation method is more common in the early design stage and it requires group work [Nielsen et al.'94]. Considering the time constraints and the difficulties to get access to certain kinds of participants to perform the walkthrough together, this method is not chosen to perform the evaluation to the WCMS.

**Cognitive walkthrough**

Cognitive walkthrough is a usability inspection method that attempts to simulate the interaction between the user and a software while in the process of performing a task [Desurvire et al.'92]. It helps the designers to consider factors from the perspective of users. The problems found by cognitive walkthrough indicate mismatches between users’ and designers’ conceptualization. During the walkthrough the evaluator uses a detailed review of action sequences to evaluate the possible usability problems that could occur. Cognitive walkthrough focuses on evaluating a software for ease to learn, which could facilitate skill acquisition. However, it has the same defects as the heuristic evaluation – the problems found based only on an individual evaluator will reduce the completeness and validity of the inspection. Then again, because it is a simplified inspection method, it is cheap and easy to learn and use, and a real user testing will be performed after the inspection, so I still consider this method suitable to perform the inspection.

**Severity ratings**

Whenever usability problems are found, severity ratings can be used to access the relative severity of the problems. Such severity ratings can then be used to make sure that the usability problems with highest severity ratings will have priorities to be fixed first. The severity of a usability problem is a combination of three factors according to [Nielsen et al.'94]:

1. The frequency with which the problem occurs: Is it common or rare?
2. The impact of the problem if it occurs: Will it be easy or difficult for the users to overcome?

3. The persistence of the problem: Is it a one-time problem that users can overcome once they know about it or will users repeatedly be bothered by the problem?

I decided to use severity ratings to access the usability problems found by usability inspection as well as end user testing. Though individual evaluators may reduce the effectiveness and validity of the severity judgment, since the severity judgment may depend on the chosen evaluator too much, it could still be a good reference for the designers in the further development of the system.

5.4 Testing

According to Lárusdóttir’09, the results from using either heuristic evaluation or cognitive walkthrough are different from the results of using the think aloud method for evaluating the same system. It is therefore very interesting to compare usability problems found in the end user testing with the results obtained from usability inspection. Moreover, it is very often shown that if the findings come from a real user testing, it can convince people better compared to the findings coming out from an expert analysis Jeffries et al.’92. Therefore I decided to formulate users’ tasks resulting from an initial usability inspection performed by me, and invite a few potential users of the WCMS to participate in the usability testing. Furthermore, I identified and analyzed the possible problems in the user interface and work process of the WCMS.

Think aloud protocol

Think aloud protocol is a method used to gather data in usability testing in product design and development, in psychology and a range of social sciences Wikipedia’09. It is widely used in usability studies to gain insight into whatever users are looking at, thinking, doing, and feeling about a software or interface during their task performance Ramey et al.’06. The users are asked to explain what they are thinking about when they are performing a set of predefined tasks. By collecting users’ verbal reports on their task performance, the information about how users interact with the software or interface and what hinder users’ interaction could be identified.

However, users’ verbalization might cause distractions from the tasks, and the interaction between users and evaluators might cause a different test
result. Is think aloud worth to use during the test session? The answer is definitely yes since it is the single most important method for practical evaluation of user interfaces [Lárusdóttir’09].

5.5 Inquiry

Data capture techniques for usability evaluation help obtain information from users in the analysis stage. The common technologies for data capture are interviews, questionnaires and most observations.

Interviews

Interviews are very valuable in clarifying users reactions [Benyon et al.’05]. It helps obtain information that the evaluators cannot obtain from watching users during the test sessions. I decided to have a short individual interview before as well as after each test.

Questionnaires

Questionnaires can gather basic background information about users and their reactions after the test session, but it will be time consuming to construct a good questionnaire [Benyon et al.’05]. And it is difficult to make a questionnaire with the aim of obtaining information on users’ impression to an interface. It is hard to measure how much usable data could have been obtained by questionnaires. And the data gathered from questionnaires is not trustable always. Moreover, there were only five users in my tests, and the results from only five persons’ questionnaires are kind of pointless. In order to obtain information from these five users in a more flexible and reliable way, I chose interview as my data acquisition method before and after the tests instead of questionnaire.

Observations

Observation helps evaluators gain extensive insight from users during the test session [Lárusdóttir’09]. Users cannot always explain all their perceptions through verbalization. Therefore, if possible, it is better to sit with users during their task sessions, observing users’ actions and reactions, understanding the perceptions that users cannot verbalize.

I decided to observe and videotape users in the test sessions. The benefits are that I can analyze the tests afterward. Moreover, the recordings could be very effective in communicating test results to developers.
Videotaping will record everything from the tests. It records what users say, how they perform the tasks, also a part of their body language, which gives information to analyze afterward. It will help to find more usability problems compared to other data collecting methods like, for instance, sound recording. And it will relieve the note-taking burden. However, it is very time consuming for the people who is going to analyze it, especially when the test users are many. And the filming might bring stress to users, which could cause them behave a little bit different from without the videotaping. Considering that I will test only five users, and I would like to get the most possible information from the testing, I chose to use videotaping during the test session.

5.6 Lo-fi prototypes

Lo-fi prototypes - often termed paper prototypes, are cheap and easy to produce and equally easy to discard [Benyon et al.'05]. This allows an interface designer to try out many ideas fast. They capture very early design thinking and they aid the process of generating and evaluating possible design solutions [Benyon et al.'05].

After the usability testing, I will produce paper prototypes with improved interfaces of the WCMS. First, it is always good to not only find problems but also find solutions to them. Second, the lo-fi prototype can help as a positive factor when communicating test results to developers.
6 Implementation

In this chapter I describe the methods that I have actually used to implement my tasks. First (6.1) is a scenario, which is used for understanding tasks and its background. Second (6.2) is a hierarchical task analysis, which shows the structure and sequence of making web sites using the system. This helps analyzing the necessary steps for building a web site. In the third (6.3) part are the questions that I have used for each step of the cognitive walkthrough. The fourth (6.4) part presents the rating scale that was used for rating the severity of the usability problems from the cognitive walkthrough results as well as the end-user testing results. The fifth (6.5) part shows information about my contacts with the users. The sixth (6.6) part is the predefined tasks I developed for the end-user testing. The seventh (6.7) part is a one page tutorial I developed for the testing. And the last part (6.8) presents the interview questions I developed to use before and after the testing.

6.1 Scenario

Alice is a teacher from the department of information technology at Uppsala University, she will start to teach a course “Interaction Design” in this fall and she wants to make a course homepage for it by using the InfoGlue system. She is new to the InfoGlue system, but has the InfoGlue system on her office computer and was given an user id and password to login to the system as a normal user. She has some basic knowledge about WCMSs and making web pages, but no idea about how the InfoGlue system works. She logs in to the InfoGlue system to make her course homepage: 1) she goes to structure tool, creates a new site as her course homepage; 2) she imports the UU/IT template to her site; 3) she goes to content tool, creates the contents for her site; 4) she adds those contents to her site.

6.2 Hierarchical Task Analysis (HTA)

Hierarchical Task Analysis describes the options and action sequences presented in the part of the InfoGlue system which is covered in the scenario and how they relate to the intended users (such as Alice). The following Figure presents the main hierarchical task analysis of the course homepage. The numeric with all sub levels (2.1.1) cross-refer to the HTA diagrams and the walk through results.

1. Login to InfoGlue.

2. Create course homepage.
2.1. Build structure.
   2.1.1. Go to structure tool.
   2.1.2. Create new site as course homepage.
   2.1.3. Create new site nodes.

2.2. Import template.
   2.2.1. Go to structure tool.
   2.2.2. Click on empty site nodes.
   2.2.3. Import template for each site node.

2.3. Create contents for course homepage.
   2.3.1. Go to content tool.
   2.3.2. Create new folder.
   2.3.3. Create new contents.

2.4. Add components to course homepage.
   2.4.1. Add navigation components.

---

Figure 1: Main HTA for course homepage
2.4.2. Add article components.
2.4.2.1. Add main contents for each site node.
2.4.2.2. Add footer information for each site node.

3. Log out from InfoGlue.

Check Appendix A to see more detailed action sequences for accomplishing the sub task of making course home page and the associated system responses, as well as the detailed hierarchical task analysis (HTA) figures continue from Figure 1.

6.3 Cognitive walkthrough

In this method, the following two questions by Spencer [Spencer’00] will be used for each step of the cognitive walkthrough:

1. Will the user know what to do?

2. If the user does the right thing, will they know that they have achieved progress towards their goal?

Check from Appendix B to see the detailed implementation of cognitive walkthrough.

6.4 Severity ratings

The 0 to 4 rating scale [Nielsen et al.’94] shown as following was used for rating the severity of the usability problems from the cognitive walkthrough results as well as the end-user testing results:

0 = I don’t agree that this is a usability problem at all

1 = Cosmetic problem only - need not be fixed unless extra time is available on project

2 = Minor usability problem - fixing this should be given low priority

3 = Major usability problem - important to fix, so should be given high priority

4 = Usability catastrophe - imperative to fix this before product can be released

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6.5 Participants

The targeted users will mainly be the employees at the Department of IT who are going to make course homepages or research homepages using the system. They will be typical users of the system. Then how many users should I recruit for the tests? According to [Nielsen et al.'94] at least three and preferably five people are needed to participate in tests in order to get a nice payoff from a trade-off between cost and benefit. However, some practitioners and researchers argue that this is too few if there are several different groups of target users existing.Obviously this argument is not applicable in my case, since I will focus my testing only on one main user group - the staff from the Department of IT who will not be having any introduction training. So my solution came out which was to recruit five employees at the Department of IT to participants in my tests, and I would like to recruit staff that play different roles in the department. The following shows the five users’ profiles:

**User 1:** A potential expert user of InfoGlue. She is a course administrator at the Department of IT in Uppsala University. She has been using InfoGlue for a few months, and she has experience of using it.

**User 2:** A novice user of InfoGlue. She is a administrative coordinator at the Department of IT in Uppsala University, and she might become a potential expert user of InfoGlue. She has looked at InfoGlue once before the testing.

**User 3:** A novice user of InfoGlue. He is a PhD student at the Department of IT in Uppsala University. He will be one of the normal user of InfoGlue. He has experience of using other WCMSs and has deep general understanding of web publishing.

**User 4:** A novice user of InfoGlue. She is a PhD student at the Department of IT in Uppsala University, and she might become a normal user of InfoGlue.

**User 5:** A novice user of InfoGlue. He is a senior lecturer at the Department of IT in Uppsala University. He has deep understanding on web publishing tools. He is a potential expert user of InfoGlue.

The reader may wonder why I pick four novice users and only one experienced user to perform the tests. The reason is that there at the time were no more experienced users at the Department of IT, since the InfoGlue system had not actually been used at the department yet. Except user 3, the
users are native Swedish. All of them speak very good English, and they had no problems expressing themselves and communicating with me in English, therefore misunderstanding and missing things due to the language problems should be rare during the tests and interviews. Moreover, all the five users used the Swedish version of InfoGlue to perform their tasks, which should be more comfortable for them. All the quotes which were Swedish, basically names of buttons and windows, during the test sessions are translated into English in this report.

6.6 Predefined tasks

The end-user testing is based on predefined tasks, so I developed the predefined tasks in the following. The predefined tasks were developed mainly based on the cognitive walkthrough results, complemented with very basic and detailed operations in the system, for instance, uploading a file, rescaling an image, etc. Before testing the real users, my adviser helped me try out the tasks in the real InfoGlue environment to make sure they were realistic, do-able, and exploring the InfoGlue system thoroughly. I also estimated the time for users to perform those tasks which was approximately an hour.

In addition, I used Swedish words to name all the web pages in the predefined tasks, since the users were going to perform their tasks under the Swedish version of InfoGlue. Moreover, under task 8, there is a * with a sentence connected which was the modified version of task 8, since task 8 was slightly changed during the testing to extend the range in order to find more usability problems.

**Task 1** Find site node “Kursinfo”.

**Task 2** Create a new page with name “Interaktionsdesign” under “Kursinfo”.

**Task 3** Create new pages with name “Hemsida”, “Föreläsningar”, “Uppgifter” and “Examination” as sub nodes of site node “Interaktionsdesign”.

**Task 4** Copy a paragraph from the PDF file you received via email and add it to the page “Hemsida”.

**Task 5** Add an image to page “Hemsida”, set width to 200px and height to 300px.

**Task 6** Rearrange the order of the navigation menu (from up to down) as: “Hemsida”, “Föreläsningar”, “Uppgifter” and “Examination”.

**Task 7** Change the page navigation title from “Hemsida” to “Interaktionsdesign”.

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**Task 8** Link any text on page “Hemsida” to the PDF file you received via email.

* Create a link with name “pdf-version” on page “Hemsida” to the PDF file you received via email.

**Task 9** Create a English version of “Interaktionsdesign” page, name it “Interaction Design”.

**Task 10** Change a English navigation menu for “Interaction Design” page.

### 6.7 A one page tutorial

After testing the first user, who had been using InfoGlue for a few months, it was apparent that the tasks might be difficult for users to perform, especially for novice users. So I considered whether a one page tutorial should be presented before the tests. The one page tutorial might help users during the test, but then the test results might also be affected. On the other hand, if the users cannot perform any task at all, that would be even worse. I therefore decided to give the rest of the users the one page tutorial. Check the one page tutorial in Appendix D. It is mainly just the explanations of the InfoGlue terminologies in the user testing. However, it was indicated from the testing that this one page tutorial is not helpful, which might because: 1) the one page tutorial I developed was not good; 2) a simple one page tutorial is not enough to save people in a system that is hard to learn and use.

However, since I decided to use the one page tutorial, the question became whether I should use the original test plan or developing a new test plan in order to use the tutorial while somehow keeping the results from before? To cope with this I developed an alternative test plan although I had to discard the plan later:

The total number of users will be 10, and they will be divided into two groups, each group with 5 users. The first group will perform the tasks without having any tutorial, and the second group will get a one page tutorial before testing. Videotaping will not be used due to the limited time in this case.

From this test plan, I will get the same test results from the group which will not use the tutorial, but also get the data from the group which will use it. When comparing the results from the two groups, I will know if the one page tutorial is helpful. The main advantage of this test plan is that it could help to discover if the tutorial is useful and how much it could help, but it drifts far off from the goal, so it was discarded later.
6.8 Interviews

From a short interview before the tests, I want to obtain information about how much they know about the WCMS, and how they understand the interface by their intuition, since most of the users are novice users in this case. It could also help indicate the mismatches between users’ and designers’ conceptualization. The questions I developed referred to the default interface of InfoGlue (Figure 2) for the short interview before the test are the following:

Figure 2: Default interface of InfoGlue

1. Have you ever seen the interface of InfoGlue before?
2. Without clicking on anything yet, please describe the tabs you see on the interface and what you think they do.
3. Without clicking on anything yet, if you were exploring, what would you click on first? Why?

From a short individual interview after testing, I want to acquire feedback from the users about their opinions of the WCMS, the particular difficulties the users encountered in the tasks. And some more specific questions based on objectives and goals of my thesis. The questions I developed for the short interview after the test are as follows:

1. What are the hard things for you to do during the task?
2. From what I tested, do you think those functionality are enough for you to make a web site? Do you think they are easy enough to learn?

3. Do you want to be an expert user of the system? For example, create your own web page template.
7 Results

The results are presented in three parts. The first part (7.1) is an analysis results through cognitive walkthrough of the system, which focus on the usability problems in the process of making a web site. The second part (7.2) presents the results from the end-user testing. The third part (7.3) is a visual prototype of an improved interface according to the findings in the analysis.

7.1 Cognitive walkthrough results

The cognitive walkthrough was mainly focused on the working process of making web sites based on existing web templates. I used the variant of Spencer’s two questions for each step of the cognitive walkthrough.

The results are divided into four part according to the main hierarchical task analysis (Figure 1), which are build structure (2.1), import template (2.2), create contents (2.3) and add components (2.4). Check from Appendix B to see the detailed results.

7.2 End-user testing results

Although usability inspection by an expert is a good beginning, it will not enough to find all problems. Experts even find problems which do not really exist - users overcome many minor difficulties using a mixture of common sense and experience. So it is very important to get some real users involved in the analysis process, trying out the system with some predefined tasks. From another point of view, it is easier to convince the developers to change their design if the evidence does not come out just from one expert but also with real users tests.

A brief summary of the end-user testing

The following three charts provides an overview of the end-user testing. However, no analysis of these three charts will be included in this report.

Figure 3 shows: 1) the number of tasks that each user completed without help; 2) the number of tasks that each user completed with help; 3) the number of tasks that each user did not complete in the test sessions. It is indicated from the chart that the experienced user performed the most tasks without help (7 out of 10), and the average number of tasks that were completed by the four novice users were less than five (4.25 out of 10).
Figure 3: Test result 1

Figure 4 presents: 1) the amount of time it took for each user to complete each task; 2) the total time that each user spent for the whole test session. It is indicated from the chart that user 5 used the least time to go through all the tasks, and user 2 used the most time. And we can also see from the chart that the users spent the most time on task 4 and task 5, except the tasks that they could not complete.

In Figure 4, the reader can find information about: 1) the number of users that completed a task without help; 2) the number of users that completed a task with help; 3) the number of users that did not complete the indicated task. According to this chart, task 3 and task 7 were the easiest tasks, since
all users could complete them without help; task 9 and task 10 were the most
difficult ones, because each task had four users who did not complete it, see
subsection 6.6 to gain more information about the predefined tasks.

![Figure 5: Test result 3](image)

**Problems gathered with severity ratings and resolutions**

The following problems were found in the end-user testing. Each problem is
given a severity rating and a resolution. The number inside the parentheses
is the severity rating, and see subsection 6.4.

1. **General problems**

   1.1. Default tab is “Content Tool” rather than “Structure Tool”. (4)
   This is not a problem for experienced users, but might be a serious
   problem for novice users of the system. For a normal user to create
   a web site with a predefined template, they can finish all the basic
   works by going to “Structure Tool”. However, the first that was
   presented to them in InfoGlue was “Content Tool”, with a file
   hierarchy from the left side. It was indicated from the testing
   that user2 and user3 were stuck here for more than 10 minutes,
   attempting to find how to create a site node which was actually
   doable only in “Structure Tool”. If the “Structure Tool” would

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3“Content Tool” manages everything that concerns information/content in InfoGlue.
4“Structure Tool” handles building specific web sites in InfoGlue.
5A “predefined template” means a pre-designed website with reserved area for a user
to add his/her own personal contents.
6A “site node” means a web page.
be presented first, rather than “Content Tool”, the users could probably find and create a site node within 1 minute. Moreover, both of them were frustrated and could not finish the task without help from the observer.

Resolution 7.1. a) Make the default tab “Structure Tool”. b) Combine the “Content Tool” and “Structure Tool” in one frame both on the left side, when users choose something from “Content Tool”, “Structure Tool” should go automatically to the right side for showing the content page in the middle, and when users choose something from “Structure Tool”, “Content Tool” should go automatically to the right side thereby showing the web page in the middle.

1.2. Normal Users are allowed to create all types of content pages which might cause system disaster. (4) The user3 from the test made an empty page template when he attempted to create a web page, and later he used this page template for his web page, which caused a system error. It indicates that a normal user in the system have too much access rights, which is a big threat to the system.

Resolution 7.2. Set different access rights to different kinds of users in the system.

1.3. No information is presented to remind users to save their content page before they leave it, and if they leave, what they did without saving lost. (4) It could be a very serious problem for all the users of InfoGlue. Everybody might think their content will still be there if they do not get any warning about leaving the page, and there is no way to recover from it. User2 in the test suffered from this a lot, she attempted to delete two images from her content page at least 5 times, and because she did not save, the two images were still there, which made her frustrated.

Resolution 7.3. Create a pop-up window to warn the users who are going to leave a page without saving their pages.

1.4. The inheritance makes users from a lower level able to edit a web page from an upper level. It is not good, since users can easily

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7A “content page” in InfoGlue is for creating contents.
8A “content” in InfoGlue can be text, image, word-files, animations or anything else of informational value.
9The “inheritance” in the InfoGlue system makes all the sub pages in a web site can inherit contents from their parent pages.
destroy an upper level page. Moreover, when a component\footnote{A “component” is the container for holding all kinds of contents in InfoGlue.} from upper level is empty, it appears to be editable on all its lower level’s web pages. Users can go through the procedure of creating a content, but the content will not be appeared in the site node. (4)

It is indicated from the testing that user5 attempted to upload a picture to the right side of the page which was inherited from the upper level, and it just didn’t work. Nothing was presented on the right side of the web page.

Resolution 7.4. a) Make users unable to edit their upper level’s web pages. When a web page from upper level is empty, hide it from its lower level’s pages. b) Remove the inheritance.

1.5. In the “Link to internal file” view, users can accidentally delete any existing files in InfoGlue without warning, and the files will be removed from pages that had references to them. It is a very serious problems, people might for instance delete an image by mistake which had hundreds of pages referring to it, and the only way to recover from it right now is to upload the image to InfoGlue again and add it to those hundreds of pages manually. (4)

Resolution 7.5. Set the access right for normal users to make sure that they can only delete their own images. However, if their images are referred to from other pages in the system, a warning message should be presented before users can actually delete them.

1.6. Terminologies in InfoGlue are not “WYSIWYG\footnote{What You See Is What You Get}”. (3)

Content tool, structure tool, my desktop, repository, site node, content, component, container, etc.. Those terminologies in InfoGlue misled and confused the users when they saw them as well as when they were doing the tasks. It is not a problem for experienced users, but a serious problem for novice users of the system.

Resolution 7.6. Considering changing the names of those terminologies in order to make them “WYSIWYG” to users, otherwise, it is important to let the help information be understandable by users.

1.7. When users attempted to add a component below the navigation menu on the left side of a page, the newly added component will override the navigation menu instead of staying below it. And it is not easy to recover from that. (3)
Resolution 7.7. The inheritance here needs to be clearly addressed. For instance, by giving some visual cues when a component is inherited. When users add components to a page, the newly added components should not override but sit below the existing components.

1.8. “Add Components” from the right-click menu can make normal users do mistakes on their web pages. (3)
It is indicated from the testing that especially when the users attempted to create new articles and insert images, this functionality confuses and distracts them a lot. Both user2 and user3 opened the “Add Components” window a few times and then they closed it without doing mistakes, however, user4 did it many times and she added some special components on her page. In her case, it might cause big disaster on the web page, and there is no “undo” functionality existing in InfoGlue yet. Moreover, user5 commented that the item “Add Component” in the right-click menu seems to be the only useful item in the right-click menu.

Resolution 7.8. Show some help information when users point their mouse on it.

1.9. There is a mixture between component items and page items which is confusing users. For instance, “Edit text”, etc. refer to components, while “Change page meta data” and “Page structure” refer to the site node. (3)
In the testing, the users looked at the right-click menu, but none of them used it.

Resolution 7.9. Make a clear distinction between component items and page items. Page item should be always the same, accessible also from the component right-click menu.

1.10. Users do not get back to where they were when they switch between “Content Tool” and “Structure Tool”. (3)
It is sometimes hard for the users to find where they were in the tree structure since InfoGlue is a WCMS which can store a lot of information, and the pages are allowed to have same names. Moreover, even if users could find where they were, it takes time, and it annoys people.

Resolution 7.10. Let the system remember where the users were when they switch between “Content Tool” and “Structure Tool”.

1.11. Default repository[^12] is not the UU/IT repository. (3)

[^12]: “Repository” is a container which contains everything of a website in InfoGlue, such
This is not a problem for experienced users, but might be a problem for novice users of the system. It is indicates from user3, user4 and user5 that they were not aware at all that they were in the wrong repository even when they began to preform the task. It might take a long time for them to notice that they were in the wrong repository without warning from the observer.

Resolution 7.11. Configure UU/IT to be the default repository of information technology department.

1.12. If users do not choose template when they create new site nodes but afterward, a “Binding properties” window will be presented which make them confused. (2)
Since the template was there after users chose it, it is not good to let them bother with the “Binding properties” window which is unnecessary to them.

Resolution 7.12. Hide the “Binding properties” window from the users who are not be expected to use it.

1.13. Mixed English and Swedish on pages. (2)

Resolution 7.13. Modify to make every page have a uniform language version.

1.14. Except from user5, the other users never used the article, mini-article and image folders to store their articles, mini-articles and images. (2)
It indicates from the test that almost none of the users stored their articles and images in these three folders. Moreover, user2 got confused when she saw the article folder and mini-article folder because it is difficult for a novice user to understand the difference between them.

Resolution 7.14. Remove them or hide them from normal users.

1.15. The functionality of “My Desktop” is unclear. (2)
It is always good to know how users understand a system, so from a short interview before testing, it appears that user2 thought she could make a new page or modify a page from “My Desktop”, user3 thought it was a place to store some preferences that he had fixed for himself, user4 thought it was her site inside it. Because of that, they went there several times each to make sure that it

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as all the contents and structures of a website. One repository holds one specific website.

13 “Article” is a content type in InfoGlue
14 “Mini-article” is a content type in InfoGlue
15 “Image” is a content type in InfoGlue
was true that they really could not do anything there, it just a waste of attention. It might not be a big problem for users, but it confuses them, wastes their time and distracts them from the correct place for performing tasks.

Resolution 7.15. In the tree structure, it should be indicated where the content ought to be saved. This is better than hiding unsuitable folders since it preserves the former tree structure.

1.16. Users can select language version from a drop down list on a content page, but it appears that they can also select it from the button “change language”, this seems duplicated. However, the button “change language” changes the language settings that the content belongs to, while the drop down menu shows the corresponding language version. If these two are confused the system behavior unexpectedly which makes it hard from recover, a pop up window is always presented after users select a language version from the drop down list. Even the document is saved, the text presented in this window is “Are you sure you want to change? If you have any unsaved changes they will be lost.”. This could block some users from going to the next step. (2)

Resolution 7.16. Remove the button “change language”, since the need for this feature is limited. In the rare case, if the users want to change the language versions, they can copy the content between the language versions. Moreover, change the text of the pop up window to “Please make sure you saved all the unsaved changes before going to the next step!”, and show this only when changes have been done.

1.17. It is not possible to simply remove a page that has a version created by someone else. (2)

The feature as such is not bad - it keeps the user from accidentally deleting someone else’s information. However, the user does not get the correct information about what went wrong – just a notification about the page containing references that need to be removed first. Furthermore, the link (s) that appears in this notification leads to the wrong page (s), from which it is not possible to resolve the problem.

Resolution 7.17. Show the correct information about what has happened and how to resolve the problem if the action was intentional.

1.18. Preview mode is making users lost. (2)
It indicates from the testing that no user use the preview mode, since they can preview when they edited pages under structure tool. User2 from the test went to the preview mode when she was trying something out and she was lost there, she did not know how to go back. It is not a big problem but also it is not necessary to have it because people might get lost.

Resolution 7.18. Remove this button.

1.19. The latest UU/IT template does not work. (2)
Resolution 7.19. Hide it from users.

1.20. The text and buttons on the interface of InfoGlue are too small for some users to read. (1)
Resolution 7.20. Make the buttons and texts adjustable.

2. Article problems

2.1. Three different windows are presented before users can see the page for editing articles when they attempt to create new article or edit article from a site node. (4)
It is indicated from the testing that user2, user4 and user5 stopped from the first window which is “bind a content to”, user3 stopped from the second window which is “create name and choose type for the container”, moreover, all the four novice users stopped from the third window which is for uploading files, and none of them needed to upload any file. Only user4 and user5 managed to go through this window without help from the observer, because they noticed the “NEXT” button there. However, user5 was confused about which button he should choose, the “SAVE” button or the “NEXT” button. It is very obvious that without the help from the observer, none of them can go through the three “doors” to finally reach the page for editing articles. It is a very serious problem, but only for novice users, and for experience users, it means unnecessary work.
Resolution 7.21. Remove the window for uploading files and combine the other two windows with the content page. This reduces unnecessary steps also for experienced users since the main goal when creating an article is not to upload a file. Moreover, make the meaning of buttons more clear to the user.

2.2. Users cannot choose an article to add onto a mini article container on a web page, it will break the web page. (4)
It is indicated from the testing that user5 broke almost all his
pages because of this behavior, and he was totally confused about what had happened.

Resolution 7.22. Is the mini article component necessary, since CSS\textsuperscript{16} can do the formatting for articles?

2.3. Users get confused by link “Create New Article” and link “Edit Article” on a site node. They prefer to always click on “Create New Article”. (3)

The first time when users want to create new text or image, etc. to a page, they need to choose “Create New Article”. However, when some content already exists, and they want to add or modify the content, they should not use “Create New Article” except when they want to override their pages with some new content, but instead “Edit Article” or “Choose Article”. It is indicated from the testing that user2 clicked on “Create New Article” when she attempted to link a PDF\textsuperscript{17} file to the paragraph that she created before, and the paragraph was overridden by the link to the PDF file. She was not able to recover the paragraph from it. Moreover, user4 would have made the same mistake if the observer did not prevent her from doing it. She commented that she had added contents successfully last time by using “Create New Article”, so it was the right place to add more things. It is not a problem for experienced users, but might be a very big problem to inexperienced and occasional users, because they might destroy their own pages as well as the other pages by simply clicking on “Create New Article” without any warning.

Resolution 7.23. Combine “Create New Article” and “Edit Article” to “Edit Article”, remove the links and let users use the right-click menu. Furthermore, this will establish right-click as a standard way of working in InfoGlue.

2.4. Users get confused by window “Edit Node Properties” and window “Edit Article”. (3)

The window for “Edit Node Properties” and “Edit Article” look exactly the same in InfoGlue, which confused and misled the users. InfoGlue gives users a lot of information per page, which lead them to forget things quickly, so when users see two different windows with the same appearance, it is not easy for them to distinguish between them.

\textsuperscript{16}Cascading Style Sheets is a style sheet language used to describe the presentation semantics (that is, the look and formatting) of a document written in a markup language.

\textsuperscript{17}Portable Document Format is a file format created by Adobe Systems in 1993.
Resolution 7.24. Make them look different from each other, for example, change the colour for one of them.

2.5. “Paste As Plain Text” window for copying text into the full text area. (3)
It indicates from the testing that user2, user3, user4 and user5 all attempted to copy their text into the full text area first, and user2, user3 and user4 attempted it several times, and then user2, user3 and user5 noticed that there was a “Paste As Plain Text” window existed, and they copied their text there, however, user4 did not notice this window without a remark from the observer, and after she failed to copy her text into the full text area for the fifth time, she wondered if she had to type the text by herself instead. All of them said “stupid” to the “Paste As Plain Text” window. Since user1 did not suffer from this problem, this is also a problem only for novice users.

Resolution 7.25. a) Make it possible that users can copy their text directly into the full text area. b) Has “Paste As Plain Text” as an option for copying text (This only works well in Internet Explore).

2.6. The procedure to link to an internal file is complicated. (3)
First users need to click on a button “Choose from InfoGlue” from tab “Link Info” on window “Link”. It indicated from the test that it is not obvious for some users to click on the button “Choose from InfoGlue”. Then they need to choose the tab “Link to internal file” from the other window “Choose file or page to link to”, and under tab “Link to internal file” there are four more tabs. It is not intuitive for the users. Moreover, if users want to change the link to another file, it is possible that they delete it from the original location by mistake.

Resolution 7.26. a) Aggregate all different windows and buttons into one frame; b) Allow users to create links by dragging structure items to the text area.

2.7. The uploaded files which were uploaded from the window “uploading files” or from the button “attach file” are attached to the content pages, but to actually add the files to the content page requires that the user creates a link in the content page. (2)

Resolution 7.27. a) To reduce confusing of uploading files; b) Make “drag and drop” work as user expected.

2.8. Navigation title for a content page. (2)
A content page is for storing contents inside it and displaying itself
on a web page, so it is unreasonable to have a navigation title for a content.

Resolution 7.28. Remove it or express the meaning of it to users in a better way.

2.9. Users do not know what “container” refers to in the window “create name and choose type for the container”, and the types they can select in the window are “Article” and “Article”. (2)

Resolution 7.29. Because the types that users can choose are “Article” and “Article”, so remove it and make “Article” as the default type. Combine this window with the content page.

2.10. After copying some text from a file to the full text area of a content page, the formatting is gone. (2)
User5 noticed this and he commented that it was quite possible to preserve the formatting of the text unless the text was created in some strange ways.

Resolution 7.30. Make it possible to preserve the formatting and see 2.5.

2.11. After users create a new article on a web page, a “Binding properties” window will be presented which make users confused. (1)

Resolution 7.31. Hide the “Binding properties” window from the users who are not be expected to use it.

2.12. When users attempt to paste text into “Paste As Plain Text” window, the help information on that window is press “Ctrl + V” to paste your text which misleads the users who use Mac computers, because they need to press “Command + V” to paste their text. (1)

Resolution 7.32. Let users know that they can paste their text by pressing “Ctrl + V” or “Command + V”.

2.13. “Lead in text” on a content page. (1)

It is not necessary to have a “lead in text” on a content page since people can edit their “lead in text” from the full text area, it is kind of duplicate to have both “lead in text” area and “full text area”. It ought to be mentioned here is that actually the users do not need to fill anything in the “lead in text” area, but it indicates from the test that most users filled it up with something rather than left it empty.

Resolution 7.33. a) Explain the purpose and usage for lead in text more clearly. b) Remove it.
2.14. Related articles and areas on a content page. (1)
It might be a good functionality of InfoGlue, but life might be
easier without them. It is not a problem for users since no one
cares about them, but they might annoy users.

Resolution 7.34. Remove them or make use of them.

3. Image problems

3.1. Rescale image button is invisible for users. Moreover, it does not
look like a button for rescaling. (3)
It indicated from the testing that all the users suffered from this
problem. User1, user3 and user5 did not find this button at all. User2 found this button but because she could not manage to save
her changes to the image, she started to doubt that the rescale
button was for rescaling. User4 found this button but she was not
so sure the button was for rescaling since nothing indicated that
it was. None of the users from the testing found it or notice it,
and user1 and user2 were totally confused and frustrated. It shows
that this is a problem for experienced users as well as novice users.

Resolution 7.35. Make the button bigger and looking more like
a rescale button. Moreover, when a user points her mouse on it,
shows some help text such as “rescale the image” to the user.

3.2. Rescale image button is separated from a window where users can
adjust other kinds of properties (such as Hspace\(^{18}\) and Vspace\(^{19}\)
of an image. (3)
Users might use the rescale property much more often than other
kinds of properties (such as Hspace and Vspace) of an image, and
it is easier for all the users to understand the rescale property of
an image rather than others, so it is no point to put other kinds of
properties of an image in an obvious place but without the rescale
property.

Resolution 7.36. Put them together in one window.

3.3. Users have to save their rescaled images twice in two different
windows (rescale window and uploading window) in order to save
the rescaling to their images. (3)
It is hard for some users to perform. For instance, user2 in the
test rescaled the image, saved it one time, and she did these two
steps several times, but the image was still the original one which

\(^{18}\)Hspace sets the horizontal space between the image and surrounding text.

\(^{19}\)Vspace sets the vertical space between the image and surrounding text.
made her very frustrated and she started to doubt that what she
did was right. This is a problem to a group of users who are not
aware of saving their works by themselves.

Resolution 7.37. a) Make users only need to save once. b) Show
some warning information to the users when they do not actually
save the image before they switch to some other task.

3.4. User5 tried to use link “Create New Article” to add an image, he
pressed the link and then chose folder “Image” to store his image,
but the container type shows from the “create name and choose
type for the container” window is “Mini Article”. He remarked
that he did not know what a mini article was, but that it did not
sound like an image type. (2)

Resolution 7.38. Make “Image” the default type under folder “Im-
age”. Combine this window with the content page.

3.5. Users are forced to give a keyword to the images that they ad-
justed. (1)
It is not a big problem, but it annoys people.

Resolution 7.39. Users can decide if they want a keyword for an
image or not.

4. Navigation problems

4.1. “Sort Order” does not work unless users rearrange all the items
with numbers. Moreover, the numbers from “Sort Order” are hard
for some users to understand. (4)
It is not reasonable, it will prevent people from rearranging their
navigation menu easily, and when the navigation menu is long,
even if users know how it works, it is still hard for them to assign
an order to each navigation item correctly. It is a problem for all
the users of InfoGlue.

Resolution 7.40. Modify the logic under “Sort Order” to make the
rearranged navigation items rearrange in all cases.

4.2. “Sort Order” from the “Edit Node Properties” window which is
for rearranging the navigation menu is invisible/meaningless for
users. (3)
It indicates from the testing that none of the users noticed the
item “Sort Order” in “Edit Node Properties” window without
help from the observer, which means it is “invisible” to users.
Moreover, even after the observer pointed it out to the user3 and
user4, they still could not understand it was for rearranging the
navigation menu. It is a problem for experienced users as well as novice users.

Resolution 7.41. a) It would be better if there are two buttons displayed beside the navigation menu which can move navigation items up and down. Then users only need to click on the buttons to rearrange the navigation items easily. b) Make “drag and drop” work for rearranging the navigation menu.

4.3. The text following “Sort Order” is “undefined 76”. (2) The “undefined 76” is meaningless to users, and it makes users confused. User5 remarked that the “undefined 76” was a little bit strange.

Resolution 7.42. Remove it and put some meaningful text which could explain what “Sort Order” does. For instance, “Sort Order is for rearranging the navigation menu”.

7.3 Improved prototypes

This subsection is targeted at a group of users who wish to create web pages but do not wish to use the advanced functionality of the system. Thus the functionality I changed and removed might be useful in some other test cases. I will present the current interfaces of the InfoGlue system, and pointed out the problems found by real users' testing. After that, the improved prototype will be presented as well.

Before I present the current interfaces and the improved prototype, first I want to address one major change from the interfaces of content tool and structure tool: I removed those interface buttons, instead I put them in the right-click menu. Because 1) all the users tried to right-click several times in the tree structure without success; 2) the buttons are different in each context and therefore the user has difficulties to remember where certain functionality can be found or even to notice that the buttons have changed; 3) users do not understand the functionality of some buttons, right-click would be more contextual.

The current interface of a site node (web page) is presented in Figure 6 and the following items 1 to 9 reflect to the marks in Figure 6:

1. Those buttons are unnecessary for the users. The users can finish their tasks without having any of them. I removed them from the improved prototype for a content page.

2. Motivated by problem 4.1, 4.2, 4.3. Add a “drag and drop” functionality to change the order of the navigation items. When users point their
Figure 6: Interface of a site node

mouse on navigation items, changing the shape of the cursor, showing a help text to inform users that they can use “drag and drop” to rearrange navigation items.

3. Motivated by problem 1.7. When users add new components here, make sure the new components will not override the navigation menu.

4. Motivated by problem 2.3. I removed the link “Edit Article”, “Choose Article” and “Create New Article” from the improved prototype. Instead I put them into the right-click menu, and I removed “Override Article”.

5. Motivated by problem 1.4. Make sure the inheritance works properly here.

6. Motivated by problem 1.10. Please let the system remember where the users were when they switched between “Content Tool” and “Structure Tool”.

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7. It is indicated from my tests that the users attempted to use “drag and drop” to move sites and site nodes, and they also attempted to right-click to perform their tasks. Therefore to add the “drag and drop” and right-click menu here in the left file hierarchy could bring convenience to the users.

8. Motivated by problem 1.11. Configure UU/IT to be the default repository of information technology department.

9. Motivated by problem 1.9. Make the default tab “Structure Tool”.

The improved prototype of a site node (web page) is presented in Figure 7 and this interface should be presented when users enter into the InfoGlue system refers to problem 1.1. If users right-click from the main area and choose “Edit Article” from the right-click menu, the content page will be presented in Figure 9, and users could create new content or edit their existed content from there:

![Figure 7: Improved prototype of a site node]

The current interface of a content page is presented in Figure 8 and the following items 1 to 8 reflect to the marks in Figure 8:

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Figure 8: Interface of a content page
1. Those buttons are unnecessary for the users. The users can finish their tasks without having any of them. I removed them from the improved prototype for a content page.

2. Motivated by problem 2.8. I removed it from the improved prototype.

3. Motivated by problem 2.13. I removed it from the improved prototype.


5. Motivated by problem 1.10. Please let the system remember where the users were when they switched between “Content Tool” and “Structure Tool”.

6. It is indicated from my tests that the users attempted to use “drag and drop” to move folders and contents, and they also attempted to right-click to perform their tasks. Therefore to add the “drag and drop” and right-click menu here in the left file hierarchy could bring convenience to the users.

7. Motivated by problem 1.16. When users attempt to change a language version, a pop-up window is presented with text “Please make sure you saved all the unsaved changes before going to the next step!”.

8. Motivated by problem 1.3. When users want to leave a page without saving, a pop-up window is presented with text “Do you want to save changes before leaving?”.

The improved prototype of a content page is presented in Figure 9. When the users press the “SAVE” button, another window is presented in Figure 10 to ask them to choose a place inside the InfoGlue system to save their content page. And after that, they should be back in their web pages (Figure 7):

It is indicated from my testings that most of the users met problems when they attempted to add images to their pages. They could not find the rescale button, they forgot to save. All of them got confused or lost by the complicated processes of adding images to their pages. The current interfaces for adding an image to a content page is presented in Figure 11 and the following items 1 to 3 reflect to the marks in Figure 11:

1. This window is presented first when users press the “Insert/Edit Image” button. Though it has a tab “Upload” and a button “Choose from
InfoGlue", they are mixed up with editing properties of images. It is more like a place mainly for editing the properties of images, but not to choose or upload an image to add to a content page. In my improved prototype, I suggested this window only work as the window for editing image properties.

2. This window will be presented when users press button “Choose from InfoGlue” from window 1. It is the window mainly for insert images to a content page. In the current interface, users can use their own images and they can also use the images from other person, and all these images are shown in this window without any difference. However, the person who own an image can delete the image without informing the users who have used the image in their pages, and the image will be removed from their pages. Moreover, any user in the system can delete other users’ images. They might cause big disasters to the system. In my improved prototype, I suggested to distinguish the images that belong to a user or not, and according to that, providing different options to users to make sure the users cannot delete other person’s images as well as get a warning information when they want to use other person’s
3. Motivated by problem 3.5. In my improved prototype, I removed the “keyword” option from users.
The improved prototype for adding an image to a content page is presented in Figure 12.

Figure 12: The improved interface for adding an image to a content page

The current interfaces for linking files to a content page is presented in Figure 13, and the following items 1 to 3 reflect to the marks in Figure 13.

1. Motivated by problem 2.6. This window is presented first when users press the “Insert/Edit Link” button. No matter the users press the button “Choose from InfoGlue” or go to tab “Upload” and upload a file there, they always have to go to the window 2 to actually link the
file to a content page, and all these things can be done in window 2. So I removed this window in my improved prototypes.

2. This window will be presented when users press button “Choose from InfoGlue” from window 1. It is the window which links files to a content page. In the current interface, users can use their own files and they can also use the files from other person, and all these files are shown in this window without any difference. However, the person who own a file can delete the file without informing the users who have linked the file in their pages, and the file will be removed from their pages. Moreover, any user in the system can delete other users’ files. They might cause big disasters to the system. In my improved prototype, I suggested to distinguish the files that belong to a user or not, and according to that, providing different options to users to make sure the users cannot delete other person’s files as well as get a warning information when they want to link other person’s files in their own pages.

3. Motivated by problem 3.5. In my improved prototype, I removed the “keyword” option from users.

The improved prototype for linking files to a content page is presented in Figure 14.
Figure 14: The improved interface for linking files to a content page
8 Evaluation

There is a big gap between how we think people use a system and how they actually use them. We might think people want a system which meets all kinds of requirements by providing lots of functions to them, but it was indicated from my testing with the real users that they rather want the core functionality in the system to be easy to use. It was common for the users to spend much time during the tests glancing at each button, right-click items, switching between different tabs, and trying things which they thought was right for performing their tasks. There were many buttons and items which they never even clicked once. One user from my testing commented on the system: “This system might have thousands of functionality, I just feel it is overkill to use it. There are thousands of functionality but actually you just need five to create your web pages.” In order to avoid that, I believe a system developing team need to concentrate on the system’s core functionality, concern with users’ needs, focus on usability throughout the entire system life cycle. Usability focus can be applied by educating the system developers with usability understanding and knowledge or by hiring trained usability engineers.

8.1 Discussion

The following discussions will focus on the questions in my thesis specification, and I will present my opinions mainly based on my understanding to the usability theory and the User-Centered System Design theory which I studied in Chapter 4, as well as my testing results.

How do WCMSs best support the work of the members of an organization?

For the purpose of best supporting the work of the members of an organization, a WCMS should offer functionality which is enough for the users in an organization to fulfill their work tasks. Moreover, the WCMS should be easy to learn and use, and not present an obstacle in their regular work. These two points can be checked by performing usability evaluation on users. As a web publishing tool chose by Uppsala University, the WCMS is like an “information channel”. However, it is not a primary tool for the employees in the Department of IT, but only for them to publish information about their teaching and researching on the web. Therefore the WCMS should aim at aid and facilitate the web publishing tasks of the employees, it should be easy to learn and use, and not become a burden to the employees in their
daily work.

It is important that each part of the WCMS is usability tested and probably redesigned before applying it to the organization. The reason is that the designers will be aware of the usability problems and system bugs from the system, and can better understand how the members of the organization expect from the system, therefore they can adjust the system to ensure that the system will fit the needs and requirements of the organization properly. Another reason is that users will not adjust easily to usability problems in the WCMS [L´arúsdóttir’09], which means that they will suffer from the poor usability of the system and refuse to learn the hardest parts of the system.

Evaluation and redesign should be repeated as often as necessary. However, introductory training and technology support can be carried out for optional support.

What problems are there with providing increased and more advanced functionality in systems generally? Is there a limit for how much it is reasonable that a WCMS provides?

Providing increased and more advanced functionality in systems itself is possible, however, it may lead to a more complicated system that is difficult to ensure usability in. It is not enough to only consider functionality in a system, but also the harmonious interaction with other elements of the system as well as the users. For instance, it should be easy to find and easy to use, and it should be easy to go back to the main interface, it should not distract users who will not use it, etc. To sum it up, the difficulties to ensure usability throughout a whole system make it even harder to apply usability throughout a complicated system.

Furthermore, the human has limitations of their working memory. Working memory is a short-term memory store holding material for up to 30 seconds and very limited in size, holding only three or four “chunks” of information [Benyon et al.’05]. A chunk is the largest meaningful unit in the presented material that the person recognizes [Wikipedia2’09]. It indicates that the human are generally only able to recall and recognize between three and four “chunks” of information. The more functionality a system provides to users, the more information the users will gain from the system, but the more difficult it is for users to remember what they need to remember. They will be frustrated and they will fail. If they fail, then the system fails. Therefore there is probably a natural limit for how much functionality a WCMS is to provide to users based on users working memory limitations. Suppose one information “chunk” could stand for one group of functionality in the WCMS, for instance, a right-click menu or a list of navigation items, then
the WCMS should not provide more than four groups of functionality per interface.

Is it possible to design a system so that it does not require introductory training?

It is possible in theoretical, if the usability aspects are concerned and taken into account during a system development process. And if a design can make the users’ mental model consistent with the design model of a system, the need for introductory training may be avoided. However, usability aspects are often ignored or omitted by a design team during the design life cycle. The resistance to users involvement and attitudes like “things will work out anyway”, “an introductory training will solve all problems” hinder designing a system that does not require introductory training [Rosenbaum et al. 00].

Involving users is often considered to be too time-consuming and expensive, but a later introductory training will definitely be much more time-consuming and costly. And no one can make sure that it will really help users improve. A study described in [Láruskir 09] indicates that tasks that are very difficult for users to solve to begin are difficult to perform still after six months usage.

It seems quite hard to find a system which does not require introductory training in reality. However, it is still possible to reduce introductory training to a minimum by concerning and applying usability throughout a system development process.

How should the intended WCMS be designed so that the need for introductory education is reduced?

Fix the usability problems that exists in the interface and work process of the WCMS according to the usability evaluation results. Reduce the need for users to think and remember by showing all information needed to perform a task. For instance, when creating an article, the heading should be shown. Hiding the advanced functionality with options and buttons from them by setting access rights. Ensure the interface is simple and intuitive for users to learn, and the interaction between users and the system is recognizable and predictable for the users.

Continuous usability evaluation and re-design is necessary, and the design should always consider all different kinds of requirements and capabilities of users.
What different roles or permissions should a system provide in order to best support the work of the intended users and what functionality do these roles imply?

After analyzing the results from testing users, the different types of users and their goals are identified. Except the users who have to be expert users of the system, who are responsible for the Department of IT’s web publishing, the users just wish to stay as normal users. They require just the basic and core functionality that helps them accomplish their tasks. We had a meeting with the university’s WCMS support team before the testing, and we initially thought that there must be users who are good at programming and web knowledges who would like to have more freedom to maneuver the system. However, the test results from the two programming and web experts (user 3 and user 5) indicated that neither of them want to be an expert user, see Appendix C.3 for more information. Their answers to whether they want to become experts of the system were as following:

User 3: “No, I don’t want, the basic functionality are enough for me. If I want to style my pages, the text editor is enough for me.” – He can switch from visual mode to HTML tag in the text editor, and write his CSS codes directly there in order to style his pages.
User 5: “Ideally I would like not to have to, but I think I would still, sometimes be able to do such things.”
User 5: “Yes, I want to be an expert user, but I don’t want to have to be it all the time.”

The results more or less surprised me. We thought that people with different backgrounds would require different freedom from the system, but they only want the core and basic functionality to finish their tasks. Therefore I divided the users with their goals simply into three groups:

1. Normal users – Responsible for making their web pages using the WCMS.
2. Advanced users – Responsible for managing and maintaining the department’s page templates and web pages, helping normal users.
3. System developers – Responsible for maintaining the WCMS, developing new functionality according to real users’ needs, and giving technical support to the users.

Moreover, the advanced functionality could be hidden from the normal users through setting access rights.

System designers quite often put lots of functionality into a system to ensure that the system have met all kinds of users’ requirements. But the result is often that users only get lost and frustrated when they are using the
system. A powerful system with poor usability is much worse for its users than a simple system with good usability. People will give up in their way to reach those powers when the system is too complicated for them. And it is thoughtless to develop some advanced functionality just because certain type of users have the capabilities to learn and use them. The focus should be both on the utility and the usability when considering additional features. Developing a system without considering the need of users might lead to big system disasters.

In order to best support the users in fulfilling their goals, user participation throughout the system development is very important. The designers must understand the users, their requirement, cognitive behavior, capabilities and the characteristics of their work tasks. The design should start from the needs of the users. For an existing system like the intended WCMS, it could be a continuous iteration in order to fix usability problems which are existing in the system, but it will still be cheaper and less time-consuming than technology support and training. Moreover, it solves the problems essentially.

8.2 Future work

The next step is to do a usability testing based on my test results – the improved prototypes. The goal is to investigate whether my resulting design is valid and effective, and whether my results help solve some usability problems from the interface and the work process of the WCMS.

It could be interesting to do a comparison between the results from expert analysis and the results from end-user testing, and to see if they fit well with the research results from [Lárusdóttir’09] of using different evaluation methods.

8.3 Conclusion

To relieve the reader from any confusion about what the tasks for this thesis have been, I will begin this conclusion with a short summary. The tasks were: 1) identified and analyzed possible usability problems in the user interface and the work process in the WCMS; 2) re-designed the interfaces with lo-fi prototypes for the system to better fit the needs of the users.

The person from the test sessions were all glad to know that I was trying to identify the poor usability in the system and make improvements to it. And the developing team of the WCMS was very interested in my work results. The improved prototypes are not only a change to the interface, but the whole interaction with creating web pages. Quite a lot of unnecessary
functionality were removed from my lo-fi prototypes, and some system bugs were found with resolutions.

All in all, systems are made to facilitate and aid the humans, but not present obstacles in their work tasks. And a system with good usability increases the satisfaction of users. Thus usability evaluation should always be concerned and taken into account in the system development.
References


A Detailed Hierarchical Task Analysis (HTA)

The following is presented the detailed the action sequences for accomplishing the sub task of making course home page and the associated system responses, as well as the detailed hierarchical task analysis figures continue from Figure 1:

Task (2.1.2): Create new site as course homepage (Figure 15):
Action sequences: The six required actions for accomplishing this task and the associated system response on Infoglue system are as follow:
2.1.2.1. Find repository where you will built your site in.
Infoglue: Lists all the existing repositories in the system.
2.1.2.2. Click on the name of the repository.
Infoglue: The contents belong to the repository is shown in the left navigation side. The tool tab is presented at the top of main task area.
2.1.2.3. Click on “NEW SITENODE”.
Infoglue: “Create new page” is presented in the main task area.
2.1.2.4. Create new site.
2.1.2.4.1. Create new “SiteNode name”.
Infoglue: The new site node name is presented in the text area.
2.1.2.4.2. Choose “SiteNode type”.
Infoglue: A chosen type is presented from the drop down list.
2.1.2.4.3. Click on “SAVE”.
Infoglue: A new site node is presented from the left navigation side and a empty page with some existing templates is presented from the main task area.

Figure 15: HTA for 2.1.2 continue

Task (2.1.3): Create new site node for course homepage (Figure 16):
Action sequences: The five required actions for accomplishing this task and the associated system response on Infoglue system are as follow:

2.1.3.1. Click on the name of the new site.
Infoglue: The tool tab is presented up at the top of main task area.
2.1.3.2. Click on “NEW SITENODE”.
Infoglue: “Create new page” is presented in the main task area.
2.1.3.3. Create new site pages.
2.1.3.3.1. Create new “SiteNode name”.
Infoglue: The new site node name is presented in the text area.
2.1.3.3.2. Create “SiteNode type”.
Infoglue: A chosen type is presented from the drop down list.
2.1.3.3.3. Click on “SAVE”.
Infoglue: A new site node is presented from the left navigation side as a sub node of the new site, and an empty page with some existing templates is presented from the main task area.

Figure 16: HTA for 2.1.3 continue

Task (2.2.3): Create new site node for course homepage (Figure 17):
Action sequences: The six required actions for accomplishing this task and the associated system response on Infoglue system are as follow:

2.2.3.1. Click “here” on Infoglue working area.
Infoglue: An “add components” window pops up.
2.2.3.2. Choose component which will be template of the site.
Infoglue: The “add component” window closes and a “bind properties” window pops up.
2.2.3.3. Bind properties to the page.
2.2.3.3.1. Click on “undefined” from the pop-up window.
Infoglue: A “choose page/content” window pops up.
2.2.3.3.2. Choose properties to bind to the page.
Infoglue: The picked property has an underline on it.
2.2.3.3.3. Click on “SAVE”.
Infoglue: The “choose page/content” window closes and the “undefined” from the “bind properties” window changes to the name of binding page or content.
2.2.3.4. Click on “SAVE & EXIT”.
Infoglue: The “bind properties” window closes.

![HTA for 2.2.3 continue](image)

Figure 17: HTA for 2.2.3 continue

Task (2.3.2): Create new folder for course homepage (Figure 18):
Action sequences: The five required actions for accomplishing this task and the associated system response on Infoglue system are as follow:
2.3.2.1. Click on the name of the repository.
Infoglue: The contents belong to the repository show in the left navigation side. The tool tab is presented up at the top of main task area.
2.3.2.2. Click on “NEW FOLDER”.
Infoglue: “Create new folder” is presented in the main task area.
2.3.2.3. Create new folder.
2.3.2.3.1. Create new “Container name”.
Infoglue: The folder name is presented in the text area.
2.3.2.3.2. Choose “Content type”.
Infoglue: A folder type is presented from the drop down list.
2.3.2.3.3. Click on “SAVE”.
Infoglue: The folder is presented from the left navigation side.

Task (2.3.3): Create new contents for course homepage (Figure 19):
Action sequences: The nine required actions for accomplishing this task and the associated system response on Infoglue system are as follow:
2.3.3.1. Click on the name of the new folder.
Infoglue: The tool tab is presented at the top of main task area.
2.3.3.2. Click on “NEW CONTENT”.
Infoglue: A “create new content” window pops up.
2.3.3.3. Create new content nodes.
2.3.3.3.1. Create new “Container name”.
Infoglue: The name of the content was filled in the text area.
2.3.3.3.2. Choose “Content type”.
Infoglue: The chosen type is presented from the drop down list.
2.3.3.3.3. Click on “SAVE”.
Infoglue: The “content version” is presented in the main task area.
2.3.3.4. Add contents to content nodes.
2.3.3.4.1. Create “Title” of new content.
Infoglue: The title was filled in the text area.
2.3.3.4.2. Create “Navigation title” of the new content.
Infoglue: The navigation title was filled in the text area.
2.3.3.4.3. Create “Full text” of new content.
Infoglue: The full text was filled in the text area.
2.3.3.4.4. Click on “SAVE”.
Infoglue: “Content details” is presented in the main task area.

Task (2.4.1): Add navigation components for course homepage (Figure 20):
Action sequences: The seven required actions for accomplishing this task and the associated system response on Infoglue system are as follow:
2.4.1.1. right-click on where you wish to put the navigation components.
Infoglue: The right-click menu is presented up.
2.4.1.2. Click “Add components” from the right-click menu.
Infoglu: “Choose components to add” window pops up.
2.4.1.3. Choose component which will be navigation menu of the site.
Infoglu: The “Choose components to add” window closes and a “bind properties” window pops up.
2.4.1.4. Bind site nodes to the navigation menu.
2.4.1.4.1. Click on “undefined” from the pop-up window.
Infoglu: “Choose site node” window pops up.
2.4.1.4.2. Add site nodes to bind to the navigation menu.
Infoglu: The added site nodes are shown from the right side of the “Choose site node” window.
2.4.1.4.3. Click on “SAVE”.
Infoglu: The “Choose site node” window closes and the “undefined” from the “bind properties” window changes to the names of the binding pages.
2.4.1.5. Click on “SAVE & EXIT”.
Infoglu: The “bind properties” window is closed.
Task (2.4.2.1): Create main contents for each site node in course homepage (Figure 21):
Action sequences: The seven required actions for accomplishing this task and the associated system response on Infoglu system are as follow:
2.4.2.1.1. right-click on the main area of a site node.
Infoglu: The right-click menu is presented.
2.4.2.1.2. Click “Add components” from the right-click menu.
Infoglu: “Choose components to add” window pops up.
2.4.2.1.3. Choose component which will be main components of the site.
Infoglu: The “Choose components to add” window closes and a “bind properties” window pops up.
2.4.2.1.4. Bind content nodes to main component.
2.4.2.1.4.1. Click on “undefined” from the pop-up window.

Infoglue: “Choose content” window pops up.

2.4.2.1.4.2. Add content nodes to bind to main component.
Infoglue: The chosen content node is presented with an underline.

2.4.2.1.4.3. Click on “SAVE”.
Infoglue: The “Choose content” window closes and the “undefined” from the “bind properties” window changes to the name of binding content node.

2.4.2.1.5. Click on “SAVE & EXIT”.
Infoglue: The “bind properties” window is closed.

Task (2.4.2.2): Add footer information for each site node in course homepage (Figure 21):

Action sequences: The seven required actions for accomplishing this task and the associated system response on Infoglue system are as follow:

2.4.2.2.1. right-click on the footer area of a site node.
Infoglue: The right-click menu is presented.

2.4.2.2.2. Click “Add components” from the right-click menu.

Infoglue: “Choose components to add” window pops up.

2.4.2.2.3. Choose component which will be footer component of the site.

Infoglue: The “Choose components to add” window closes and a “bind properties” window pops up.

2.4.2.2.4. Bind content nodes to footer component.

2.4.2.2.4.1. Click on “undefined” from the pop-up window.

Infoglue: “Choose content” window pops up.

2.4.2.2.4.2. Add content nodes to bind to footer component.

Infoglue: The chosen content node is presented with an underline.

2.4.2.2.4.3. Click on “SAVE”.

Infoglue: The “Choose content” window closes and the “undefined” from the “bind properties” window changes to the name of binding footer information.

2.4.2.2.5. Click on “SAVE & EXIT”.

Infoglue: The “bind properties” window is closed.

Figure 22: HTA for 2.4.2.2 continue
B Cognitive walkthrough results and severity rating

The results for building structure of the course homepage are as following (Table B):

<table>
<thead>
<tr>
<th>Step</th>
<th>Walkthrough questions</th>
<th>Comments</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1.1. Go to structure tool</td>
<td>Will the user know what to do?</td>
<td>No, probably not. There is no information reminds users to start from here. And it is difficult to relate “structure tool” with “start from here to create new site”.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>No. No useful sign or information is presented here to tell users if they are right or what to do next.</td>
<td></td>
</tr>
<tr>
<td>2.1.2.1. Find repository where you will built your site in</td>
<td>Will the user know what to do?</td>
<td>Probably some users might not know what “repository” means. Yes. The lists of all existing sites are presented.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1.2.2. Click on the name of the repository</td>
<td>Will the user know what to do?</td>
<td>Yes, assuming there is a course homepage template site existed. Yes. The contents inside the repository are presented.</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1.2.3. Click on “NEW SITENODE”</td>
<td>Will the user know what to do?</td>
<td>No, probably the users understand “BUILD NEW SITE” but not “NEW SITENODE”. No. Although the newly created site node is presented, users won’t know it is a “folder” for holding the whole site but not a “site node”.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1.2.4.1. Create new “SiteNode name”</td>
<td>Will the user know what to do?</td>
<td>Yes.</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Yes.</td>
<td></td>
</tr>
<tr>
<td>2.1.2.4.2. Choose “SiteNode type”</td>
<td>Will the user know what to do?</td>
<td>Yes. Except they might choose wrong. Yes. They know what type they chose.</td>
<td>0</td>
</tr>
<tr>
<td>Step</td>
<td>Walkthrough questions</td>
<td>Comments</td>
<td>Severity</td>
</tr>
<tr>
<td>------</td>
<td>------------------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>2.1.2.4.3. Click on “SAVE”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Yes, the newly created site node is presented.</td>
<td>0</td>
</tr>
<tr>
<td>2.1.3.1. Click on the name of the new site</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>No. The users might not aware of building the structure of the site. Yes. The structure of the site is presented on the left navigation side.</td>
<td>1</td>
</tr>
<tr>
<td>2.1.3.2. Click on “NEW SITENODE”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Only if the above steps were successful achieved by the users. Yes, the “Create new page” page is presented.</td>
<td>1</td>
</tr>
<tr>
<td>2.1.3.3.1. Create new “SiteNode name”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Yes.</td>
<td>0</td>
</tr>
<tr>
<td>2.1.3.3.2. Create “SiteNode type”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Except they might choose wrong. Yes. They know what type they chose.</td>
<td>0</td>
</tr>
<tr>
<td>2.1.3.3.3. Click on “SAVE”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Yes, the newly created site node is presented.</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 1: Results of the cognitive walkthrough for building structure

The results for importing template of the course homepage are as following (Table 2):
<table>
<thead>
<tr>
<th>Step</th>
<th>Walkthrough questions</th>
<th>Comments</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2.1. Go to structure tool</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>No, probably not. There is no information reminds users to start from here. And it is difficult to relate “structure tool” with importing template. No. No useful sign or information is presented here to tell users that they are right or what to do next.</td>
<td>2</td>
</tr>
<tr>
<td>2.2.2. Click on empty site nodes</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Yes. An note appears to tell the users that they did the right thing.</td>
<td>0</td>
</tr>
<tr>
<td>2.2.3.1. Click “here” on InfoGlue working area</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. A note reminds users to do that. No, not obvious. A window pops up with the name “choose component to add” which seems not associated with “template”.</td>
<td>0</td>
</tr>
<tr>
<td>2.2.3.2. Choose component which will be template of the site</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>No, not obvious. Except the title of the component show that it is a template. Yes. The template is presented on the empty site node.</td>
<td>3</td>
</tr>
<tr>
<td>2.2.3.3.1. Click on “undefined” from the pop-up window</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>No. The template works fine. Users might only get confused by this “undefined” No, no obvious. A window is presented to ask user to bind properties, but they might not know why they have to do this.</td>
<td>3</td>
</tr>
<tr>
<td>2.2.3.3.2. Choose properties to bind to the page</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. No. They might ask why they have to do this when the template has already worked fine.</td>
<td>3</td>
</tr>
<tr>
<td>2.2.3.3.3. Click on “SAVE”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Yes. The binding properties are presented.</td>
<td>0</td>
</tr>
<tr>
<td>2.2.3.4. Click on “SAVE&amp;EXIT”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. No, not obvious. Although the properties binding window is closed, no information is presented to show users that the binding is saved.</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 2: Results of the cognitive walkthrough for importing template
The results for creating contents of the course homepage are as following (Table 3):

<table>
<thead>
<tr>
<th>Step</th>
<th>Walkthrough questions</th>
<th>Comments</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3.1. Go to content tool</td>
<td>Will the user know what to do?</td>
<td>No, probably not. There is no information reminds users to start from here for creating contents.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>No. No useful sign or information is presented here to tell users that they are right or what to do next.</td>
<td></td>
</tr>
<tr>
<td>2.3.2.1. Click on the name of the repository</td>
<td>Will the user know what to do?</td>
<td>Yes.</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. The contents inside the repository are presented.</td>
<td></td>
</tr>
<tr>
<td>2.3.2.2. Click on “NEW FOLDER”</td>
<td>Will the user know what to do?</td>
<td>Yes.</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. The “Create new folder” page is presented in the main task area.</td>
<td></td>
</tr>
<tr>
<td>2.3.2.3.1. Create new “Container name”</td>
<td>Will the user know what to do?</td>
<td>Yes.</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. The name is presented in the text field.</td>
<td></td>
</tr>
<tr>
<td>2.3.2.3.2. Choose “Content type”</td>
<td>Will the user know what to do?</td>
<td>Yes.</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. There is a drop down lists with all existed “content type” in it. Users just need to choose from it.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes. The chosen type is presented.</td>
<td></td>
</tr>
<tr>
<td>2.3.2.3.3. Click on “SAVE”</td>
<td>Will the user know what to do?</td>
<td>Yes.</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. The folder is presented on the left navigation side.</td>
<td></td>
</tr>
<tr>
<td>2.3.3.1. Click on the name of the new folder</td>
<td>Will the user know what to do?</td>
<td>Probably. Except the users who did not create folder before.</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. The tool tab is presented on the top of the main area.</td>
<td></td>
</tr>
<tr>
<td>Step</td>
<td>Walkthrough questions</td>
<td>Comments</td>
<td>Severity</td>
</tr>
<tr>
<td>------</td>
<td>----------------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>2.3.3.2. Click on “NEW CONTENT”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. “NEW CONTENT” button is presented for create new content. Yes. The “create new content” page is presented in the main task area.</td>
<td>0</td>
</tr>
<tr>
<td>2.3.3.3.1. Create new “Container name”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Probably yes. Some user might confuse about “Container name”. Yes. The name is presented in the text field.</td>
<td>1</td>
</tr>
<tr>
<td>2.3.3.3.2. Choose “Content type”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. There is a drop down lists with all existed “content type” in it. Users just need to choose from it. Yes. The chosen type is presented.</td>
<td>0</td>
</tr>
<tr>
<td>2.3.3.3.3. Click on “SAVE”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. The new content page is presented.</td>
<td>0</td>
</tr>
<tr>
<td>2.3.3.4.1. Create “Title” of new content</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Probably yes. Some users might confuse “Title” with “Container name”. Yes. The title is presented in the text field.</td>
<td>0</td>
</tr>
<tr>
<td>2.3.3.4.2. Create “Navigation title” of the new content</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. No. Users might not know when and where to use this “Navigation title”.</td>
<td>1</td>
</tr>
<tr>
<td>2.3.3.4.3. Create “Full text” of new content</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Yes. The content is presented.</td>
<td>0</td>
</tr>
<tr>
<td>2.3.3.4.4. Click on “SAVE”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. No, not obvious. No information is presented to show users that the content is saved.</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3: Results of the cognitive walkthrough for creating contents
The results for adding components to the course homepage are as following (Table 4):

<table>
<thead>
<tr>
<th>Step</th>
<th>Walkthrough questions</th>
<th>Comments</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.4.1.1. right-click on where you wish to put the navigation components</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. There has text to remind the users. Yes. The right-click menu is presented.</td>
<td>0</td>
</tr>
<tr>
<td>2.4.1.2. Click “Add components” from the right-click menu</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. No, not obvious. A window pops up with the name “choose component to add” which seems not associated with “navigation menu”.</td>
<td>0</td>
</tr>
<tr>
<td>2.4.1.3. Choose component which will be navigation menu of the site</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>No, not obvious. Except the title of the component show that it is a navigation menu. No. Not enough information is presented.</td>
<td>3</td>
</tr>
<tr>
<td>2.4.1.4.1. Click on “undefined” from the pop-up window</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Probably no. Users might only get confused by this “undefined” Yes. The “Choose site nodes” window is presented.</td>
<td>3</td>
</tr>
<tr>
<td>2.4.1.4.2. Add site nodes to bind to the navigation menu</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>No, not obvious. The text there is “The following page is bound so far” which gives no information about navigation. No. No information is presented.</td>
<td>3</td>
</tr>
<tr>
<td>2.4.1.4.3. Click on “SAVE”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Yes. The name of the bound site nodes is presented as navigation menu in the page.</td>
<td>0</td>
</tr>
<tr>
<td>2.4.1.5. Click on “SAVE &amp; EXIT”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Yes. The navigation menu is presented.</td>
<td>0</td>
</tr>
<tr>
<td>Step</td>
<td>Walkthrough questions</td>
<td>Comments</td>
<td>Severity</td>
</tr>
<tr>
<td>------</td>
<td>-----------------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>2.4.2.1.1. right-click on the main area of a site node</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. There has text to remind the users. Yes. The right-click menu is presented.</td>
<td>0</td>
</tr>
<tr>
<td>2.4.2.1.2. Click “Add components” from the right-click menu</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Probably yes. A window pops up with the name “choose component to add” which seems to be the right thing.</td>
<td>0</td>
</tr>
<tr>
<td>2.4.2.1.3. Choose component which will be main components of the site</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>No, not obvious. Except the title of the component show that it is a template for main components. No. Not enough information is presented.</td>
<td>3</td>
</tr>
<tr>
<td>2.4.2.1.4.1. Click on “undefined” from the pop-up window</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>No. Not obvious. Users might only get confused by this “undefined” Yes. The “Choose content for component binding” window is presented.</td>
<td>3</td>
</tr>
<tr>
<td>2.4.2.1.4.2. Add content nodes to bind to main component</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Here the user should use the content nodes that they built in task 2.3. No. No information is presented.</td>
<td>3</td>
</tr>
<tr>
<td>2.4.2.1.4.3. Click on “SAVE”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Yes. The bound content is presented in the page.</td>
<td>0</td>
</tr>
<tr>
<td>2.4.2.1.5. Click on “SAVE &amp; EXIT”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Yes. The content is presented in the page.</td>
<td>0</td>
</tr>
<tr>
<td>2.4.2.2.1. right-click on the footer area of a site node</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. There has text to remind the users. Yes. The right-click menu is presented.</td>
<td>0</td>
</tr>
<tr>
<td>Step</td>
<td>Walkthrough questions</td>
<td>Comments</td>
<td>Severity</td>
</tr>
<tr>
<td>------</td>
<td>-----------------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>2.4.2.2.2. Click “Add components” from the right-click menu</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Probably yes. A window pops up with the name “choose component to add” which seems to be the right place.</td>
<td>0</td>
</tr>
<tr>
<td>2.4.2.2.3. Choose component which will be footer component of the site</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>No, not obvious. Except the title of the component show that it is a template for footer information. No. Not enough information is presented.</td>
<td>3</td>
</tr>
<tr>
<td>2.4.2.2.4.1. Add content nodes to bind to footer component</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Here the user should use the content nodes that they built in task 2.3. No. No information is presented.</td>
<td>3</td>
</tr>
<tr>
<td>2.4.2.2.4.1. Click on “SAVE”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Yes. The bound footer information is presented in the page.</td>
<td>0</td>
</tr>
<tr>
<td>2.4.2.2.5. Click on “SAVE &amp; EXIT”</td>
<td>Will the user know what to do? If the user does the right thing, will they know that they have achieved progress towards their goal?</td>
<td>Yes. Yes. The footer information is presented in the page.</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4: Results of the cognitive walkthrough for adding components
C Usability Logs

This is a detailed logs from usability testing sessions that document the test subject’s activities, including detailed timings, as well as real time observations.

C.1 A short interview before the tests

User 1: Because user 1 has been using InfoGlue for a few month so the observer skipped those questions from her.

This is the interface of InfoGlue. Please give me your initial reactions to this interface without clicking on anything right now.

Have you ever seen the interface of InfoGlue before?

User 2: Yes, just very briefly.

User 3: No, I have never seen that before.

User 4: Yes, I think Mikael shows me this once but I don’t remember anything about it, and it was like half years ago.

User 5: Yes, I have seen the interface, the tabs, I know the difference between the content tool and structure tool a little bit.

Without clicking on anything yet, please describe the tabs you see on the interface and what you think they do.

User 2: She first pointed at “Content Tool” and said:”I guess it is the contents of the web, I guess I could see kind of overview of the web site from here.”. Then she pointed at “Structure Tool” and said:”I think that would be how the different parts are connected, I hope I can see that there.”. At the end she pointed at “My Desktop” and said:”I guess when I am supposed to make a new page or change a page which was already here, I will click here.”.

User 3: “Content Tool” will be to store the information. “Structure Tool” is probably to display the information. “My Desktop”, I have no idea, I have to click on it to see what did they mean by “My Desktop”, maybe some preferences that I have fixed for myself so that it is easier to manipulate the content and structure.
User 4: You said content was like different images, text, the things that are going to be at the page. Structure must be like if I have one main site then I have different under pages, something like that. And my desktop, it must be my site, I don’t know, no, maybe not the site but the codes I need to build the site.

User 5: The content tool is for managing the information, text and things like that. The structure tool is for managing the structures, I think it is the structures on a web page. I think you can put things from content into it, sort of match these things, so it can become a web page. My desktop, I have no idea, maybe for bookmark.

**Without clicking on anything yet, if you were exploring, what would you click on first? Why?**

User 2: I guess I will start from clicking on each folder from the left side (she pointed at “Content Tool” which is the first page users will see when they enter InfoGlue). And to see what I can relate my old experience of making web pages to InfoGlue.

User 3: First thing I will do is probably read this in the middle (he pointed at the text in the working area). And then probably I will click on “Repository”. And then I will click on the other two tabs (“Structure Tool” and “My Desktop”). And once I have these, I will probably click on “My Settings” to see what I can change to configure it for myself.

User 4: I think I will start from looking at different tags, because now I don’t know anything about this system really. So I think I would like to understand a little bit to see how it works.

User 5: Actually I think I will click on the repository thing, just to check out what height in that menu. It is standout on the interface. It is more readable compare to the other tiny text.

### C.2 Testing

**Task 1. Find site node “Kursinfo”.

User 1 (0.07 minutes): She went to the “Structure Tool” first and then she found site node “Kursinfo” from the site hierarchy on the left which are the correct steps of doing it.**
User 2 (3.14 minutes): She stayed at “Content Tool” page and chose the “Kursinfo” from the left hierarchy of the contents, then she said that it was easy without doubting she was wrong. Then the observer pointed “site node” to her and asked her what did that mean to her, and she said: “I read that site node means web page, but why doesn’t it say web page?” After that she asked the observer if that wasn’t what she wanted her to do, the observer said yes. Then she realized that she did the task wrong and she said that was not obvious to her. Later she attempted to do it again. She went to the “Structure Tool” and found the “Kursinfo”, however she wasn’t that sure this time and she asked the observer if this is the web page, which showed that she did the right thing but she might did not know that she was right.

User 3 (2.00 minutes): He first used the search function to search site node “Kursinfo” under “Content Tool”, but due to the default repository was not the UU/IT repository, so nothing was found after searching. Then the observer asked him to change to the right repository. After that, he switched between “Structure Tool” and “Content Tool” once, and then he was back in the “Content Tool”. He searched for the “Kursinfo” again using the search function, this time some linked titles with name “Kursinfo” were presented. He clicked on one of the titles and then a content page was presented, he checked the page for a while, and then he clicked on “Structure Tool” and commented that he had no idea where it was. Then he looked carefully on the site hierarchy from the left side and he found site node “Education”. Then he clicked on it and the site node “Kursinfo” was presented.

User 4 (1.24 minutes): She clicked on the “Structure Tool” first, then the observer noticed that the default repository was not the UU/IT repository, so she asked her to change to the right repository. After that she clicked on one site node from the left site hierarchy, and the site node was presented on the work area. And because it was a site map page, so she found a link to “Kursinfo” on the page and clicked on it, the “Kursinfo” page was presented. Then the observer remarked that she wanted her to find it from the left site hierarchy rather than inside a page, and then she found it there successfully.

User 5 (2.40 minutes): He went to “Structure Tool” first, but he was in the wrong repository which is the default setting of InfoGlue, so he could not find it. Then he went to “Content Tool”, and then he switched to “Structure Tool” again, and he still could not find it. Then he went to “Content Tool” again and he remarked that he was a little bit frustrated. After that he went into “Structure Tool” and “Content Tool” again and unfolded the folders,
but he still could not find it. Then he looked into “Publish Tool” which he remarked that it was not intuitively. Then he attempted to click on “My Desktop”, and at that time, the observer asked him to check from repository, then he chose the right repository from the list. After that he found a content page which had a name “Kursinfo”, and he was happy. Then the observer explained that it was a content but not site node, then he went to “Structure Tool”, and found the site node “Kursinfo”.

Task 2. Create a new page with name “Interaktionsdesign” under “Kursinfo”.

User 1 (0.12 minutes): She clicked the button “new site node” first and named the page as “Interaktionsdesign”, then she chose the template for the page, and save. However, she mentioned that she did not really understand what were the difference between different site node types. And she thought that the “Publish date” and “Expire date” could be useful for her.

User 2 (7.15 minutes): She went to the “My Desktop” first then she noticed that she went to a wrong place, then she went back to the “Content Tool” and clicked on several folders from the left hierarchy. She commented that she could not understand the difference between “Article” and “Mini Article”. Then she clicked on button “New Content”, but she was not sure that she should follow the steps of creating new content, so she just clicked around in “Content Tool”. She remarked that she was not sure whether she should choose “New Content” or “New Folder”. At that moment the observer told her what she did was not right, then she said she had no idea how to do it. After that she went to “My Desktop” again but it seemed that she did not want to try “Structure Tool” which was the right place for this task. So the observer gave her a hints which was: “Why don’t you try structure tool?” , then she went there and clicked on some pages from the left hierarchy, and then she clicked on “New site node”, after that she was quite sure that she was in the right track, and she created the “Interaktionsdesign” page.

User 3 (10.58 minutes): He went to the “Content Tool” and clicked on the folder “Article” from the left side, and inside that folder, he clicked on the folder “Kursinfo”. Then he went to “Structure Tool” and clicked on some items from the left side. After that he went back to the folder “Kursinfo” under “Content Tool”, and then he clicked on the button “New Content” and created a new content named “Interaktionsdesign” with type “Page Template”, then saved it. Then another page was presented with titles and empty text areas, he wrote “Interaktionsdesign” as the name, then
he clicked on the button “SAVE & EXIT TO COVER”. After that he went to “Structure Tool” and refreshed the page, and he clicked on the site node “Kursinfo” and opened the page. He attempted to find some differ on this page but failed, which referred that he had some misunderstanding about how “Content Tool” and “Structure Tool” worked. That was, after he created a new content from “Content Tool”, he thought what was changed in “Content Tool” would be automatically presented from “Structure Tool”, but it was not. After that he changed the setting of the page from “Working” to “Publish” and checked the site node “Kursinfo” again but there was still no change. Then he went back to “Structure Tool” and this time he noticed that there was a “New site node” button available, so he clicked on it and named it “Interaktionsdesign”, and then he chose the site node type as “HTML Page”, which led to a system error after he saved the page. After that he just clicked around and he commented that this was why it took one hour because it was far from intuitive. After several unsuccessful attempts, the observer asked him to delete the site node and content page which were created by him. Then he clicked on “New site node” from “Structure Tool” again, and the observer asked him to add the UU/IT template to this page and explained the difference between “Component Page” and “HTML Page” to him. After that he chose the UU/IT template and type “Component Page” for this page, and created the page successfully.

User 4 (2.07 minutes): She pointed her mouse on “New site node”, and she commented that she did not really understand what “site node” was. The observer explained that “site node” was “web page”. After that she clicked on the button “New site node” and created a new page. Then she named it “Interaktionsdesign” and saved it. She thought she had done this task at that moment, but she did not choose any template for the page. The observer asked her to choose UU/IT template for the page and she did so, but then the window of binding properties was presented, and she was confused by that. Then the observer asked her to just click on the button “Save & Exit” and closed the window, she did so. After that she finished the task.

User 5 (0.50 minutes): First he attempted to right-click on the site node “Kursinfo”, but it did not work. He commented that he was used to right-click and left click. Then he clicked on the button “new site node” and created a new page. He named the page as “Interaktionsdesign” and chose the template for the page. Then he saved the page.
Task 3. Create new pages with name “Hemsida”, “Föreläsningar”, “Uppgifter” and “Examination” as sub nodes of site node “Interaktionsdesign”.

User 1 (2.29 minutes): She clicked the button “new site node” first and named the page as “Hemsida”. Then she chose the template for the page, and saved. Then using the same steps, she created page “Föreläsningar”, but she created it as a sub node of site node “Hemsida” because she forgot to go back to site node “Interaktionsdesign”. However, she managed to move it to the right place by using the button “Move Site Node”. Later she created “Uppgifter” and “Examination” using the same steps as well. She mentioned that sometimes she created new site nodes from the page’s navigation menu, and other times she created them from the left site hierarchy. Moreover, she almost never goes to the button “Preview Site Node” because she can see how the page looks like when she is editing it.

User 2 (4.21 minutes): She clicked the button “New Site Node” first and named the page as “Hemsida”. Then she chose the template for the page, and saved. Then using the same steps, she created page “Föreläsningar”, but she created it as a sub node of site node “Hemsida” because she did not go back to site node “Interaktionsdesign” as well. However, she noticed that and moved it to the right place by using the button “Move Site Node”. She first chose “Föreläsningar” itself to move but failed. Then she noticed that she should choose a site node where she could move page “Föreläsningar” into it, and then she moved it successfully. She remarked that it did not work as she thought. Later she created “Uppgifter” and “Examination” using the same steps as well.

User 3 (1.27 minutes): He clicked the button “new site node” first and named the page as “Hemsida”. Then he chose the template for the page, and saved. Then using the same steps, he created page “Föreläsningar”, “Uppgifter” and “Examination” as well.

User 4 (2.05 minutes): She clicked the button “new site node” first and named the page as “Hemsida”. Then she chose the template for the page, and saved. Then using the same steps, she created page “Föreläsningar”, “Uppgifter” and “Examination” as well. One thing that needs to mention here is that she chose the two different templates randomly.

User 5 (1.30 minutes): He clicked on the button “new site node” first and named the page as “Hemsida”. Then he chose the template for the page,
and saved. Then using the same steps, he created page “Föreläsningar”, “Uppgifter” and “Examination” as well. It is indicated that he just chose different templates randomly, and after he commented on something, he forgot to choose any template for the rest two pages. Moreover, his comment was that he want to have a feature which is that he can press “Enter” to save or submit a page. Later he chose a template for the page which had no template, then a “binding properties” window was popped up, which made him confused.

Task 4. Copy a paragraph from the PDF file you received via email and add it to the page “Hemsida”.

User 1 (3.20 minutes): She went to “Content Tool” and found the “Kursinfo” folder, then she created a folder “Interaktionsdesign” with a content page named “Hemsida” inside it. The content page was presented and she named both the “Title” and “Navigation Title” as “Hemsida” and copied the content in “Full Text” area then saved the page. After that she went back to “Structure Tool” and went to the “Hemsida” page of “Interaktionsdesign”. She clicked on “Choose Article” and chose the content page she just created from the popped up window, after that she added it to “Hemsida”. She commented that she prefered to separate the “Content Tool” and “Structure Tool”.

Questions to her during this tasks:
What do you think about the “Navigation Title”?
She said she just wrote the same title for the page title and page navigation title every time, and she thought there might be some cases that these two names were different but she never tried.
What do you think about the “Lead in Text” area?
She commented that this part was not necessary for her since she could do the same thing from “Full Text” area.
What do you think about the “Related Articles” and “Related Area”?
She was not so sure whether she could add related articles, however, she commented that she never tried.

Use2 (8.45 minutes): She seemed confused because she clicked on the left side navigation menu and wondered what did component mean. The observer suggested her to have a look at the one page tutorial again in order to get some ideas. After a few seconds she clicked on “Create New Article”, and then she got a window where she was asked to bind a content to, she said: “No!” and canceled it. Then she went to “My Desktop” because
she thought it could be her working place when she want to edit something, but she could not find anything useful there so she went back in “Structure Tool”. She complained that she was lost because she did not get back to the page where she was. Then she found the page again, she right-clicked on the left navigation menu and chose the item “Add Components”, then the “Add Components” window was presented, she said: “No!” and canceled it. Then she said: “I don’t know how to do this!” However, she tried one more time. She clicked on “Create New Article” again, and then she got the same window again where she was asked to bind a content to. This time she chose a folder and saved, and then she created a name and chose type “Article” for this content. After that a window for uploading files was presented, which made her confuse again because she thought she was going to copy some text rather than including a file. She commented that she would stop doing this task if the observer was not here. After that the observer pointed the “Next” button to her, then she clicked on it and went into the content page, and tried to copy the text into the “Full Text” area but failed. Then she noticed that she had to copy it into a small window which was called “paste some ordinary text” and she copied the text into it and said:”Stupid!” And then she wrote a title, a navigation title and some leading text then saved the page. After that the text was shown in the web page “Kursinfo” which made her very surprised. She commented that she was confused because InfoGlue had a totally different way compared to hers, and she did not see the “Next” button at all, but she thought she could repeat the steps of this task.

User 3 (7.42 minutes): He went to the page “Hemsida” first and looked around. Then he clicked on “Content Tool” and looked around. And then he was back in page “Hemsida” again. He asked why all the status of pages are “Working” rather than “Publish”. After that he right-clicked and chose the “Add Components” from the right-click menu, but when the window for adding components was presented, he thought it was wrong and closed it. Then he clicked on “Create New Article”, and he got a window where he was asked to bind a content to as well, he clicked on the “Kursinfo” folder, and saved. Then another window which asked for name and type of the content was presented, which made him confused a bit. The observer explained that the paragraph was actually an article component. Then he wrote a name and chose type “Article” for this content. After that a window for uploading files was presented, he read all the text on this window, and then he commented that he did not need to upload anything. He clicked on button “Cancel” and canceled it, which led him back to the empty “Hemsida” page, he was frustrated. After that he right-clicked, and then he clicked on “Create New Article” again, he did the same steps as before until he came to the win-
window for uploading files. He remarked that it was same again. The observer pointed the “Next” button to him as well. Then he clicked on it and went into the content page. He wrote a title, a navigation title, some leading text and copied the text into the “Full Text” area as well. He had to copy the text into window “paste some ordinary text” as well. After that he saved the page, and the paragraph was there on page “Hemsida”.

User 4 (10.28 minutes): She went to “Structure Tool” and clicked on “Edit node properties”, and then she copied the paragraph to the text area of “Meta info” and saved, but nothing was added to the page. Then she found the help text on the page which was “right-click to add component”, so she did it, then the window of add components was presented. After that she closed the window. Then she clicked on “Create new article” on the page, but when the “bind a content to” window was presented, she canceled it. Then she right-clicked and chose “Add component” again, and from the presented window, she chose a component which was “Courses and Programs” and added it into the page. She knew that it was wrong, but after a few unsuccessful attempts, she add the “Courses and Programs” component again to the page. Then she commented that she did not know how to do it. The observer explained that a paragraph is an article component. Then she asked that if she should choose “Create new article” and the observer said “Yes.”. After that she clicked on “Create new article” and went into the presented page, then she clicked on folders there and said:”I cannot open it.”, then she saved it and went into the next presented page. She commented that she had no idea what she was doing. The observer explained a bit what are the container and content to her, after that she wrote a name for this page and saved. Then another page was presented which asked her to upload a file, she clicked on “next” and then the page for creating article was presented. She tried to copy the text into the “Full Text” area but failed. Then she tried 4 times more and then she asked the observer:”Am I suppose to write it by hand?”. The observer suggested her to do it again and meanwhile looked carefully around the page, and she did that and noticed that “paste some ordinary text” window at last. She copied the text there, and said “Very stupid!”.

After that she named the page and saved it, then the paragraph was there on page “Hemsida”. However, because she added two times “courses and programs” by mistakes to the page, so the “courses and programs” was presented on the page too. The observer asked her to delete them, first she right-clicked on the empty place of the page, and she could not find “delete” there. Then she right-clicked on the component and deleted one “courses and programs”, but there was still the same thing on the page, then she said “No!”. After that the observer told her that maybe because she added
the component twice, then she noticed that and did the delete one more time.

User 5 (10.21 minutes): He went to the page “Hemsida” first and looked around. Then he clicked on “Create new article” which is the right place, but when the “bind a content to” window was presented, he canceled it. Then he clicked on “Create new article” again and the window was presented again. Then he commented that he thought the content would store on page “Hemsida”, so why he had to choose a place to store the content. After that he went back to page “Hemsida”. Then he looked at “Add component”, then he remarked that it did not feel like he needed to add a component, but he wanted to add just text. Then he clicked on “Create new article” again, but he was still confused about what he needed to choose a place to store the text. Then he unfolded a folder and double clicked a folder under it, since the double click did not work, he clicked on button “SAVE” and went into the second window. There he was asked to create a name for the container as well as choose a type for it. Then he commented that he needed to think about what container and container type meant. He then created a name for the container, and clicked to open the drop down list of container type, and there was only article type existing. He remarked that he could only choose “Article” and “Article” type for the container, it was totally wired, and he laughed. Then he saved the window and went into the “uploading file” window. He was confused and he commented that either he did something in a wrong way or he needed to create a file to put his text into it which was too stupid. The observer told him that maybe he did not need. Then he noticed that there were a “SAVE” button and a “NEXT” button existing, but he was confused by which button he should press. Then he decided to press “NEXT” button, and then he went into the content page. He pointed at the title and the navigation title, and he commented that they should default to the container name that he created. After that he tried to copy the text into the “Full Text” area but failed, then he noticed that he had to copy it into a small window which was called “paste some ordinary text”. The help information on that “paste some ordinary text” is “press Ctrl + V to paste your text” which misleads users who use Mac computers, because they need to press “Command + V” to paste their text. He copied the text into it using “Command + V” and said: “Stupid!”. Then he noticed that the formatting of the file had gone, and he remarked that it was quite possible to preserve the formatting of the text unless the text was created in some strange ways. After that he created names for title and navigation title, and he filled up the lead in area with some text. Then he looked at “Related Article” and “Related Area”, he commented that “Related Article” might be useful, but he did not understand what was “Related Area”. After that he
saved the page. Then the paragraph was presented on the page “Hemsida”, but there was also a pop up window presented. He commented that he did not understand why he should select the language from the pop up window but not in the content page, and then he pressed the “Advanced Properties” and looked what he could do there. Then he pressed the “SAVE & EXIT” button which closed the pop up window. The task was finished.

**Task 5. Add an image to page “Hemsida”, set width to 200px and height to 300px.**

User 1 (14.23 minutes): She went to content page “Hemsida”, clicked on the button for image at the “Full Text” area, then the window for editing images popped up. She chose the tag for uploading the image and uploaded the image. After that she attempted to adjust the width and height of the image by filling Hspace and Vspace with 200 and 300, but failed. After several unsuccessful attempts, she noticed that Hspace and Vspace were not for width and height but for the margin, and she deleted the images that she added to the page and redid the task from the very beginning. This time she chose the image that was already uploaded by her to InfoGlue system, then the page with a rescale image button was presented, but she did not try that button. After several unsuccessful attempts, the observer gave her a tip which was “Why don’t try this button on the top?”. Then she tried the right button and adjusted the image successfully. She commented that she thought the right button for rescale was for expanding rather than rescaling, she thought it was odd to put the rescale, Hspace and Vspace in different pop up windows because she was totally confused by that.

User 2 (19.08 minutes): First she clicked on “Edit Article” from the page “Hemsida”, then the edit window was presented, she pointed her mouse on some buttons and clicked all the tags in that window, then she remarked that it was not right. The observer asked her what was she looking for then, and she explained that she wanted to find the place where she could set the width and height of the image. She pointed at the tag for uploading files and commented that this tag meant the already uploaded files in this page to her, but she was not sure. Then she clicked on that tag and when the uploading window was presented, she knew that she did the right thing. Then she uploaded the image and saved it. After that she found the rescale button for image and adjusted the image, she saved the image in the rescaling window but not in the uploading window. Then she went to the text area and uploaded the image, however, the image was still very big, so she tried to rescale again. After several unsuccessful attempts, she still did not notice
that she had to save the image twice in two different windows that would actually made the rescale work. Moreover, she started to doubt that what she attempted was wrong, which meant she started to doubt that the rescale button she found was the right place for rescaling. After that the observer told her that it was the right place but she also need to save the image from the uploading window. She did that and finished the task. She commented that it was very difficult for her and she was frustrated. Another thing to mention here was that she did not use the scroll bar very often, so when the “save” button was at the bottom of the page, she possibly could not find it. And actually she attempted to delete two same images for at least five times without saving, so the images were always there which made her frustrate very much.

User 3 (2.01 minutes): First he clicked on “Edit Article” from the page “Hemsida”, then the edit window was presented, he found the tag for uploading image directly and uploaded the image. After that he attempted to adjust the width and height of the image, but he could not find it. Then he clicked on the tag “Advanced” and wrote down the codes for styling the image rather than attempted to find the rescale button. Then he saved the image from both the uploading window and the content page, after that the image was presented on page “Hemsida”.

User 4 (7.23 minutes): First she clicked on “Create new article”, then the observer said that it was not right, then she right-clicked and chose “Add component”, then canceled it. After that she clicked on “Edit Article” and then the editing window was presented. She uploaded the image first, then she found the “Edit” button for images and clicked on it, and the edit window for images was presented. She comments that she did not understand what the presented buttons were. However, she clicked on the first button on the top which was the right button for rescale, and she rescale the size of the image and save it. After that, a window was presented and asked her to wrote a key word for this image, and she did that with the suggestion from the observer, and saved. Then she checked the text area and tried to find the image there, but failed. Later she found the “Insert” button for image and inserted the image successfully, but she was confused about from where she could find her image after uploading it.

User 5 (6.45 minutes): First he commented that he did not know where to add it, because it is not an article. He right-clicked on “Add Component”, then he thought that was not useful, so he canceled it. He commented that some parts of the page were in English but some were in Swedish. After that
he attempted to add the image to the right side of the page. He first pressed “Create”, and he chose folder “Image” from the first presented window. After that he was in the second window which asked him to create a container name and choose a type, he looked into the drop down list of the container type, and there was only one type which is “Mini Article”. He remarked that he did not know what was mini article but it was not sound like an image type. Later he went into the mini article page and he attempted to upload the image. He clicked on the button for image at the “Full Text” area, then the window for editing images popped up, he pressed the button “choose from InfoGlue” and attempted to upload from there but failed. Then he noticed the tag for uploading the image, he went into the tag “Image Info”, and pressed the drop down list of image style, but there was no style for rescale could reach the task requirement, so he pressed the other existing tags and attempted to find the place for rescale but failed. After that he went back to tag “Image Info”, then he chose something else from the image style list and saved. The image was presented on the full text area with wrong size. Then he opened the window for editing image again and clicked around, attempted to find the place for rescale. He also attempted to drag from the corner of the image to adjust it to the right size. After that he right-clicked on the image and opened the editing image window one more time. After all these unsuccessful attempts, he said that he did not think he could do this. And he also commented that maybe it was on the next page. Then he saved the mini article page, and then the page “Hemsida” was presented but there was no image showing up from the right side of the page. He selected the mini article page and attempted to add it to the right side of the page again, but failed. After that he attempted to add it to the main area of the page, under the paragraph which he created in task 4, but he could not choose the mini article this time, so he chose the folder which contained the mini article page instead. Then an error occurred, moreover, the paragraph was destroyed as well. After that he skipped this task.

Task 6. Rearrange the order of the navigation menu (from up to down) as: “Hemsida”, “Föreläsningar”, “Uppgifter” and “Examination”.

User 1 (13.05 minutes): First she attempted to do this by moving site nodes, then she clicked around on the interface and tried to find the way of doing it, but failed. Meanwhile, she commented that she totally could not understand why button “Simple Page Component” was there and how did it work. After several unsuccessful attempts, she remarked that she wanted to skip
this task. Then she moved on with task 7. But after she changed the navigation title of “Hemsida” to “Interaktionsdesign”, she noticed that the order of “Hemsida” in the navigation menu changed, so she moved back to try this task again. She chose the “Edit Node Properties” which was the right place to go but she did not notice that there was a “Choose Order” option available on that window. Later she did it several times with rearranged only parts of the order and it did not work, which indicated that unless she rearranged all the items, the items did not change as she wanted. She commented that it was odd to rearrange the navigation menu through “Edit Node Properties” and she was completely confused.

User 2 (6.09 minutes): She attempted to rearrange the items by moving side nodes first as well, but then she noticed that it did not work. Then she clicked on some other buttons. One thing to mention here was that after she clicked on the preview button, she was in the preview mode of the page and she did not know where she was and how to went back. After some unsuccessful attempts, she skipped this task.

User 3 (4.52 minutes): He attempted to do “drag and drop” on the navigation menu but it did not work. Then he right-clicked and looked at the right-click menu, but it still did not work. And then he clicked on “Edit Node Properties”, and looked and clicked around, then he closed it. After that he asked the observer what was the “site node cover” and the observer explained that to him. After a few unsuccessful attempts, he went back to the window of “Edit Node Properties”. He looked at the “Sort order” and clicked on it, then he asked the observer what was “Sort order”. It seemed that he did not understand this Swedish word “sort” since he is French, then the observer attempted to explain but he said he wanted to test it by himself, and then he noticed that it was the place to rearrange and he rearranged navigation menu successfully.

User 4 (7.57 minutes): First she right-clicked on the navigation menu and chose “Page structure”, then she closed it. Then she pointed her mouse on “Move site node” and commented that she did not really understand what that was. The observer told her that it was not the right place. After that she right-clicked on the navigation menu again and commented that she did not remember what she did last time when she changed the title of the navigation. Then she clicked on “Edit site properties”, she clicked around and tried all the tags there and then she said:”No.”, and closed the window. After a few unsuccessful attempts, she said:”I don’t know!” . The observer then suggested her to look carefully on “Edit site properties” window, so
she looked carefully on each tags but she could not find anything related
to rearrange the navigation menu. Later she noticed the “sort order” with
help from observer, and then she commented that she did not understand
what did the numbers from the drop down menu of “sort menu” mean. Then
she managed to finished the task with help from observer. She commented
that this one was very hard to understand. Obviously, without help from
observer, she could not finish this task.

User 5 (3.10 minutes): He attempted to do “drag and drop” on the navi-
gation menu but it did not work. Then he right-clicked and looked at the
right-click menu, then he said “It doesn’t look useful.” and closed it. And
then he clicked on “Edit Node Properties” and clicked around, then he said
“No.” and closed it. Then the observer told him it was the right place and
suggested him to look carefully. So he opened the “Edit Node Properties”
window again, and he noticed the “sort order”. Then he rearranged the nav-
igation item successfully. He said “Oh my god!” when he was rearranging.
Moreover, he remarked that the “undefined 76” was a little bit strange.

Task 7. Change the page navigation title from “Hemsida” to “In-
teraktionsdesign”.

User 1 (1.28 minutes): She clicked on button “Site Node Cover” and went
into the site node cover page, from there she changed the “SiteNode Name”
to Interaktionsdesign which changed the title of page rather than the nav-
igation title of page. After that she viewed the page content and noticed
that the navigation title of the page was still “Hemsida”, then she changed
the page title back and went to the “Edit Node Properties” and changed the
navigation title from there.

User 2 (2.50 minutes): She clicked on “Edit Node Properties” and changed
the navigation title from there successfully.

User 3 (0.52 minutes): He went to the content page “Hemsida” first and
changed the navigation title to “Interaktionsdesign” there. Then he went
back to page “Hemsida” but the navigation title did not change, then he
went to “Edit Node Properties” and changed the navigation title from there.

User 4 (0.40 minutes): She clicked on “Edit Node Properties” and changed
the navigation title from there successfully.

User 5 (0.30 minutes): He clicked on “Edit Node Properties” and changed
the navigation title from there successfully.

Task 8. Link any text on page “Hemsida” to the PDF file you received via email.

User 1 (2.26 minutes): She went to content page “Hemsida”, and chose some text from the “Full Text” area, then she clicked on “Insert/Edit Link” button and uploaded the PDF file. She was not sure if she need to choose “Protocol” but then she decided to skip it. After that she chose “Link Style” to be “PDF” and saved the page. She then went to the “Structure Tool” and chose the “Hemsida” page, clicked on the linked text then the PDF file was presented.

User 2 (14.28 minutes): She clicked on “Create New Article” on the page and went into the new content page, but there was a window popped up for uploading files before the content page was presented, so she uploaded the file first. Then she came into the new content page, she wrote something for the title, navigation title and leading text of the page, and she commented that she did not understand why a content need a “Navigation Title”. After that she went to the “Full Text” area and she clicked on “Insert/Edit Link” button and uploaded the PDF file one more time. Then she clicked on the button “Choose From InfoGlue” and clicked on the tag “Link to internal file”, from there she saw the two uploaded files. However, she did not understand why there were two rather than one. After that she chose the newly uploaded one and tried the edit button of it. Then she clicked on “Use marked” and went back to the “Insert/Edit Link” page and clicked the button “OK”. Then the link that automatically generated by InfoGlue for the uploaded file was presented in the “Full Text” area, but in a strange format, and she did not understand what was that and what to do next, she stopped there. After a while the observer asked her to saved the page. And then the “Hemsida” page was presented with the link to the PDF file but all the contents from before disappeared. She was quite frustrated and she said that she did not understand why, after that she skipped this task.

* Create a link with name “pdf-version” on page “Hemsida” to the PDF file you received via email.

User 3 (1.42 minutes): He clicked around on the page “Hemsida” and said:”Where did I do it last time?”. Then he found the “Edit Article” and clicked on it, then the edit window was presented. He wrote “pdf-version” in the full text area below the image, and then he chose text “pdf-version” and clicked on
“Insert/Edit Link” button and uploaded the PDF file, then he saved the page. He commented that he had used this text editor before.

User 4 (4.56 minutes): She was confused again about if she had to create a new article, and the observer said: “You don’t need.”. After that she chose “Edit article” and the window for editing article was presented. She clicked on “Insert/Edit Link” button and uploaded the PDF file, then she clicked the button “OK” and the link that automatically generated by InfoGlue for the uploaded file was presented in the “Full Text” area. She attempted to name it as “pdf-version”, and she changed the “Target Frame Name” from tag “Target” as well as “Name” from tag “Advanced” to “pdf-version” on “Insert/Edit Link” window, but the automatically generated link was still there. She said that she did not know how to do it and canceled the task.

User 5 (4.56 minutes): He first created the pdf file from the right side of the page, he attached the pdf file from the uploading file window which presented before the content page, but nothing was presented. Then he used “Choose Article” from the right side and attempted it again, but still failed. Then he pressed the “Create new article” from the main area of the page, he uploaded the file, created a title and a navigation title for the content page, then he saved the page. After that the title was presented on the page but not the pdf file. He was confused. Then he clicked on the title of the article, and a save button and an exit button were presented, he commented that he did not know what were they suppose to do. Then he pressed the exit button. After that he clicked on “Choose article” and attempted to add the content page which had the attached pdf file to the page again, but failed again. He wondered that what does it mean by attaching a file on content page if it does not show up. After that he skipped this task.

Task 9. Create a english version of “Interaktionsdesign” page, name it “Interaction Design”.

User 1 (6.16 minutes): She skipped this task after several unsuccessful attempts.

User 2 (3.47 minutes): She skipped this task after several unsuccessful attempts.

User 3 (4.35 minutes): First he just clicked around in “Structure Tool”, and he was not quite sure about how to do it. The observer explained this task for him and also suggested him to try “Content Tool” since the only thing
will be changed in this task was content. Then he went to “Content Tool”, and attempted to find the article content that created by himself. After a while he found it and went inside the page, and he found “Language Version” at the top of the page, then he clicked on “English” from the drop down list, and named the page “Interaction Design” as well as filled up the other text areas on the presented page. After that he saved the page. Then he went back to “Structure Tool” and presented the page “Interaction Design”.

User 4 (9.00 minutes): She skipped this task after several unsuccessful attempts.

User 5 (4.10 minutes): He pressed the link “English” on the page first. Then he clicked on the button “Edit Node Properties” and looked around, then he closed it. Then he right-clicked on the left hierarchy. After that he opened the “Edit Node Properties” window again, then he closed it again. It is indicated that he did not know how to perform this task, so the observer explained the task for him, and also suggested him to try the content page that he created. Then he went into the content page, and he clicked on “English” from the drop down list of the “Language Version”. After that a pop up window was presented, with a warning information which is “Are you sure you want to change language? If you have any unsaved changes they will be lost.”. He read the information, then he canceled it. Then he noticed that there was a button on the top which was “Change Language”, he pressed it, followed the following steps, and he created a English version of this content page successfully. However, he broke his page “Hemsida” by mistake, so he could not see the result from the “Hemsida” page. Then he attempted to add the content page to the other two web pages but failed as well.

**Task 10. Change a English navigation menu for “Interaction Design” page.**

User 1: She skipped this task because she did not complete task 9.

User 2: She skipped this task because she did not complete task 9.

User 3 (2.09 minutes): He went to “Edit Node Properties” and looked around, then he went into “Content Tool”, he found the content page “Interaction Design”, and changed the navigation title of it to “Interaction Design”, and saved. After that he went to “Structure Tool” to check if the English navigation menu changed to “Interaction Design” but it was not. Then he clicked on “Edit Node Properties” and changed the navigation title from there suc-
User 4: She did this task accidentally when she tired to do task 9.
User 5: He skipped this task because his page was destroyed.

C.3 A short interview after the tests

What are the hard things for you to do during the task?

User 1: When things don’t work as I expected, such as reset the image and rearranged the navigation menu, it is hard.
User 2: The difficult thing was to figure out where to do different things, to really hold together contents, structures and where do I do the different changes. I understand more about how the system works after I did the tasks.
User 3: The misunderstanding about how “Content Tool” and “Structure Tool” work in InfoGlue. And also the menus are so many and appear everywhere which are not intuitive for me.
User 4: I don’t understand what component is, what content is, and the structure over the page is hard. If I want to put information here (pointed at the main article area of the page), I don’t know where to put the information. It looks easy but is hard to understand. The “Edit site properties” and “Edit article” are very similar, which made me confuse a lot.
User 5: One thing was sort of difficult was when I tried to upload a picture to the right side of the page, and it just didn’t work. There was no way of setting the width and the height of the picture. I couldn’t find it. The reordering of the navigation menu was absolutely silly the way you have to do it. And it is not obvious to me the way to change the page’s language, but it should definitely be easier. And it is really really confusing that you select an article, but it doesn’t appear.

From what we tested, do you think those functionality are enough for you to make a web site? Do you think they are easy enough to learn?
User 1: I think it has all the basic functions, but it is not easy enough to learn. You can see I have been working with this system for a few month,
but I am still confused by doing some tasks.

User 2: Yes, I think so, but I need more practicing, of course. And when I want to learn how to use it, I guess I have to think “InfoGlue” way.

User 3: Yes, enough. Well, they are easy to learn, but the functionality that I used in this task are probably five, however, this system might have thousands of functionality, I just feel it is overkill to use it while there are thousands of functionality but actually you just need five to create your web pages.

User 4: Yes, I think so. Yes, well, my problem was that I forget what I did things.

User 5: In some sense, yes, but it could be very awkward. No, it is not easy enough to learn. One of the main thing is the separation between the content tool and structure tool, which I think could be very confusing to many users. I think there has to be some default settings which matches this better. For instance, if a user create an article from structure, the default place for that article must be in a matching location in the content tool. Otherwise people will get lost and lose their content and waste a lot of time finding their content again and again and again.

**Do you want to be an expert user of the system? For example, create your own web page template.**

User 1: I don’t think I am allowed to do that, but if it is possible, I would like to ask Mikael to do that for me.

User 2: Yes, because I am one responsible people for maintaining the web pages of the department, so it is my work. (She said that she wanted to run away before she needed to do it with laughing.)

User 3: No, I don’t want, the basic functionality are enough for me. If I want to style my pages, the text editor is enough for me.

User 4: No, I don’t want.

User 5: Ideally I would like not to have to, but I think I would still, sometimes be able to do such things. (Hmm..)Yes, I want to be an expert user, but I don’t want to have to be it all the times.
D  One page tutorial

InfoGlue

InfoGlue is a WCMS. More simply, InfoGlue is a platform where anyone can build their web pages in by using predefined templates.

Component

Component is the container for holding all kinds of contents in InfoGlue. The contents can be anything on a website, such as an article, a navigation menu, an image, a PDF file, etc..

Site node

Site node means web page.

Structure Tool

This is the presentation/structure part of the InfoGlue system. You start from here to build your websites. With this tool you build and manage your web site and choose components from content tool to add and present here.

Content Tool

This is the place where you store and manage the information/content of your web site. The information/content can be text, image, files, animations, etc.. There are no format limitations. You create your own contents for your web site here.

Edit on-site

When you are editing a site node (web page), you can right-click to open the right-click menu and choose Open in new window, then you are in edit on-site mode.

Repository

It is a container which contains everything of a website, such as all the contents and structures of a website. One repository holds one specific website.