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Lund University Website Evaluation:

Focus on homepage and English research pages

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Resumé

The present universities have their own websites to achieve academic goals, and for this reason, the process of maintaining a high quality and effective website is vital for a university to strengthen its unpredictable creativity and entrepreneurialism. The aim of this study was to develop and validate university website usability, quality and performance, especially focuses on English homepage and research pages. In addition, we will develop a model of how to evaluate university website.

Specific objectives were to identify major usability issues and provide a foundation for future development work. The web evaluation methods adopted during the study fall into three major classes: usability testing, user feedback and usage data. Results indicated that English information on website is incomplete, layout and design of the English homepage need to be improved, and the quality of the English research pages varied dramatically. Some web pages were of high standard, enabling quick access to current research and reinforcing the university's brand as a high quality university conducting world's leading research. Other web pages were a usability disaster, giving poor user satisfaction and negatively affecting the credibility of the university. The study recommends making an improvement in content, design, layout and new technology, it is necessary to work closely with the faculties and institutes on a 'case by case' basis, and finally to improve site performance.

Key words

Website evaluation, university website, homepage, research pages.

Acknowledgements!

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Lund University, June 2009

Xin Wang, Weiqi Huang

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Chapter 1

Introduction

Website is a primary user interface for net-enabled business (Straub and Watson 2001), information provision, and promotional activities (Alba *et al*. 1997, Jarvenpaa and Todd 1997, Schubert and Selz 1998). Now, the World Wide Web revolution has swept through many universities. Over the past decades, universities have progressed from little or no use of the Web for distributing information to using the Web as a major, and increasingly as the primary, means of distributing information. The web provides an exciting and constantly expanding opportunity for universities to enhance their national and international reputation for excellence in research, scholarship, teaching, business, and community links. The Web also offers a rich information resource for staff and students. (University of Adelaide, 2009).

Research pages are one of the indispensable components of university websites. High quality research pages enable quick access to current research and reinforce the university's brand as a high quality university conducting world-leading research, while low quality ones may adversely affect the image of the quality of site, and affect the credibility of the university as well. This in turn has made usability and performance become integral components of website deployment as a key platform for university research. However, the usability of most university websites is poor, such as low compliance with official university design, a low usability rating, and high percentage of overdue and undated pages. For example, the homepage of Brown University (http://www.brown.edu/) is notorious for both being poorly designed and overwhelmingly difficult to use.

The university homepage is the "face to the world and the starting point for most user visits" (Nielsen, 2002). Improving homepage quality could assist in building good reputations for a university and enhance usability of the whole website. Furthermore, according to Nielsen (2006), 40% of users start their information search from the homepage, and usually they come back to the homepage to get an idea and start a new search again. In short, the homepage gets visited most often and it is the most important among the webpages.

1.1 Problems

Often when designing a website, a business takes the time to define its functional or economical requirements, but not the time to map users' needs. Rarely designers have walked through users' experience to understand their needs, in the end, the unseen elements of user experience are the parts of the iceberg that will sink your project, while your stakeholders are busy focusing on the 'tip'. (Van Gorp, 2008). User experience is a key element of website design, making it challenging to understand it thoroughly. "User experience is difficult or impossible to define, and there is no cohesive UX theory in place." (Roto *et al*., 2008, 'UX' here is an abbreviation for 'user experience').

In addition, there are millions of websites nowadays, but only a small percentage of them ever reach a high ranking or manage to attract more than a couple of visitors a

day. What makes a website successful is gaining more attention among designers. Unfortunately, there is limited guidance for how to make educational websites successful, and many designers have little sense of it as well. Most designers always emphasize the technology aspect, (i.e. the performance of website) or information delivery rather than aesthetics (which is appearance of website) or user experience. (Sterne, 2002).

1.2 Purpose

Due to the current limited number of studies evaluating university websites, we want to set an example for similar research in the future through the website evaluation for Lund University. The goal of this study is to gain a deep understanding of user experience, as well as of university website success. (Sections 2.1 and 2.2)

We have three sub-purposes for this study. Firstly, we want to attain a clear overview of Lund University website, by studying its homepage, English Research Pages, and general ideas from experts and users. Secondly, we want to give out some feasible suggestions to improve the university website based on feedback from users and experts. Finally, we want to develop a model for website evaluation, not only for the Lund University website, but also other university websites, to inspire other researchers in evaluating websites.

1.3 Research question

We have formulated three research questions based on research purpose stated above:

(1) Does the university website function smoothly enough to deliver educational services?
(2) How can the university website be improved in homepage, research page?
(3) How to evaluate university website more comprehensively?

During the study, we will answer these three questions by using multidimensional approaches. By investigating the English homepage and research pages, we wonder whether and to which extent the university website meets visitors' needs. After evaluation of these web pages, problems occurring in homepage, research pages and some general problems of the whole website will be identified (section 5.1). Then recommendations based on those common problems will be given to improve the quality of the university website (Section 5.2). Finally, we want to develop a general evaluation model which can be used by other researchers in university website evaluating (chapter 6).

1.4 Delimitation and approach

This study analyses Lund University, and focuses on homepage, English research pages of some faculties. An approach towards analyzing the Lund University website is made, using heuristic analysis, online questionnaire, group interview, and additional website analysis softwares. The respondents are mainly researchers, website designers and international students at Lund University.

The authors are mainly concerned with providing an example of website evaluation for designers, also develop a model of how to evaluate websites in general. Thus a good part of the work will be devoted towards developing a theoretical framework of user experience and website success in order to evaluate the Lund University website more comprehensively. Again, Pages in Swedish and some other pages which are not research pages would not be considered, as it would throw the whole study into a different focus.

Chapter 2

Conceptual Frameworks

Our conceptual frameworks chapter is divided into three sub-chapters: user experience model, website success model. Each sub-chapter starts with a literature review, and next we select or develop models appropriate for university website evaluation. The following part of each sub-chapter will be the detailed description of factors of each model. In the end, we will briefly summarize user experience model and website success model, from which aspects we conduct our website evaluation.

Websites have without doubt become the largest connected media around the world. As to the website of Lund University, it plays a quite important role in teaching, research, and communication with the outside world. In this chapter, we discuss user experience (satisfaction level) and website success, based on which, we develop a website evaluation model to examine how far the website is from ultimate web success.

2.1 User experience

The concept of user experience has become central to interaction design, Garrett (2003) defines the concept "user experience" as how a product behaves and is used in the real world. Garrett (2003) points out that there is a duality to websites. The Web was originally conceived as a hyper textual information space; but the development of increasingly sophisticated front- and back-end technologies have promoted its use as a remote software interface. This dual nature has led to much confusion, as user experience practitioners have attempted to adapt their terminology to cases beyond the scope of its original application. He refers to such terms as User Needs, Site Objectives, Content Requirements, Functional Specifications, Information Architecture, Interaction Design, Information Design, Navigational Design, Interface Design, and Visual Design as aspects of user experience. It is important to point out that one cannot design a user experience, but design for a user experience. In particular, one cannot design a sensual experience, but only create the design features that evoke it (Rogers *et al*., 2006).

What makes a good experience varies from person to person, product to product, and task to task, but a good general definition is to define something as “usable” if it’s functional, efficient, and desirable to its intended audience (Kuniavsky, 2003):

- Functionality: A product – or a portion of a product – is functional if it does something considered useful by the people who are supposed to be using it.
- Efficiency: People – on the whole – value efficiency, and how quickly and easily users can operate a product attest to how efficient that interface is.
- Desirability: Although long recognized by usability specialists and industrial designers, this is the least tangible aspect of a good user experience.

It’s hard to capture what creates the surprise and satisfaction that comes from using something that works well, but it’s definitely part of the best product designs. With

regard to websites, there are three general categories of work when creating a user experience (Kuniavsky, 2003):

- Information architecture is the process of creating an underlying organization system for information the product is trying to convey.
- Interaction design is the way that structure is presented to its users. On the web, every page is a different interface. The interface experience is not just functionality, but readability, navigation.
- Identity design amplifies the product's personality and attraction. Brands are incredibly powerful parts of the user experience; identity is a big part of the product's brand but is not the whole of the brand.

Norman (1999) described user experience as encompassing all aspects of the users' interaction with a product: the experience of the system happens during the interaction with the system. Mahlke (2005) defines the processing of information about the interaction as the central part within the basic user experience process. He assumes that information about the interaction with the system is processed on different dimensions of experience. In his study, he integrated four concepts as experience dimensions: perceived usefulness, ease of use, perceived hedonic quality and perceived visual attractiveness. Perceived usefulness and ease of use represent instrumental quality aspects, they are defined in Davis' Technology Acceptance Model (Davis, 1989). The concept of hedonic quality and the construct of visual attractiveness are studied as non-instrumental quality aspects (Hassenzahl 2001, Heijden 2003). The intention to use a system as an important predictor of website usage is one consequence of experience. These assumptions are summarized in their user experience model presented in figure 2.1. We have only studied the concepts in the dark area.

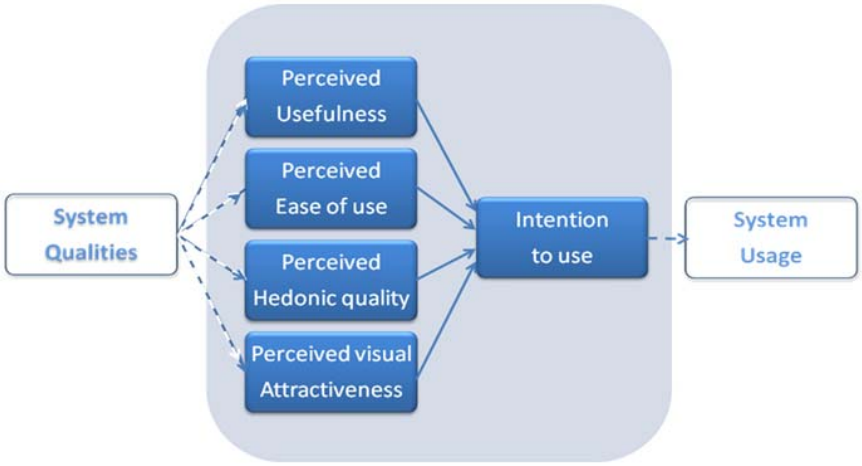


Figure 2. 1 User experience model (Hassenzahl 2001, Heijden 2003)

Buxton (2005) discusses his experience with three different juicers which, give rise to qualitatively different experiences, although two of these are very similar in design look, and feel, thus user experience is considered as the combination of visual, experiential aesthetics and usability — the indicator of the degree of pleasantness of the experience coupled with the reflective emotional and cognitive judgment of the products utilitarian usability aspects.

The term "user experience" refers to a concept that places the end-user at the focal

point of design and development efforts, as opposed to the system, its applications or its aesthetic value alone. It's based on the general concept of user-centered design (Rubinoff, 2004). When the Apple iPhone was launched, its features were quite modest when compared with the competition and yet people queued at stores from midnight to be the first to get one. Why? Style and user experience! Despite being less capable than its competitors the touch screen interface, sleek design and glitzy graphics ensured that it was more desirable than anything else in the market place. The same principles apply to websites with rich features and attractive styling being the difference between Lund and other educational websites. (Rubinoff, 2004). In Rubinoff (2004)'s study, he considered that user experience as made up of four factors:

- Usability,
- Functionality,
- Content,
- Branding.

Independently, none of these factors makes for a positive user experience; however, taken together, these factors constitute the main ingredients for a website's success. We will use the result of his research because this model includes most factors of user experience which are also used by other researchers. Also, this model was developed from website evaluation practices' perspective. In following sub-chapters, we will describe this model with more details.

2.1.1 Usability

Usability entails the general ease of use of all site components and features. Sub-topics beneath the usability banner can include navigation and accessibility. Different scientists have proposed different criteria to measure usability. Table 2.1 describes various models of usability by Seffah *et al.* (2006). And we also add Wixon and Wilson (1997)'s model.

Table 2. 1 Usability attributes of various standards or models (Seffah *et al*., 2006, Wixon and Wilson, 1997)

Constantine and Lockwood (1999)	**ISO 9241-11 (1998)**	**Schneiderman (1992)**	**Shackel (1991)**	**Nielsen (1993)**	**Wixon and Wilson (1997)**
Efficiency in use	Efficiency	Speed of performance	Effectiveness (speed)	Efficiency of use	Efficiency
Learnability		Time to learn	Learnability (time to learn)	Learnability (Ease of learning)	Learnability
Rememberability		Retention over time	Learnability (Retention)	Memorability	Memorability
Reliability in use		Rate of errors by user	Effectiveness (errors)	Errors/safety	Error rates
User satisfaction	Satisfaction (comfort and acceptability of use)	Subjective satisfaction	Attitude	Satisfaction	Satisfaction

In table 2.1, there is an apparent agreement with regard to “efficiency” and “user satisfaction”, but not all models have the same definition of usability. In the specified context of using system, usability can be conceptualized in different ways with the particular focus. Shackel (1991) defined usability in the five dimensions, which includes speed, time to learn, retention, errors and user`s attitude. And similar definitions were explored further by Schneiderman (1992), Nielsen (1993), Wixon and Wilson (1997). Till 1998, the ISO/IEC standards models were developed for quantifying and measuring usability. For example, The ISO 9241-11 (1998) measures the system`s usability with focus on efficiency, effectiveness and satisfaction. Then in 1999, Constantine and Lockwood suggested their conception of usability, which includes efficiency in use, learnability, rememberability, reliability in use and user satisfaction as the five major attributes of usability.

During the study, we use the theory from previous research, and narrowed down to four factors (Website Standards Association, 2008):

- Efficiency: user can perform tasks on website quickly.
- Learnability: users can easily accomplish basic tasks on website.
- Error rates: the number of errors that users make, and user can easily recover from these errors.
- Satisfaction: the design of website is easy to use.

Memorability means that the interaction with the website is intuitive and user can easily re-establish proficiency (Website Standards Association, 2008). It’s also an important factor of usability. The reason why we removed it from our usability model is that it relates to the layout design, which belongs to the next model we will discuss
- website success model (Section 2.2).

2.1.2 Functionality

Functionality includes all the technical and 'behind the scenes' processes and applications. It entails the site's delivery of interactive services to all end users, and it's important to note that this sometimes means both the public as well as administrators. It’s different from usability. Functionality refers to whether the function of website can do what is needed, while usability relates to the question of how well users can use the function. Statements used to measure a site's functionality can include (Rubinoff, 2004):

- Users receive timely responses to their queries or submissions.
- Task progress is clearly communicated (e.g., success pages or email updates).
- The Website and applications adhere to common security and privacy standards.
- Online functions are integrated with offline business processes.
- The site contains administration tools that enhance administrative efficiency.

2.1.3 Content-information

Written content is the first important factor for user experience, as well as website success (will be discussed in section 2.2). Content refers to the actual content of the site (text, multimedia, images) as well as its structure, or information architecture. We look to see how the information and content are structured in terms of defined user

needs and client business requirements. Content is undoubtedly a very important element of websites. People visit particular websites because they are attracted by its content. Good content is described as "suitable language for audience, high-quality writing with no grammatical and typographical errors, passages that are easy to read and understand, clear information about authors, and references cited where applicable". (Shahizan and Li, 2005) In addition, information should be up to date and the outdated webpages should be removed. Table 2.2 presents a list of criteria for content.

Table 2. 2 List of criteria for content (Shahizan and Li, 2005, p. 10)

Sub-Category	Objective	Subjective
Scope	• Suitable language for audience • Up-to-date publication(e.g. news & articles) • Archive of previously published materials	• Contents provided meet the expectation of target users
Accuracy	NA	• High-quality writing (e.g. good grammar)
Authority & Reliability	• Information on authors of text/documents (e.g. names) • References or sources of text and other documents • Background information of institution/organization/owner of site (i.e., logo, name, address, phone number)	NA
Currency	• Up-to-date contents	NA
Uniqueness	• Options for output/print format when appropriate • Choices of language for multi-ethnic audience • Choices of media type for particular information (e.g., text only, audio, or video) • Information/warnings on file type and size for downloading	NA
Linkages	• Clear distinctions between internal and external links • Links to other relevant sites (e.g. state and local branches)	NA
Text Quality	• News/articles/documents/stories with pictures • Summary of news/articles/documents/stories with links to full versions • Divide news/articles/documents/stories according to scope (e.g. local and international)	NA

2.1.4 Branding

Branding includes all the aesthetic and design-related items within a Website (Alkan, 2006). It refers to the site's creative projection of the desired organizational image and message. Statements used to measure branding can include (Alkan, 2006):

- The site provides visitors with an engaging and memorable experience.
- The visual impact of the site is consistent with the brand identity.
- Graphics, collaterals and multimedia add value to the experience.
- The site delivers on the perceived promise of the brand.

- The site leverages the capabilities of the medium to enhance or extend the brand.

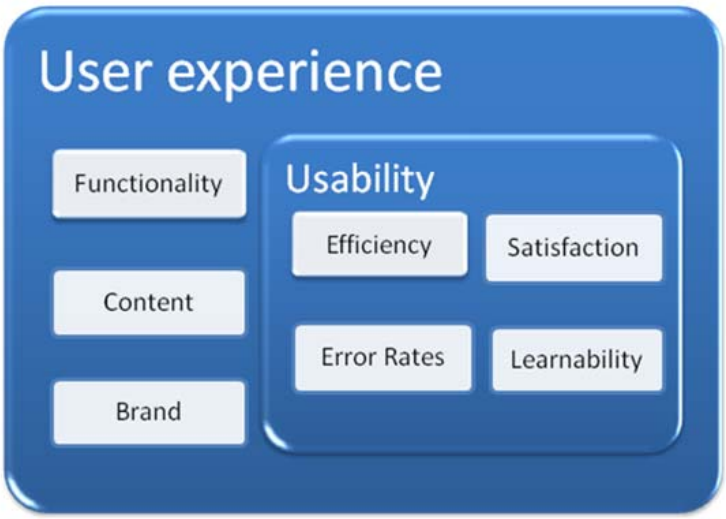


Figure 2. 2 User Experience model

During previous literature review, we finally develop Rubinoff (2004)'s model and get our final User Experience Model (Figure 2.2). Compared to Rubinoff's model, our model divides usability into efficiency, satisfaction, error rates and learnability. Not all factors refer to usability are included in this model because we want to specify the concept of usability in the context of website evaluation.

2.2 Website Success

Palmer (2002) suggests that website success is significantly associated with website download delay (speed of access and display rate within the website), navigation (organization, arrangement, layout, and sequencing), content (amount and variety of product information), interactivity (customization and interactivity), and responsiveness (feedback options and FAQs). Palmer (2002) also points out that from a substantive point of view, site design, usability, and media richness appear to be closely associated with site success. For webpage owners to be successful and for users to be satisfied, websites need to consider usability and other design criteria (Nielsen, 2000). Poor interface design has been a key element in a number of high profile site failures (Buschke, 1997).

The 20 website success features (appendix 1) identified by DeLone and McLean (2003) can be classified into four broad factors. These success factors have generally been accepted as being desirable in websites (Barnes and Vidgen, 2002), and other researchers (Dinesh *et al*., 2008) as well suggest that these factors are:

- Quality (i.e., the accessibility, reliability, security, and ease of use of the site) which has been termed as "systems quality" by DeLone and McLean (2003);
- Appeal (i.e., the user friendliness, appearance, and convenience) which is encompassed in the "use" metric of DeLone and McLean (2003);
- Efficiency (i.e., savings generated in cost and time and greater control over delivery of services) which has been termed as "net benefits" by DeLone and McLean (2003);

- Identification (i.e., personalization and community created by the site) which is encompassed by the "information quality" metric of DeLone and McLean (2003).

The study performed by Rhodes (1998) suggested that good content, simple design, and few grammatical errors were required to establish website trust, as well as final website success. Elling *et al*. (2007) developed WEQ (Website Evaluation Questionnaire) to evaluate website usability and user satisfaction, starting from three basic factors of website success: *navigation*, *content and layout*. The dimension of *navigation* is related to attitudes towards the process of looking for information in the website, the dimension of *content* is related to attitudes towards the outcome of this process: the information that is found in the website, and another dimension of *layout* is related to the so-called "look and feel" of the website.

A survey carried out by Alkan (2006) identified four factors, which are important for the success of a website: Design, Navigation, Technology, and Content.

Table 2. 3 Models of Website Success

Jonathan (2002)	**Mirchandani *et al*. (2008)**	**DeLone and McLean (2003)**	**Rhodes (1998)**	**Elling *et al*. (2007)**	**Alkan (2006)**
Content	Identification	Information quality	Content, Grammatical errors	Content	Content
Navigation				Navigation	Navigation
	Appeal	"use" metric	Design	Layout	Design
Download delay	Efficiency	Net benefits			
Interactivity, responsiveness					
	Quality	System quality	Web trust		
					Web-technology

The previously discussed models are summarized in Table 2.3. Among all these previous findings for website success, it is easy to identify some common features among them, for instance, aspects of design, navigation, content are discussed in most models. Web-technology is another important aspect in the current setting, which should be taken into account when evaluating website success. Therefore, finally we chose to use model by Alkan (2006), consisting of four factors, which will be discussed below:

- Design,
- Content,
- Navigation,
- Web-technology.

2.2.1 Design

The layout (design) is essential for websites. It helps users to understand the structure of content better, and influence the first impression as well. Psychologists at the

Carleton University (Lindgaard *et al.*, 2006) found that it takes the users only 50 milliseconds to decide whether they like a website or not. There is no time to lose! Within the blink of an eye it is necessary to succeed in making a positive impression on the user. If users get negative impressions, they probably lose interest no matter how excellent the website is from perspectives of content and usability. And once the users lose interest, there may not be a second chance to compensate for that, since impression is hard to change. The saying "The first impression counts!" also applies to the Internet. It is worth investing in the design of university website. This may be summarized into some objective and subjective criteria (table 2.4).

Table 2. 4 List of criteria for website design

Objective	**Subjective**
• Picture/Graphics are relevant to the information presented • Appropriately use media (explain more in the following)	• Font is visually appealing and easy to read • Color scheme is visually appealing

In addition, one important component of website design is Media. The main media elements are sound, graphics, images, audio and video (Shirley, 1999). Sound can help improve or degrade usability. Things that cannot be described by words could be expressed by graphics or images. Furthermore, vivid dynamic pictures or background music can be embedded in a website to make it more attractive. Table 2.5 is list of criteria for media use.

Table 2. 5 List of criteria for media use (Shahizan and Li, 2005, p. 9)

Sub-Category	**Objective**	**Subjective**
Continuous/time-based media (audio, animation, and video)	• Control features for continuous media where appropriate (e.g. reply/turn off) • Alternative access (e.g., text version) to any information in continuous media • Avoidance of looping animation to prevent users' distraction	• Use of continuous media to suit content (e.g., demonstration, instruction, and speeches)
Static media (Graphics, images, pictures)	• Labeling of all static media, especially those used for menus and icons • Use of thumbnails to display photos	• Use of static media to enhance the information being presented • Non-excessive use of static media

2.2.2 Content-presentation

Content is not only important in the way of what information it contains, which has been discussed in Section 2.1.3, but also in the way of how it is presented. The information displayed on the web pages needs to be usable and attractive to target users. One the one hand, the language should be simple and the text area should be

suitable. According to Nielsen (1997), readers rarely read long articles word by word; instead, they just glance down and pick up some keywords or sentences that attract their attention. Therefore, it's suggested to employ "scannable text" (Nielsen, 1997) to improve the readability.

On the other hand, from an aesthetic point of view, there should not be too much content displayed in one page, to avoid excessive scrolling. Most users do not scroll down or do it reluctantly, and when they do it do not finish (Nielsen and Loranger, 2006, according to Lencastre and Chaves, n.d.) It means they seldom go to the end of the web page, since they suppose the most important information is presented in the beginning.

2.2.3 Navigation

The basic element of an effective website is its navigability. "Good navigation in a website is comparable to a good road map." (Shahizan and Li, 2005, p. 408) With good navigation, proper grouping of contents, users would know where they are, where they have visited, and how they can get to a destination from their current position. In brief, navigation is the key to make user experience enjoyable and efficient. Krug (2006) claims that friendly websites are those where users don't have to understand why and how.

Navigation should be designed in a way that is easy to understand and user-friendly. Make use of site navigation to draw user's attention to the highlights of university website. Motivate the user by using attractive navigation labels to follow our paths. (Shahizan and Li, 2005). Below (Table 2.6) a list of criteria for navigation is presented.

Table 2. 6 List of criteria for navigation (Shahizan and Li, 2005, p. 8)

Objective	**Subjective**
• Menu/list of key content in the main page • Menu/list of key content in all sub-pages • Links to the main page in a sub pages • Accurate/unbroken links • Use of sitemap • Menus are fit on screen (no scrolling) • Use of text within text link (where applicable) • No/short page scrolling	• The wording for each category of contents is meaningful to users • Contents should be grouped into a small number of key categories • Small number of steps/links to arrive at a particular information (rule of thumb is 3)

2.2.4 Web-technology

The Web technology utilizes standard communication protocols that provide transfer of data throughout the world. (Weaver, 1997) Web applications software programs and websites are developed with various tools and programming languages developed by JAVA SUN or MICROSOFT. Those languages could be C++, C#, ASP, Java, JSP, XML (Extensible Markup Language), etc. (Jaime, 2009).

We're well into the current era of the Web, commonly referred to as Web 2.0. Features of this phase of the Web include search, social networks, online media

(music, video, etc), content aggregation and syndication (RSS), mashups (APIs), and much more. Currently the Web is still mostly accessed via a PC, but we're starting to see more Web excitement from mobile devices (e.g. iPhone) and television sets (e.g. XBox Live 360). No innovation in technology will definitely lead to final website failure. To this extent, new technology coupled with various application tools make website be full of innovation and attraction. We have witnessed lots of websites such as Google, Facebook, and Youtube hit the top of success, new web-technology make them more intelligent, much easier to use and interact with. (Harris, 2008).

Currently, Web technology is moving from web l.0 to web 2.0. One of the major features in web 2.0 is supporting more interactive capability than web 1.0, web 2.0 is crucial roles in Internet industry.Web2.0 can support advanced web functions over Internet. (Sunghan and Lee, 2008) Different adopting in web technology might perceive attributes of a technology in different ways, their consequent behavior related to use of the technology might be different. (Hyeun-Suk *et al.*, 2009)

More and more of the Web is becoming mixable, the entire system is turning into both a platform and a database. Major websites are going to be transformed into web services - and will effectively expose their information to the world. Just as the media and businesses are coming to grips with Web 2.0 phenomena like social networking, Wikipedia and its many offspring, the growth of the blogosphere, and even microblogging, a new generation of technologies is emerging. (Jaime, 2009) Thus adopting new web technology to develop current university website become more and more crucial.

2.3 Web Evaluation Model

The previous discussion of user experience and website success suggests that they influence each other. To some extent, we may say, they depend on each other. (See figure 2.3)

Figure 2. 3 User Experience and Website Success

Web evaluation of the university website for this study is based on user experience and website success. The elements of user experience and website success determine what we should focus on during the investigation. From the perspective of user experience, user feedback is gathered through group interviews, heuristic evaluation and online questionnaire to examine the users' level of satisfaction. From the perspective of website success, web-analysis-softwares are used to obtain website performance data on usage and visitors. All of these evaluation procedures are assessed under the guidance of this model (see figure 2.4).

Figure 2. 4 Model of Web evaluation

Our website evaluation model is based on user experience and website success, at same time, user experience and website success depend on each other, the relationship between user experience and website success is not studied in this research. In the following chapters, we introduced the methods that used in this research and how they used due to different purpose.

Chapter 3

Research Methods

Our methodological chapter describes the website evaluation approaches that we have chosen to adopt for this study. The overall structure of our evaluation approaches will be discussed, followed by more detailed descriptions on their how we implementation. In short, the target webpages we are going to assess are homepage, research pages, and general usability of Lund University website. And we will evaluate them from aspects of two models (user experience and website success). In addition, the methods we use during evaluation are the three evaluation approaches that will be discussed in this chapter.

3.1 Evaluation methods classification

Combining evaluation techniques gives us a multidimensional answer. In our study, website evaluation methods fall into three major classes: Usability testing, User Feedback and Usage data.

Usability testing techniques involve obtaining feedback on website design and functionality either from experts or from users in a controlled laboratory environment. (Wood *et al*, 2003) It evaluates websites from an expert or professional perspective. Experts performed structured evaluation and give us quick and direct answer of usability questions. However, its starting point is not based on user experience and sometimes may neglect or misunderstand intended users' real need, so user feedback approach is applied also to cover its drawback. The method, heuristic analysis will be applied in this approach.

User feedback approach involves collecting mostly qualitative feedback directly from website users. The "users" could include international students, researchers, teachers or other visitors. (Wood *et al*, 2003) In this study, it is concerned with user experience and website success, and evaluates website from users' perspective. Online questionnaire and group interview will be applied.

Usage Data are quantitative data about the website's usage levels. This kind of evaluation usually involves web log data analysis or the collection of similar data by companies that measure Internet usage. (Wood *et al*, 2003) It evaluates website from data index perspective, providing comparative data on the usage of our website versus other website, and let you track overall usage trends over time. Several SEO (Search Engine Optimization) tools will be applied in this study.

Only applying one method for evaluation of a website is not enough, because all methods have some strength and limitations. By testing a multidimensional approach, one method's relative strengths could compensate for another's limitations. We can get a more accurate picture of how well the website is performing and how satisfied

the users are, and the quality and usefulness of the website could be improved accordingly.

In this study, Heuristic analysis, Online Questionnaire, Group interviews and some web analysis softwares will be applied. Below we will discuss how we combined these methods: 1) How the evaluation process goes; 2) what methods did we use when evaluating different evaluation aspects (aspects of user experience & website success models); 3) what method did we use when evaluating different pages.

3.1.1 The process of evaluating website

The evaluation process was divided into several stages which are displayed in figure 3.1. First, we registered Lund University website address in three web analysis softwares, like Google analysis, Website Grader and Alexa.com, in order to record web log data (such as frequency of visits, place or country of visits) from September 2008 to March 2009. At the same time, we invited seven experts (Heuristic analysis) to evaluate the usability of Lund University homepage and English research pages, and general usability of the whole website as well.

Second, based on the data gathered from heuristic analysis and web analysis softwares, we identified some usability problems, which may not stand for the true feeling of users, because they are just opinion of experts and softwares. So, we collected data using online questionnaire and then group interview to hear and understand the user's real need.

After all three evaluation approaches had been completed and data had been gathered we analyzed them comprehensively, summarized problems and gave recommendation for homepage, research pages and the whole website respectively.

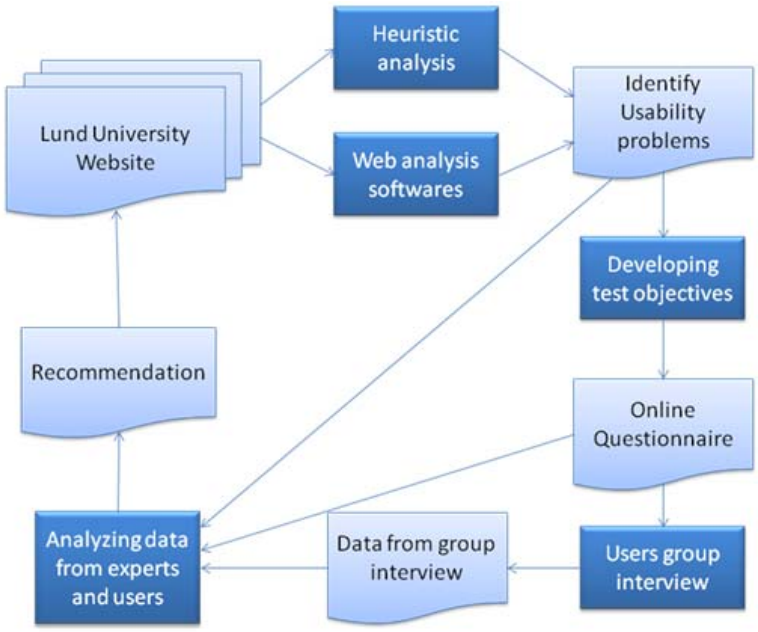


Figure 3. 1 evaluation process

3.1.2 Relationship between evaluation aspects and methods

As mentioned in the beginning of Section 3.1, all methods have some strength and limitations, and they are suitable for evaluating different aspects of User experience & website success models, so we chose different approaches for evaluating different aspects. (See Table 3.1)

Table 3. 1 relationship between evaluation approaches and two models

Evaluation Approaches / User Experience & Website Success			Usability testing (Heuristic analysis)	User Feedback		Usage Data (Web – analysis – software)
				Online questionnaire	Group Interview	
User Experience	**Usability**	Efficiency		✓	✓	
		Error rates		✓	✓	
		Satisfaction		✓	✓	
		Learnability		✓	✓	
	Functionality		✓			
	Content		✓	✓	✓	
	Brand					
Website Success	**Design**		✓	✓	✓	
	Content		✓	✓	✓	
	Navigation		✓	✓	✓	
	Web-Technology		✓			

Heuristic analysis evaluates websites from an expert or professional perspective, so in this approach, we just evaluate two aspects of user experience: functionality, and content, but assess all four aspects of website success based on technical criteria.

User feedback, in contrast, evaluates website from user perspective, so it includes all aspects belonging to user experience except functionality and brand, and considers three aspects of website success, which also have great connection with user experience.

It is hard to find a clear relation between usage data, user experience and website success since there is no criteria to determine, that's why we didn't check any criteria of usage data in Table 3.1. Take yahoo.com as an example, it is still one of the most popular website all over the world and lots of people visit it everyday. Through usage data, we may say yahoo.com is successful because it has already gained general popularity. But for websites of universities, not everyone will visit them, just a few kinds of people, like students, teachers, administrative staff etc. Usage data is really useful to web developers, information teams in faculties and management of the university (at least they might know university website much better through these data and they will think how to improve website performance in the future), for others, it just provide a review of current status of the university website.

3.1.3 Relationship between target pages and methods

As mentioned before, the target web pages we are going to analyze are homepage and research pages and we shall also analyze the general usability of the whole website. When evaluating homepage and research pages, we invited seven experts to investigate all the research pages of several faculties using heuristic analysis. Regarding to the general usability of whole Lund University website, we combined three evaluation approaches. The relation between target web pages and evaluation approaches are described in Table 3.2.

Table 3. 2 Relationship between evaluation approach and target pages

Evaluation approach / Target pages	Usability testing (Heuristic analysis)	User Feedback		Usage Data (Web-analysis-software)
		Online questionnaire	Group interview	
Homepage	✓			
Research pages	✓			
General usability of whole website	✓	✓	✓	✓

All the relationships between models, evaluation approach, and target pages are displayed in figure 3.2. In subchapters, we will discuss how we conducted those three evaluation approaches.

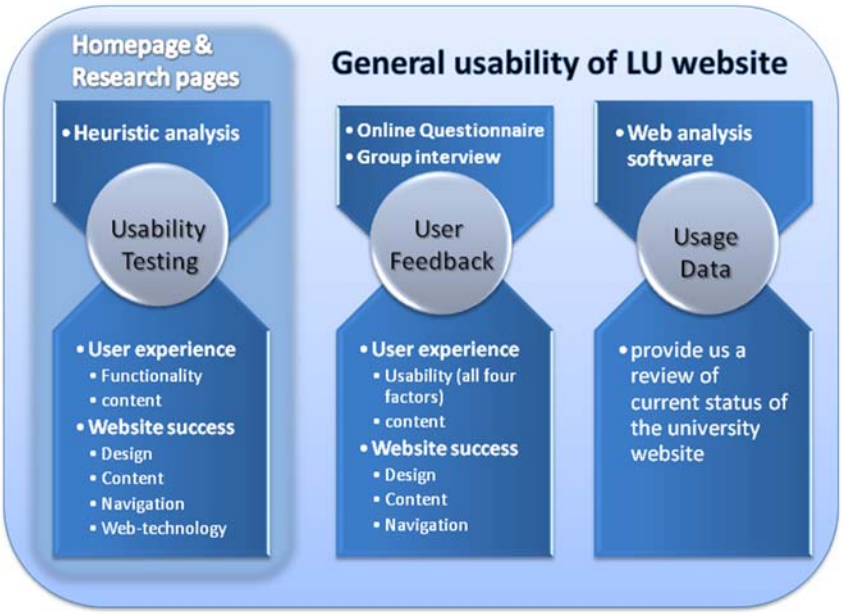


Figure 3. 2 A Multidimensional Approach of Web Evaluation

3.2 Heuristic analysis

Heuristic evaluation is a classical method in the type of usability testing, through which a website is reviewed by experts according to generally accepted web design and functionality principles and standards (Nielsen, 1993). It helps in detecting the

usability problem, and thus is frequently employed by developers or usability experts. As to web evaluation, there are attractiveness, aesthetic design and content heuristics.

In general, heuristic evaluation is difficult for a single individual to do because one person will never be able to find all the usability problems in an interface. Luckily, experience from many different projects has shown that different people find different usability problems. Therefore, it is possible to improve the effectiveness of the method significantly by involving multiple evaluators. (Nielsen, 1992).

Heuristic evaluation helps to find and explain each observed problem according to established usability principles. Independent research (Jeffries *et al*., 1991) has indeed confirmed that heuristic evaluation is a very efficient usability engineering method.

In heuristic analysis, we invited seven experts to evaluate general usability of the whole Lund University website, homepage and English research pages as well. The experts we invited are web developers, web editors, researchers and teachers in computer science. All of them have at least five years working or research experience in web design. Also, we are involved in the heuristic analysis, since we have studied computer science for bachelor and master degree, and have project experience in web design as well.

3.2.1 General usability of Lund University website

When assessing general usability of the Lund University website, we invited the experts to fill in a form (appendix 2) to assess this website from many aspects using a scale (from 1 to 5).

The aspects of website that were assessed on the form are: content, aesthetic design (layout), and navigation. The principles we used when designing this form are as follows:

- Judicious use of color: color use should be balanced and low saturation pastel colors should be used for backgrounds. Designs should not use more than 2-3 fully saturated intense colors (Reeves *et al*., 1996).
- Symmetry and style: visual layout should be symmetrical, e.g. bilateral, radial organization that can be folded over to show the symmetrical match. Use of curved shapes conveys an attractive visual style when contrasted with rectangles (Reeves *et al*., 1996).
- Structured and consistent layout: The website has an exceptionally attractive and usable layout. It is easy to locate all important elements; White space, graphic elements and/or alignment are used effectively to organize material (Paul, 2004).
- Depth of field: use of layers in an image stimulates interest and can be attractive by promoting a peaceful effect. Use of background image with low saturated color provides depth for foreground components (Reeves *et al*., 1996).
- Choice of media to attract attention: video, speech and audio all have an arousing effect and increase attention. Music can attract by setting the appropriate mood for a website (Reeves *et al*., 1996).
- Design of unusual or challenging images that stimulate the users' imagination and increase attraction: unusual images often disobey normal laws of form and perspective (Reeves *et al*., 1996).

Moreover, the content related heuristics are:

- Consistent visual style: This heuristic is on the borderline between the two sets. Visual style is generic in the sense that a website needs to be consistent in terms of layout and image, but the style also needs to reflect the corporate values. Hence a website targeted at the youth market should use arousing material, whereas a site targeted at older users may use more restful, natural images. For tranquility, choosing natural world content is advisable; conversely the image of a modern, dynamic organization is reinforced by technological subject matter (e.g. racing cars, jet aircraft, spacecraft) (Reeves *et al*., 1996).
- Visibility of identity and brand: The effectiveness of this heuristic depends on the strength of the brand image and corporate identity. The design principle just recommends making the identity visible in a consistent manner (Reeves *et al*., 1996).
- Matching arousal to user's mood and motivation: This heuristic focuses on the match between the user model and website content. Variations to be expected are between age and gender. Ultimately this is a complex topic dealt with in many books on marketing research (Reeves *et al*., 1996).
- Selecting content to suit users' requirements. This should result from a sound requirements analysis, but poor content display may confound a thorough requirements analysis. Content related to users' requirements should be clearly stated, in unambiguous language, with clear cues on how to find it (Reeves *et al*., 1996).
- Essential Contact Information. Every Web page contains a statement of authorship, school name, and date of publication/date last edited (Paul, 2004).

3.2.2 Research pages

As for research pages, we browsed every research page of some faculties, and found several common problems. The faculties we examined are Medicine, LTH, Science, and School of Economics & Management. We first identified some major problems, and then counted the number of pages that belong to those problems respectively. In the process of finding unqualified pages, we may also find more problems, then add new problem into major problems.

We examined the pages faculty by faculty. First, we went to the homepage of one faculty, there will be a list of departments that belong to this faculty. Then we click on the link of one department. In the homepage of department, there will be some links to research projects and PhD programmes, they are the pages we shall examine. Then we examine those pages project by project, and programme by programme. Finally we sum the total number of pages belongs to one department, and sum total number of pages belongs to one faculty, and then sum the number of page of different faculties Figure 3.3 presents the process how we count the unqualified pages.

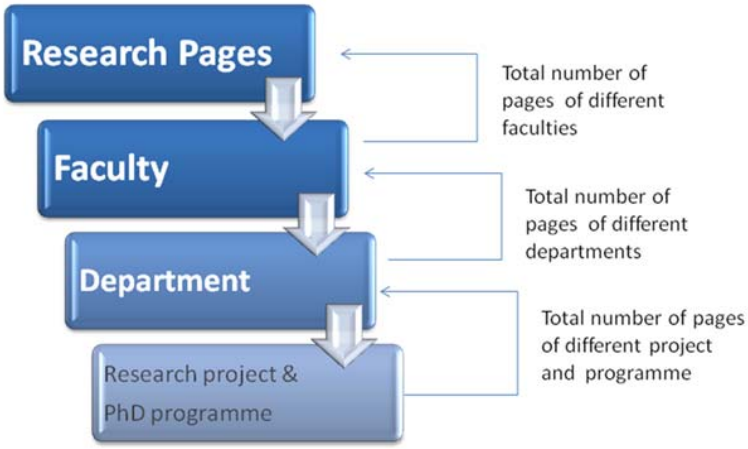


Figure 3. 3 the process of counting the number of research pages

3.2.3 Lund University homepage

Regarding the homepage, we invited seven experts to identify some problems based on their own check lists and guidelines.

Each individual evaluator inspected the homepage alone. Only after all evaluations have been completed are the evaluators allowed to communicate and have their findings aggregated. This procedure is important in order to ensure independent and unbiased evaluations from each evaluator. (Nielsen, n.d.).

3.3 Online Questionnaire

An online questionnaire can be used to gauge users' satisfaction of a particular website. Online questionnaire are convenient, don't cost much money and can easily reach the target user. (Bartels *et al.*, n.d.) In addition, since the responses are gathered in a standardized way, questionnaires are more objective than interviews, and they require cost less time to collect information as well.

However, the type of information gained from online surveys is limited, because responses are defined by the questions. To save respondents' time, most online questionnaires are set up using check boxes. (Bartels *et al.*, n.d.) "There would be little point in using the interview at all, if it simply resolved itself into a fixed list of stock questions put by the interviewer." (Merton *et al.*, 1990, according to Bartels *et al.*, n.d.). In addition, since questionnaires are standardized, it is not possible to explain any points in the questions that participants might misinterpret. (Milne, 1999) Furthermore, open-ended questions can cost much time to process and analyze.

We put an online questionnaire on the English homepage of Lund University website (https://www.questback.com/lundsuniversitet/websitequest/) for 5 weeks and got 110 valid responses from visitors and Questback.com summarized the data (appendix 4).

3.3.1 Identify Purpose

In order to get useful responses in a cost-effective way, it is important to identify the aim of the questionnaire clearly. (Milne, 1999) We developed an evaluation questionnaire seeking views of international students, researchers and university staffs, on the website's content, design and ease of use, in order to benefit future development of Lund University web pages in English. The specific aims of questionnaire were to:

- Investigate potential users and how the website is being used
- Obtain an evaluation of website's strength and weaknesses on user experience, including usability, content, and design.
- Ascertain how the website could be improved.

3.3.2 Design of questionnaire

Our questionnaire (appendix 3) included open and closed questions, consisting of general questions about personal information and also specific questions relating to website use experience. Since questionnaire belongs to the second approach (user feedback) of website evaluation, which emphasis on user experience perspective, we will conduct our questionnaire mainly based on user experience model (Section 2.1), and some factors of website success (Section 2.2) is also involved because they affect user experience to some extent as well.

Our questionnaire consists of two main dimensions of user experience and webiste success, which are generated from table 3.1:

Use experience
- Usability:
  - Efficiency
  - Error rates
  - Satisfaction
  - Ease of use, learnability (user friendliness)
- Content (Quality of information):
  - Relevance
  - Accuracy
  - Currency

Website success
- Navigation
- Design (aesthetic quality)
  - Font is visually appealing and easy to read

Design of questions
The questionnaire (appendix 3) started with some general questions about personal information, such as nationalities, working or studying conditions, in order to get to know who will be our target users, because website design depends on the users who use it. Different users focus on different elements, have different interpretations about visual auditory and aesthetic, have different capacities for processing information, and different experiences with websites. For example, students may want more

information about programme study, Lund city description, and news etc. Or students would prefer websites with modern design and more media. Thus, identifying target users helps us evaluate whether Lund University website is well designed, and meets users' requirements.

Next, some general questions were included about using Lund University website. Respondents were asked how often they use the website. The frequency of use is helpful when we evaluate user experience. On the one hand, it is possible for those who visit the site rarely that they may be unable to find information relevant to their interest. On the other hand, if the frequency of use is generally low, the designer should find some way to increase the frequency, for instance by keeping the website up to date or expanding the list of topic.

The questionnaire continues with six specific sub-questions. Respondents were asked to what extent they agree or disagree with six statements about Lund University website. The statements covered a number of issues relating to the user experience, including ease of use, navigation, design. These specific questions were realized using 1-to-3 Likert scales. Each user could mark the one benchmark that expressed his opinion best. The method of Likert scales is best apt to collect subjective data.

Regarding the content of website, respondents were asked which three topics on the website they find most useful. The questionnaire was ended with an open question about some suggestion of Lund University website.

3.3.3 General rules

Regarding design of questionnaire, we paid attention to length of survey, question format and format of the whole questionnaire:

- Length: We balanced length and information to ensure that the questions are concise and easy to understand. We tried our best to avoid asking too many questions, because "Respondents may answer superficially especially if the questionnaire takes a long time to complete" (Milne, 1999).
- Format of questions: Questions were refined over and over again to avoid "leading" and "loading" questions (Howto.co.uk, 2008), also we try to organize questions in logic group and place an open question at the end, which allows people to express themselves in their own words.
- Format of whole questionnaire: We put great effort on appearance of online survey to make it look attractive, in order to increase the response rate. Also, we spent extra time to refine the words and format of survey, and put Lund Logo in the beginning of survey to make it look more professional. It shows that if the research is taken seriously and in turn the respondents may take the same attitude. (Effective questionnaire design, n.d.).

3.4 Group interview

Group interviews are structured small group interviews used to obtain detailed information about a particular topic guided by a set of focused questions (Taylor-Powell, 2002). The persons being interviewed are similar in some way (e.g., limited

resource family members as a group, family service providers as a group, local officials as a group). (Taylor-Powell, 2002)

A major advantage of conducting group interviews is that deep and rich of information can be gathered, since participants hear and interact with each other and the moderator, which make them remind each other of different details than if people were interviewed individually (Taylor-Powell, 2002, Merton *et al.*, 1990). In addition, the moderator can ask probing questions and draw out precise issues that maybe unknown to moderator. The group interview discussion is particularly effective in providing information about why people think or feel the way they do. (Krueger, 1994, according to Bartels, *et al.*, n.d.)

3.4.1 Implementing group interview

The purpose of our group interview is to develop a broad and deep understanding of user experience of Lund University website in English. By listening to participants' story, we get to know what bother them most, in which case they waste their time, also their feeling and attitude towards Lund University website.

Participants were invited from three different groups: web designers, researchers and international students, all of whom have designed or used the Lund University website before. It's better if they are familiar with Lund University website, so as to gather more experience regarding website content. But person who are unfamiliar with it (e.g. only use it for application) could also provide useful information, for example, attitude towards aesthetic design or navigation.

The reasons for putting people from three different groups together are: First, they all have used Lund university website. Secondly, they might inspire each other with different aspects on website using experience. Group interview participants should be characterized by homogeneity, but with sufficient variation to allow for contrasting opinions. (Marczak and Sewell, n.d.). We invited ten persons and six of them showed up at the group interview session, which is within our expectation.

John Wedderburn is the main host of this group interview. He contacted the ten interviewees and booked the date and place for interview. We assisted him with designing interview questions and taking note during interview.

Setting for group interview session:

- Date: Based on participants' schedules, the session was arranged on April 17th, 2009.
- Location and equipment: the group interview was held at main University building (Universitetshuset) conference room. It is a comfortable, quiet room with adequate air condition and lighting. The chairs were arranged so that members could see each other. Spontaneity is affected by the spatial distribution of the group (Merton *et al.*, 1990). Also, we prepared ID tag for each participant.
- Length of session: Our group interview was planned to take one hour, and actually lasted one hour and fifteen minutes.

3.4.2 Conducting group interview session

The group interview session has three parts (Taylor-Powell, 2002): the opening, the interview questions and the wrap-up, but we added a fourth, i.e., the demographics of the participants in the group interview.

The methods of recording interview we chose are note taking and remembering, rather than tape recording. It is mainly because the interview we conducted was kind of conversation with users, mingled with some irrelevant information. Thus, it is no need to record the interview word by word, some key words about problems and examples are enough for getting general ideas. Kvale (1996, p.161) claims that "interviewer's active listening and remembering may ideally also work as a selective filter, retaining those very meanings that are essential for topic and purpose of the study." We separated the job during group interview: one is responsible for asking and interacting with interviewees, the other is responsible for recording.

1) Opening (Ellen Taylor-Powell, 2002)

a) Welcome, make introductions and thank participants.
b) Review the purpose of the group interview.
c) Review the ground rules: everyone's ideas are important and everyone has an opportunity to speak. There is no right or wrong answers; even negative comments are useful in gaining insight about the topic under discussion. All comments are confidential and only summarized information will be communicated.

2) Demographics

A one-page questionnaire on personal information and web use was handed out at the beginning of the session and collected at the end. "This information can influence the way the information is viewed during the final analysis of the group interview results." (Bartels *et al*., n.d.)

3) The interview questions

During the group interview session, we asked five interview questions, and invited each person to speak in turn. The questions and the purposes for each question are as follows:

Q1: How and when do you use Lund University website?
P1: We want to know how frequently users use our website and which they are interested in, through which we will have a much more clear understanding about users' needs.

Q2: Tell us about positive/negative experience while using Lund University website.
P2: By listen to users' review of the university website (they will tell us the advantage and disadvantage of the university website according to their personal experience), we may know what should be improved in the future from users' perspective.

Q3: How important is the first impression of one website?
P3: According to the report from Google Analysis, 29.46% of visitors visit Lund University website for their first time (see Figure 4.13). So it is meaningful to ask users what make them impressed when they visit one website for the first time.

Through this question, we shall know better about how to catch visitors' eyes and what we really need to pay attention to.

Q4: If you just improve one thing, what do you want to do?
P4: Maybe there are several problems for us to solve, but which is the most important one from the users' perspective? By listening to their suggestions, we shall refresh our minds in content, design or layout.

Q5: Any other suggestions?
P5: In the end of meeting with users, we want them to give us more ideas and suggestions for website's further development and improvement. Some problems they found will help us to know better about what we should figure out, some ideas will help us to jump out of box and get lots of inspiration in site management and quality improvement.

4) Wrap-up the session
When the session came to an end, we "thank the participants for their time and valuable observations and promise to send them a report of the session's findings" (Bartels, *et al*., n.d.), so as to communicate the findings clearly and accurately.

3.4.3 Difficulties

During the group interview session, we came across several difficulties, which are partly because of the drawbacks of group interviews. First, group interviews are vulnerable to random events like storms, bad directions, and traffic jams, that may be why only six participants showed up in our group interview (We invited ten people). In addition, one participant dominated the discussion, putting too much emphasis on the search engine, which persuaded other participants to consider the search engine as a really big problem. Furthermore, small numbers and convenience sampling severely limit ability to generalize to larger populations (Marczak and Sewell), the result is not representative of the general population.

3.5 Web analysis softwares

There are various methods used to gather data for web analytics, e.g. the analysis software reports drill-down data, like frequency of visits, referring URL (where the user came from), frequency of page use and search term etc (Wood *et al*., 2003). Web analytics is in fact very important and beneficial not only to web designers but also to webmasters who take care of the site's optimization and to the marketing team behind the website as well. These web analytics tools help to examine performing/non-performing sections in web page; help to determine the status of traffic rank, and finally help to evaluate the quality of the whole site.

Several SEO tools are used in the research. SEO is the process of optimizing the websites for the search engines (such as Google). The website can rank higher in the search results than other websites by optimizing, in this way it helps the potential users find the website straight away. SEO has been used by companies and large websites to promote their websites. Certain techniques are applied to web pages to help a higher rank in the search engines.

When developing and maintaining websites, analysis plays a significant role in maximizing the effectiveness of the site. There are a number of resources and tools for analyzing web pages. In our study, we use two SEO tools: Google analytics (GA) and Website Grader, which will be presented below.

3.5.1 Google analytics

Google Analytics (abbreviated GA) is a free service offered by Google that generates detailed statistics about the visitors to a website. Its main highlight is that the product is aimed at marketers as opposed to webmasters and technologists from which the industry of web analytics originally grew.

GA can track visitors from all referrers, including search engines, display advertising, pay-per-click networks, email marketing and digital collateral such as links within PDF documents.

GA's approach is to show high level dashboard-type data for the casual users, and more in-depth data further into the report set. Through the use of GA analysis, poor performing pages can be identified using techniques such as funnel visualization, where visitors came from (referrers), how long they stayed and their geographical position. It also provides more advanced features, including custom visitor segmentation. (Tyler and Ledford, 2006).

3.5.2Website Grader from HubSpot

Website Grader is a free SEO service provided by HubSpot. It offers an automated evaluation of websites, as well as comparisons to others. Criteria tracked by Website Grader are Google Page Rank, Traffic Rank, number of inbound links, and the number of Google indexed pages.

Website Grader is one of best tools on the list because of how helpful and usable it is. It delivers a lengthy report broken into various sections with an evaluation of the page and recommended changes. While the grade is helpful to know where you stand, the suggestions are more valuable because they help you to identify areas for improvement, and many of them can be pretty simple (Snell, 2008).

Maybe experts are always better than automated tools on website review, but automated tools do the same thing with experts. As to Website Grader, it checks some vital signs (Traffic; Social popularity; Inbound links; On-page SEO; and Others factors) and it helps to find some problems. Maybe it is impossible to find all problems, but it looks on specific things and reports on specific recommendations. It is important to recognize that the Website Grader score is not just about SEO, what the tool is trying to measure is marketing effectiveness. We think Website Grader has a wonderful performance till date. It clearly states that its main purpose is to check marketing effectiveness. The tool definitely gives us insight on how we can do the 'little things' better. Full report from these tools is list in the appendix 8.

3.6 Quality issues

The ensuing practical consequences for interview research involve an emphasis on the quality of the craftsmanship of research and on communicative and pragmatic forms of validation.

Reliability pertains to the consistency of the research findings. Issues of reliability during interviewing, transcribing, and analyzing have been treated. Interviewer reliability was in particular discussed in relation to leading questions, which may inadvertently influence the answers (Kvale, 1996). In our research, interview reliability was discussed on the basis of the categorizations of the subjects' answer.

Validity is ascertained by examing the sources of invalidity, the more valid, the more trustworthy the knowledge. Validation comes to depend on the quality of craftsmanship during investigation, continually checking, questioning, and the theoretically interpreting the findings (Kvale, 1996). In order to improve validity of our study, the group interview participants were asked for the validation of our transcripts and interpretations.

The *generalizability* of a study is the extent to which it can be used to inform researchers about persons, places, or events that were not studied. Generalizability has two aspects. Sample generalization refers to the ability to generalize from a sample, or subset, of a larger population to that population itself. This is the most common meaning of generalizability. Cross-population generalizability refers to the ability to generalize from findings about one group, population, or setting to other groups, population, or setting. (Russell, 2006). In order to increase the generalizability of our study, we explained our reserach procedure as detailed as possible, and described social context and subjects as throughly as we can.

3.7 Ethics

Confidentiality is the right to maintain autonomy and privacy, and control who knows your information. It is justified by three different arguments: consequence, rights and fidelity based. First, a broken confidence might make difficult for researchers to continue researching, and participants may lose trust in other researchers as well. Second, participants have rights to limit access to his/her person, to maintain secrets, deciding who know what about them. Finally, researcher owes loyalty to the informants and should honor promises associated with research. Ethics are not problems but dilemmas between confidentiality and, visibility and transparency; validity and avoiding harm; scientific understanding and individual rights, privacy and autonomy and so forth. (Israel, 2006) The experts and participants who involved in the research agreed to research before it commences.

Regarding to *informed consent*, ethical research requires all participants to agree to research before it commences, also, the consent should be both informed and voluntary. It means, participants have to understand what the research is about and their role, to agree voluntarily as autonomous individuals and can withdraw their consent anytime as well. (Israel, 2006) All participants have understood what our research is about and their role, to agree voluntarily as autonomous individuals and can withdraw their consent anytime as well.

Chapter 4

Empirical data and analysis

In Empirics Data chapter, we will put together the result we've got from experts review, online questionnaire, focus group, and technical tools. The data from experts is about homepage, research pages and general usability situation of Lund University website, other data are mainly about general usability level of Lund University website. There will be a short analysis followed each empirical table or figure.

4.1 Heuristic Analysis

In heuristic analysis, we invited seven experts to evaluate general usability of the whole Lund University website, homepage and English research pages as well.

4.1.1 Overall Evaluation of Lund University website

Seven evaluators who are knowledgeable in Human Computer Interaction and have high web usage experience carried out heuristic analysis. Evaluators were given a heuristic form (appendix 2) sheet that involved the rules of attractiveness, aesthetic design and content heuristic that have been described above. Evaluators qualified their subjective judgments by assigning marks to specific item. The marks express in a 5-mark scale, indicating the degree of conformance with each particular rule. The range of assigned values was from 1 (inadequate) to 5 (excellent). And then we have the result as follows (see table 4.1):

Table 4. 1 Assessment using the content/aesthetic/attractiveness heuristics

	Total Score (max 35)	Average (scale 1-5)
Use of color	26	3.7
Symmetry/aesthetic style	24	3.4
Structured layout	20	2.9
Depth of field	22	3.1
Choice of media	13	1.9
Unusual images	16	2.3
Visual style	27	3.9
Brand visibility	25	3.6
Mood and motivation	19	2.7
Contact information	26	3.7
Content and requirement	25	3.6

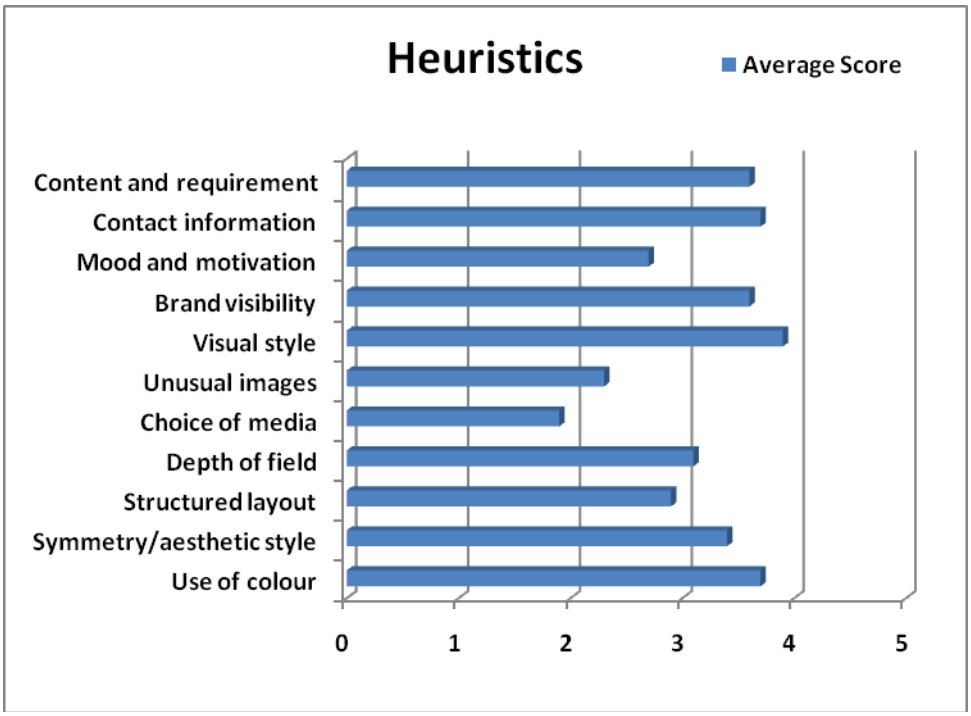


Figure 4. 1 Result of assessment using the content/aesthetic/attractiveness heuristics

From the result (see Figure 4.1) of heuristic evaluation, it is obvious that university website scored poorly on choice of media to attract interest, unusual images are either not frequently used to attract attention. As to the heuristic of matching arousal to user's mood and motivation, it changes in terms of different age and gender, university website scored neutrally but it is really hard to conclude that it will increase the website usability. The website need to be better structured from the aspect of structured layout, existing layout lengthens the 'browser height' pages which make it not easy to locate all important elements.

Overall, university website seems to include the functionality needed to support basic user tasks, the style of website could project university identity properly. Furthermore, the website has a well-stated clear purpose and theme that is carried out throughout the site. And the web pages have a usable layout and it is easy to locate most of the important elements. At the same time, links for navigation take the visitors where he/she expects to go, but some needed links seem to be missing, a user sometimes gets lost. Almost all of the information provided on the website is accurate and almost all of web pages contain a statement of authorship, faculty name, and date of publication/date last edited.

4.1.2 Research pages testing

Experts were invited to observe all research pages of four faculties: Medicine, LTH, Science, and Lund University School of Economics & Management (LUSEM). They identified three major issues:

- Out of official format: Some research pages do not follow the official university layout, but at department, or project level.
- In Swedish: some research pages turn out to be in Swedish when click links for further information.

- Link invalid/broken pages: When you click one link, the page may not be found, or the page cannot be displayed.
- Out of date: Many pages are not updated for several months, even many years. In this research, we assume that pages are out of date if they were older than 2007-01-01.

Finally we found that approximately 53.1% of pages do not follow the official layout, 6.3% of pages are written in Swedish within the English version, and 4.3% of links are broken or direct to pages with poor content (see table 4.2).

Table 4. 2 Statistics of English research pages of Lund University website

Faculty	Research Pages (total)	Out of official format	In Swedish	Link invalid/ broken pages	out of date
Medicine	476	85 (18%)	8 (2%)	61 (13%)	57 (12%)
LTH	777	549 (71%)	28 (4%)	23 (3%)	334 (43%)
Science	783	519 (66%)	104 (13%)	11 (1%)	157 (20%)
LUSEM	235	54 (23%)	3 (1%)	2 (1%)	103 (44%)
Total	2271	1207 (53%)	143 (6%)	97 (4%)	651 (29%)

Some examples of webpages which are broken or out of official layout are shown in appendix 5.

4.1.3 Examination of English home page of Lund University website

Homepage is the “face to the world and the starting point for most user visits” (Nielsen, 2002). High quality homepage helps to build good reputation for the university and enhance usability for the whole website. Thus we invited experts to evaluate the English homepage of Lund University, and some inappropriate issues are discussed in the following part (see figure 4.2):

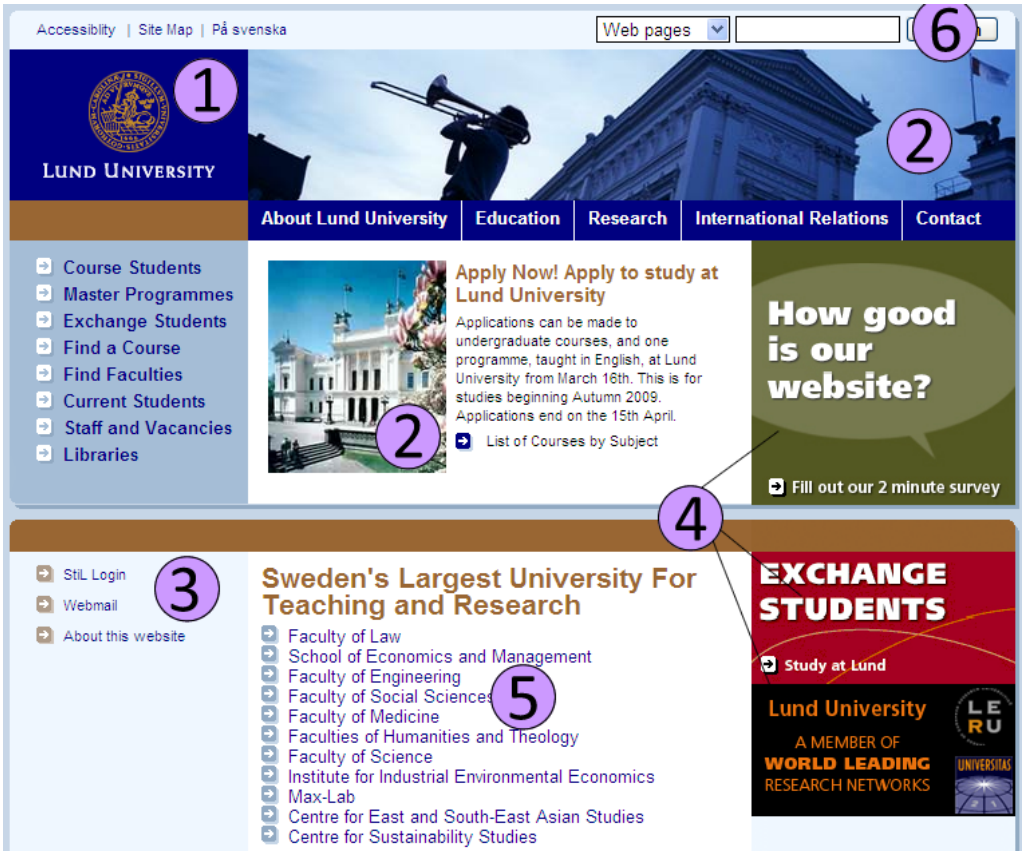


Figure 4. 2 Six issues found on the homepage during the usability review

1) Linking the logo: In some pages, there is no link returning back to homepage, it is necessary to add a link to the logo that takes the user back to the homepage.
2) These two pictures have been there for several months, a good suggestion is that updating these pictures in different seasons, which could bring new feelings to users and also remind them that the university website is an innovative one. In addition, a photo & video “warehouse” of Lund City and Lund University is recommended to build, which could make visitors outside university get to know more about Lund.
3) Shortcuts of internal services provided here is less than that on the Swedish homepage, which includes Stil, Ladok, Webmail, LUVIT, and ELIN@Lund. And a link to descriptions of these services could be shown to help the first time visitors making the internal service in Lund University more clear.
4) Sizes of these three pictures are too big, and have influenced the aesthetic “harmony” of the homepage. We suggest that they should be redesigned to an appropriate size, or to simple text links.
5) Information in area five could easily be found in the link of Find faculties, we suggest that conference or guest lectures information could be put here, just as on the Swedish homepage, many more visitors will benefit from these information.
6) Web pages of Lund University are designed for an old monitor set at 640 pixels by 480 pixels. But more than 60% of screens are now capable of viewing 1024×768 (see table 4.3), and only 5.1% users use 800x600, not to mention how small amount of user who use 640×480. Thus a 1024 size layout should be used for further development.

Table 4. 3 Screen Resolution distribution (according to Global web stats, April 2009)

	Screen type	Usage percentage
1	1024x768	38.92%
2	1280x800	17.25%
3	1280x1024	14.69%
4	1440x900	6.82%
5	800x600	5.10%

4.2 Group interview session

The group interview session was held on April 17, 2009, in Lund University. Six people joined the discussion; they were given different ID in the meeting. No.1 and 5 are master students, No.2 is a website administrator, No.3 is a researcher in Lund University and No.4 is a PhD student, No.6 is a visiting researcher from U.S. The meeting lasted for one hour and five questions were asked, the summary of discussion is presented in table 4.4, and the detailed discussion is in appendix 6.

Table 4. 4 summary of group interview discussion

Questions / Participants	1. How and when did you use LU website	2. Positive/negative experience	3. How important is first impression	4. One thing that want to improve most	5. Suggestion
No.1 Master student	• Not frequently • Apply for programmes • Find contact info	• Search engine is tough. • Hard to find the position of teacher and whom to contact when applying	• Design should be innovative • Content should keep changing	• N/A	• Create icons • Remove outdated information • Personal profiles should be more detailed • Update latest public information
No.2 Website administrator	• Find administration information • Contact info	• Better structure than LTH • Search engine doesn't work well • Pictures are not changed frequently	• Modern design • Information should be updated	• Should be modern • Rich content like topics and news	• More modern • Provide student statistic of employment status
No.3 Researcher	• Contact info • Student info • Secretary info	• Bad navigation, get lost	• Content should be rich and updated	• Improve search engine	• Develop site for mobile phone
No.4 PhD student	• A little bit • Contact info • E-learning resources • Course/programme details	• Search engine is tough • Learning resource of ELIN is not enough	• N/A	• Improve search engine • Do promotion for website	• Develop a platform of network community
No.5 Master student	• Check mailbox • PhD positions • News and events	• Not enough useful information • Cannot find what he wants • Search engine is tough	• The design of homepage is important	• N/A	• N/A
No.6 Visiting researcher	• Project information • Contact	• nice website • can find what he wants	• Advanced technology • Dynamic style	• Using new technology • Update content frequently	• Update the content

Quantitative researchers try to analyze written material in a way that will produce reliable evidence about a large sample. Their favored method is 'content analysis' in which the researchers establish a set of categories and then count the number of instances that fall into each category. The crucial requirement is that the categories are sufficiently precise to enable different coders to arrive at the same body of material is examined. (Silverman, 2006).

First, based on testing aspects in model of web evaluation (figure 3.2), we set three categories for data analysis: *design (layout), navigation, and content.* And *supersizing catalog* is also added for the unexpected usage problems. The similar problems presented by interviewees were put into the same category (see table 4.5).

Table 4. 5 Summary of problem categories

Problem classifications		**Specific problems ('No.' is the interviewee's ID)**
Design		No.1.Design should be innovative; Create icons No.2.Pictures are not changed frequently No.6. Dynamic style
Navigation		No.1. Hard to find the position of teacher and whom to contact when applying No.3. Bad navigation, and always get lost No.5. Cannot find what he wants
Content	Out of date	No.1 Content should keep changing, remove outdated information No.2. Update information No.3. Content should be rich and updated No.6. Update content frequently
	Information is poor	No.1. Personal profiles should be more detailed No.2. Rich content like topics and news
Surprising category		No.1.2.3.4.5. Search engine is tough No.4. Learning resource of ELIN is not enough No.4. Develop a platform of network community No.4. Do promotion for website No.3. Develop site for mobile phone

Then, we summarized some main problems based on Table 4.5:
Design: The webpages are too static, without much media in the website, and the pictures are not changed frequently. Users want more dynamic elements added in the web page, to make it more innovative. Icons should be created as well, thus user could tell the functions immediately through icons, and usability may be improved accordingly.

Navigation: Navigation in some pages is really poor, which make users feel lost in some cases. Also, No.1 interviewee said he couldn't find the information he wants sometimes, for example, position of teacher.

Content: Four out of six interviewees mentioned that the content should be updated frequently. Also the information in the website was not considered sufficient, for example, No.1 participant wanted more detailed personal profiles of faculty staff, and

they also complained that there is too little information like job advertisements, latest research results, publications, university events etc.

Search engine: one of the biggest problems in surprising category is research engine. Five out of six participants said that the search engine is very tough. When search for some information, e.g. a staff profile, a lot of irrelevant information listed in the result, and most of them are out of date. Sometimes, they just use Google instead.

4.3 Online Questionnaire

During the study, we used an online questionnaire (appendix 3) to get feedback (Appendix 4) from users all over the world. Nine questions were asked to get users' experiences when visiting university website. We want to know when do users visit the website and how do think about our website, we also want to receive some ideas and suggestions for current status of website and future development through the questionnaire. We put an online questionnaire on the English homepage of Lund University website (https://www.questback.com/lundsuniversitet/websitequest/) for five weeks and got 110 valid responses from visitors. The result is not positive, since there are in average 17,300 visits to Lund University website per day, according to SEO report from Google Analysis (appendix 7), but only 110 visitor did the online questionnaire during five weeks. The data collected from Questback.com and analysis of data is as follows:

1) Where are you working or studying?

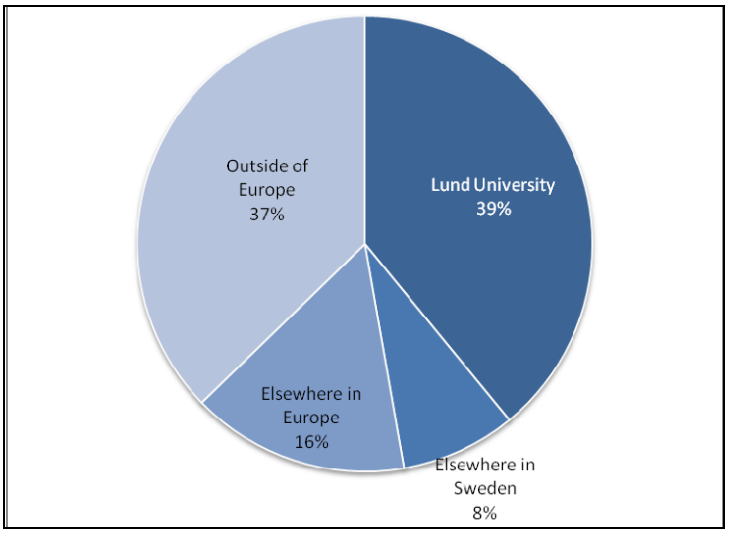


Figure 4. 3 Location of participants

The graph above provides some data regarding location of the questionnaire participants. 39.1% of them come from Lund, followed by visitors outside of Europe that accounts for 37.3%, and visitors from elsewhere in Sweden and Europe take up 8.2% and 15.5% respectively. More than half visitors are international (outside of Europe 37.3% plus elsewhere in Europe 15.5%), and the visitors who come from Lund are also probably international students or teachers who study or work in Lund

(figure 4.3). In short, almost all the visitors of Lund University in English are international, i.e. the target users are international.

2) Who are you?

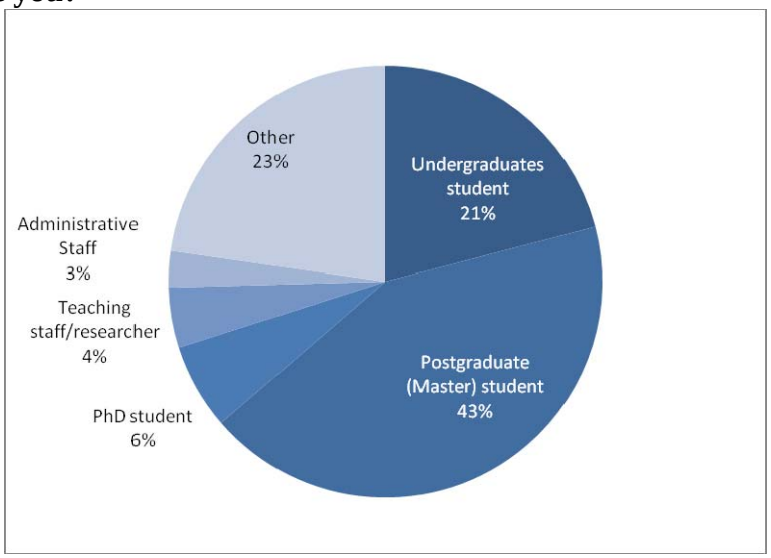


Figure 4. 4 Who are website visitors?

Master students make up 43% and undergraduate students account for 21% of the respondents. Other visitors consist of engineers, analysts, journalists, development workers etc. Master students dominate among the visitors of the English pages (figure 4.4).

3) Which subjects do you work with/study most?

Table 4. 6 Subjects visitors work/study with most

Alternatives	Percent	Number
Natural Sciences	12.7%	14
Medicine	6.4%	7
Engineering/Computer Sciences	16.4%	18
Social Sciences	20.0%	22
Humanities	4.5%	5
Business/Management	20.9%	21
Others	19.1%	19
Total	100.0%	110

The subjects which visitors work or study with most are in turn: Social Sciences, Business/Management, Engineering/Computer Sciences, and Natural Sciences. People who study Social Sciences and Business/Management dominate the visitors of the English pages (table 4.6).

4) How often do you use this website?

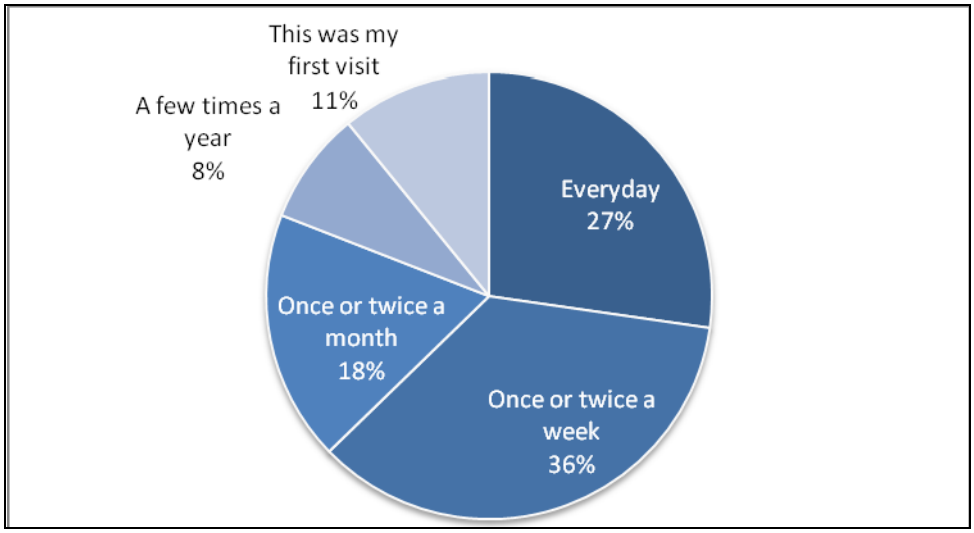


Figure 4. 5 Use of frequency of university website

From figure 4.5, it is apparent that more than 63% (once or twice a week 36% plus every day 27%) of users visit our website at least once or twice a week and 8% of users seldom use university website. Moreover, 11% of visitors visited Lund University for the first time.

5) Which version of the website do you prefer to use?

The online questionnaire was put on the English homepage of Lund University, it shows that 89.1 % of respondents choose to use English homepage when they visit the university website while the others take the Swedish version as their first choice

6) How do you evaluate/access the effectiveness, efficiency, navigation, design, satisfaction and content of the website?

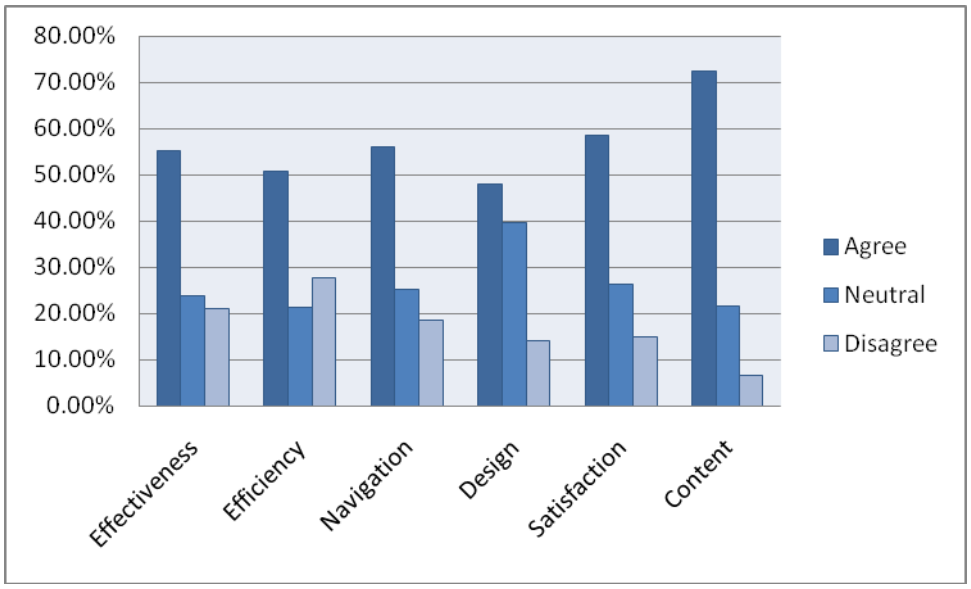


Figure 4. 6 Users' attitude towards different statements

55.2% of participants think that it is easy to find what they want on the web pages, 50.9% of them find it is easy to use the site on their first use. As to navigation, 56.1% of visitors believe it is easy to navigate around the website. However, only 48.1% of

them agree that the design of website is appropriate. Moreover, 58.5% of visitors agree that clicking on links take them to where they expect, and 72.6% of visitors are satisfied with the quality of content. From the usability questions, we can conclude that our website has the right content, efficiently organized and presented and most of visitors are satisfactory with university website.

7) What are the most common things you are attempting to do on this website? Choose a maximum of 3:

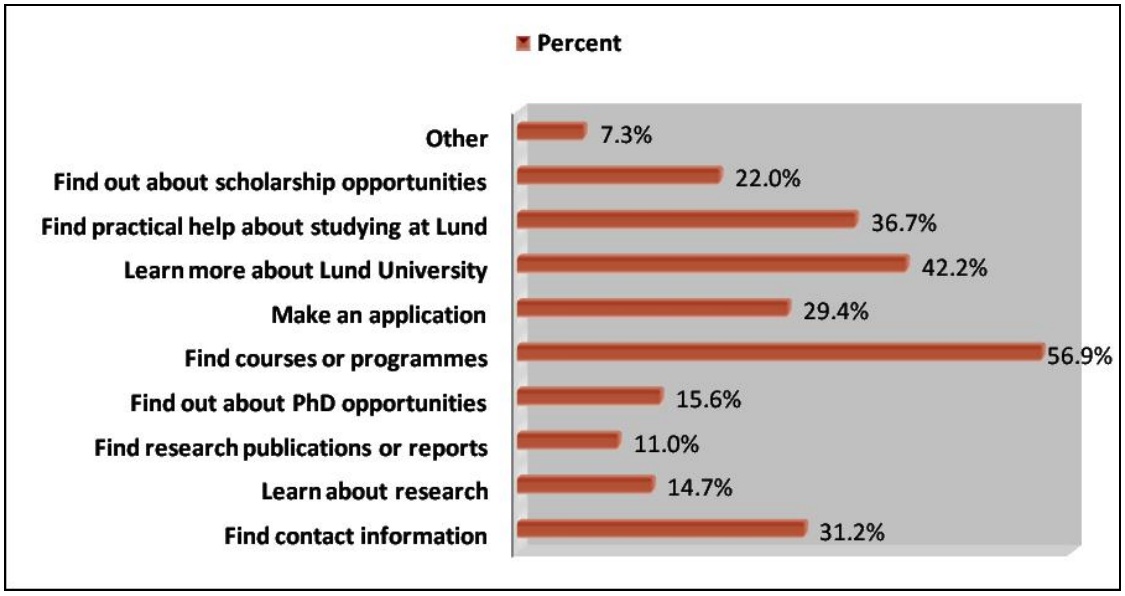


Figure 4. 7 What do users want to get from university website?

Most visitors (56.9%) want to find information about courses/programmes. Furthermore, 42.2% of them want to learn more about Lund University. Moreover, 36.7% of the visitors want to find practical help about studying at Lund University. 31.2% of them are attempting to find contact information based on particular purpose.

8) How often do you use other universities websites?

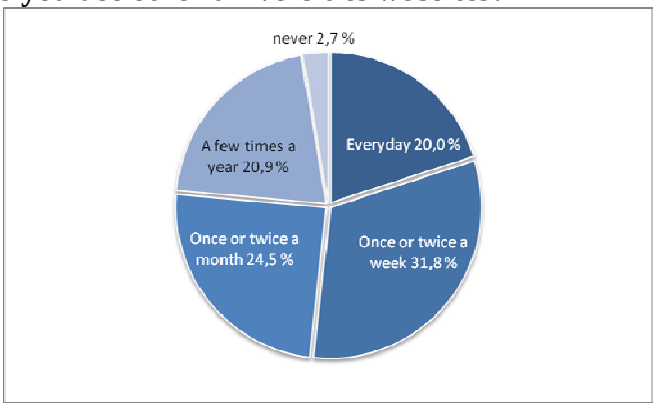


Figure 4. 8 Use of frequency of other universities websites.

52% of visitors visit other universities websites at least once or twice a week. And only 3% of visitors never visit other university websites.

9) Please leave any comments regarding the WebPages of Lund University. What can we do better?

This is an open question and we did want users to provide us with as much useful suggestions as they could. There are several voices from users: some of them complain that there is no online job center; it is hard to find PhD opportunities and other positions. And lots of visitors think that information on programmes and courses is incomplete and sometimes even misleading to students, also they suggest to increase the public information like news, report on latest research, lectures etc. in English. Furthermore, some of visitors think that information about Lund city and campus is very scarce on the web, it would be better to include more pictures and videos or links for the international students who wish to join the University, so that they can be able to visualize where they are going to study.

4.4 Data from web-analysis-software

Firstly, we used Website Grader to help us analyze some competing websites like www.uu.se, www.su.se and www.kth.se from Website Grade, Google Page Rank, Google Indexed Pages, Traffic Rank, Blog Rank etc. (see table 4.7). We also received lots of useful information from SEO Report of Website Grader (see appendix 8). Website Grader compares web sites for SEO qualities, and offers suggestions for improvement. The Lund University website got the grade of 99.3/100, which means that of the large number of websites that have previously been evaluated, Website Grader's algorithm has calculated that this site scores higher than 99.3% of them in terms of its marketing effectiveness. The algorithm uses a proprietary blend of over 50 different variables, including search engine data, website structure, approximate traffic, site performance, and others. The Lund University website ranks No.1 among four universities in Website Grade. (see appendix 8).

Page Rank is Google's way of deciding a page's importance. It matters because it is one of the factors that determine a page's ranking in the search results. It isn't the only factor that Google uses to rank pages, but it is an important one. KTH got highest rank among four universities in Google Page Rank.

Table 4. 7 Web-analysis-software results for different university websites.

Site	Website Grade	Google Page Rank	Google Indexed Pages	Traffic Rank	Blog Rank	Inbound Links
www.lu.se	99.3	8	123,000	10,724	87,897	65,481
www.uu.se	95.4	9	29,500	19,371	Not Ranked	120,866
www.su.se	98.4	8	11,800	21,273	1,655,777	39,493
www.kth.se	97.6	5	114,000	3,812	Not Ranked	133,260

Google indexed pages is the approximate number of pages on website that have been stored in the Google index. The Google web crawler will visit the website periodically and look for new content for its index. Generally, the more pages your site has within the Google cache, the better. For Lund University Website, there are 123,000 indexed pages in Google, and is the university website which has the most indexed pages among four universities.

Traffic Ranking is a combination of the number of users that view a website and the number of pages viewed will give you and nearly every website on the Internet its Traffic Ranking. Websites are rated according to the traffic (visitors) they get. We know from the table 4.7 that KTH got the most visitors among four universities.

Secondly, we use Google Analytics to get other useful information like total visits, average pages views, average time on site etc. (see appendix 7):

From Sep 1, 2008 to Mar 26, 2009, there are 3,584,797 visits, and the number of Absolute Unique visitors is 1,143,592, the average is 17,317.86 visits / Day. Pages on the Lund University Website were viewed a total of 13,817,540 times. Average Page views for all visitors: 3.85 Pages/Visit, which means that visitors look at 3.85 pages for every visit. Furthermore, Average Time on Site for all visitors is 00:03:21, which means that visitors spend 3.85 minutes for every visit.

How many new visitors come every time? During this period, New Visits account for 29.46% among all visitors. For example, there are 10000 visitors of university website today, for 2946 of them, it is their first visit. So, more and more visitors will revisit our website if the design of website is attractive, content is updated in time, all information is organized in order. Where do our visitors come from? From the analysis report, we know that most of visitors come from Europe (88.49%), and then followed by Asia (6.42%).

All these type of information from SEO tools will benefit web developers and information teams at each faculty, it will help them to know well about the current status of website and other competing university websites with regard to marketing. Through data like traffic rank, average time on site, average page views, they may know better what and how to improve the website quality.

Chapter 5

Conclusions

This chapter answers the research question respectively. First in order to answer question one, we will conclude homepage and research pages respectively based on integrated analysis of empirical data, also summarize general problems of whole website. Recommendations towards certain problem will be presented in this chapter, which are the answer to question two. In the next chapter, question three will be answered. We will discuss some limitations of our website evaluation, and then the evaluation model in chapter three will be modified to a new one.

5.1 Conclusions (Answer to question one)

Q1: Does the university website function smoothly enough to deliver educational services?

To answer this question, through analysis of experts and users data, we will identify some problems occurring in homepage, research pages and some general problems of the whole website.

5.1.1 General usability of whole Lund university website

1) Design and layout:

- Web pages of Lund University are designed for an old monitor set at 640 pixels by 480 pixels. but more than 60% of screens are now capable of viewing 1024×768 (see table 4.3), and only 5.1% users use 800x600, not to mention how small amount of user who use 640×480. Thus a 1024 size layout should be used for further development. Then the page would have more space for various information and decoration.
- Media using: The use of media in Lund University website is generally poor. Experts only marked media using 1.9 points (out of 5 points) (see table 4.1). And the respondents of group interview also mentioned that website should be dynamic rather than static, more media like audio or animation should be added. As we can see, there is no audio or video embedded in this website. In addition, the static media (like graphics, images, pictures) is seldom changed, or not appropriate to present in university website. For example, the two picture displayed in home page has not been changed for months or longer. Some inappropriate flash just used for decorating page without any usability value. (e.g. http://fisher.teorekol.lu.se/ekol_inst/mol_ekol/index.html, see Figure appendix 5.5)
- Color, font and other visual style: generally, people in the study are satisfied with color and font. Experts gave them 3.7 points (out of 5points, see table 4.1). And the people in group interview never mentioned about visual style, which may

means they are basically satisfied with it. In addition, almost 40% of online questionnaire respondents think the design of LU website is not bad.

2) Content:

- Generally, users and experts are satisfied with the website content. According to online questionnaire, 72.6% of participants think the quality of content is good. Experts also gave good mark (3.6, according to table 4.1) to content. People in group interview claimed that information in this website is rich, well updated and accurate.
- Out of date page: According to experts who investigate research pages, many pages are out of date, especially LTH, with 43% of pages out of date (see table 4.2).
- No news: a web administrator in group interview mentioned that there is no space for news in homepage, which make the LU website static, and not real time. Web designer should leave some space for news. Since the information that visitors concern most in this website are: course and programme information, information about LU (according to figure 4.7), we can put some seminar news, or important events happened in Lund in news fields.

3) Navigation

The responses to navigation are not positive. Only about half of the online questionnaire respondents think it is easy to find what they want, and consider the navigation is good. Still 20% respondents are not satisfied with navigation. And a researcher in the group interview session complained that sometimes he could not find where he was, and got lost. In addition, experts marked structure 2.9 points (see table 4.1), which is not high.

4) Search engine

Search engine was the biggest problem when people discussed during the group interview session. Irrelevant or outdated pages are listed when users use search engine to seek for the information they want, they have to click on every links till they find the one that includes the information they want, according to a master student in group interview. And sometimes, if the finding results are too long and irrelevant, they simply use Google. Search engine should be rebuild to be more powerful, for example, add the search options like " keywords only appears in title". Also, some outdated information should be deleted from result list.

*5.1.2 English homepage (**www.lu.se/english**)*

1) Design and layout

The design of LU English homepage is generally poor. In addition to what we have discussed in Section 4.1.3, we also compared our university website to that of University of Cambridge (http://www.cam.ac.uk), homepages are opened by the same browser (Windows IE7.0 Explorer), and the result is as follows (see Figure 5.1 and Figure 5.2).

- First, color is not appropriately used. There are too many kinds of colors in homepage, and the color scheme is not unified, which makes it look much more disordered than that of University of Cambridge.

- Moreover, information like the introduction of Lund University takes too much space, it could be put into the category of "About Lund University", the design of first page should be clear, easy to navigate, and always be updated in time.
- Furthermore, as we just mentioned (section 5.1.1), there is no public information such as news, latest research and publication, job advertisement etc. in English homepage.

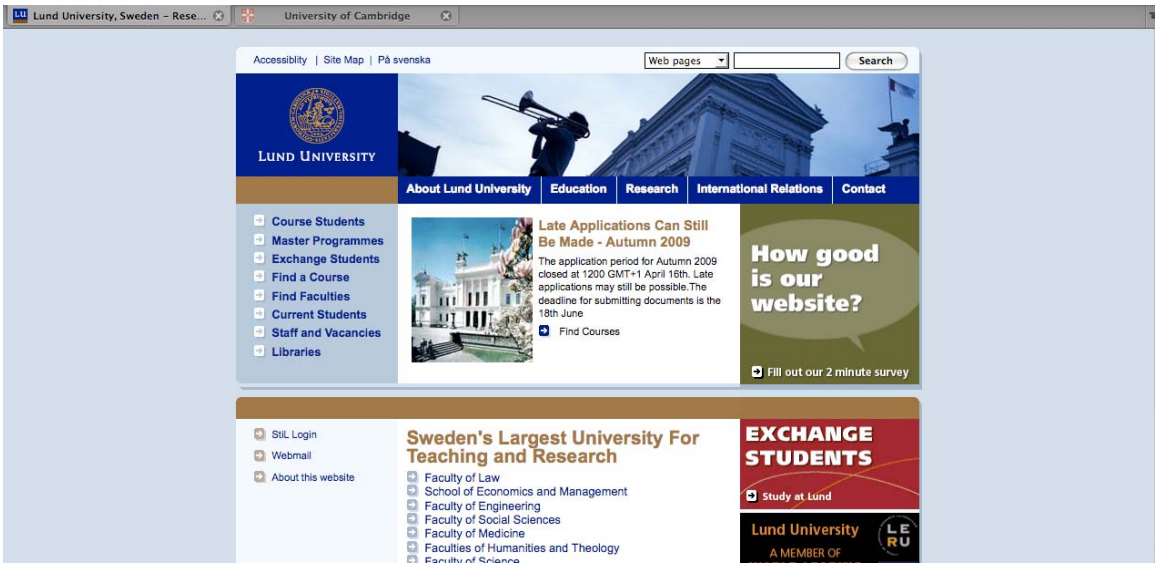


Figure 5. 1 Lund University webpage

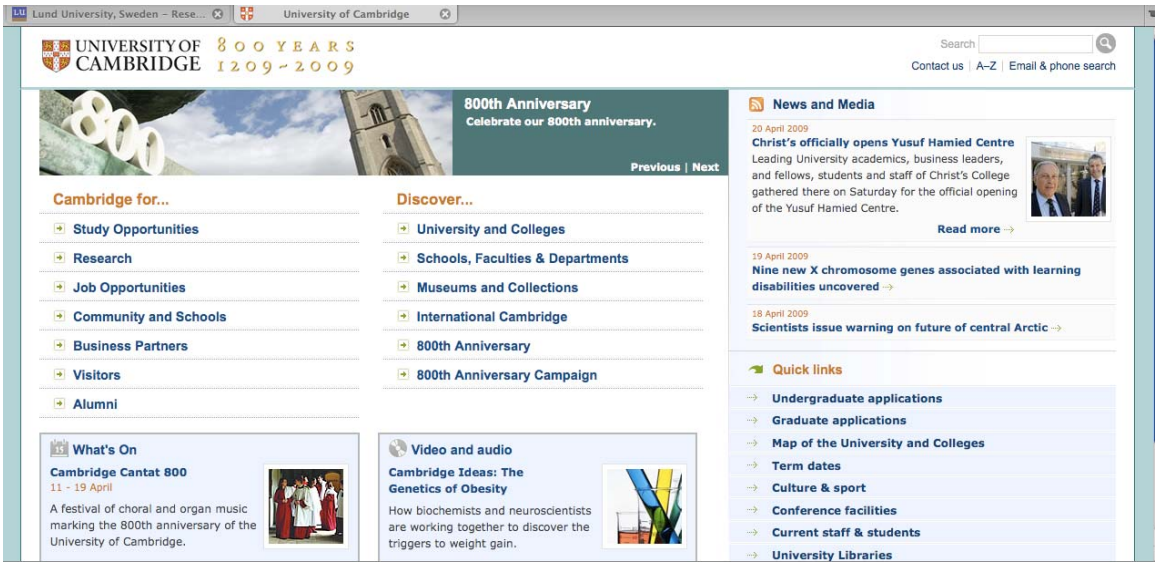


Figure 5. 2 University of Cambridge webpage

2) Content

- Some inessential information takes too much space in the homepage. As we can see in Figure 5.1, "How good is our website" and "Exchange students", these two images take up too much space of the homepage, but instead could be two small links.
- Besides public information, the homepage also lacked information about Lund University and the city of Lund, which most international students want to know

more about, but they could find it by clicking on the link "About Lund University".

- Not well structured: links are not grouped into a small number of key categories, instead, they are spread over the whole page randomly without category titles. In contrast, on the homepage of University of Cambridge the links are grouped orderly with clear category titles.

3) Navigation

The shortcut menu of internal services is inadequate, only Stil and Webmail are listed in the homepage. In addition, search engine is not efficient as mention in 5.1.1, which should be refined to enhance navigation.

4) Meta Keywords:

The web page has 34 keywords in its metadata. (See Appendix 8)

5.1.3 Research pages

1) Design and layout

The design of research pages is very poor. Beside the general problems discussed in Section 5.1.1, approximately 50% of WebPages do not follow the official university layout (table 4.2) (see examples in appendix 5).

2) Content

Content quality is in some cases very poor and has a negative effect on the usability of pages. Approximately 30% of pages are out of date with no information indicating current or closed projects, and researchers name are often used instead of subject name, contact information is inadequate in some pages. Moreover, about 6% of pages are in Swedish and 4% of pages are invalid or broken. (See examples in appendix 5) In addition, external sites are often linked to with no explanation. A variety of content management systems are used resulting in: often varying, and poor page layout, lack of centralized statistics giving an overview of visitor behavior. Content authors are often students or researchers who, in many cases, lack adequate training or resources to maintain pages, and a variety of different publication databases generated within the university.

3) Navigation

Pages do not appear to be optimized to return to the best search results either from internal and external search engines, search engines does not work well in some cases and lots of users choose to use Google instead to search the information that they want. Sometimes it is hard for users to find where they are because of poor navigation in some pages.

4) Inefficient webpage management

Many pages are not managed centrally, but at department or project level; resulting in over 100 page managers. Effective website management ensures that university is there to deliver what information and services the target audiences expect to be able to access.

5.2 Recommendations (Answer to question two)

Q2: How can the university website be improved in homepage, research pages?

As stated above, many problems regarding design, content, and navigation are existed in homepage and research pages, all of which may also occur in other university website. Below, we will give some recommendations based on those common problems, to improve the quality of homepage and research pages of university website.

5.2.1 Redesign of English homepage

1) Web address
www.lu.se/lund-university and www.lu.se/english could be shortened into www.lu.se/en to help users remember, just like http://www.uu.se/en.

2) Design and Layout
English homepage needs to be redesigned, it is better to use a 1024 size new layout, then more room could be given to structure the central content panel and the number of pages which has a long 'browser height' will be reduced. Dynamic image could be put on the homepage; all elements need be redesigned to make a better user experience. Take the homepage of Oxford University (http://www.ox.ac.uk/) as an example, it is good for us to draw inspiration from other universities website.

3) Content
Public information such as news, recent research and publications, job advertisements etc. should be put on the English homepage. Moreover, a link of video & photo center needs to be added to help users get to know more about the university and city. In that case, the difference of information between English version and Swedish version could be eliminated.

4) Navigation
We suggest that a clear shortcut menu be listed on the homepage to help users find the specific internal services, and the link of description about these services may as well be put there. The usability of search engine should be improved, which will provide a better search service for users to find the information they want. Moreover, a bewildering array of navigation designs should be avoided; a good navigation will help users to find where they are.

5) Meta keywords
The web page has 34 keywords in its metadata. We suggest that though the search engines don't weigh keywords as heavily as they used to, they're still important to get right. By using a high number of keywords, it is possible that you are diluting the effect of your most important keywords. We would suggest keeping the keywords to 10 or less. Currently, this page has keywords in its metadata.

5.2.2 Improvement of web page quality

1) Content

- *Media Center*: A media center including university news, latest research and publication, video, photos and other useful information of Lund City and Lund University should be built to help visitors be much more accessible to know well about Lund University and Lund City. E-magazine (including some latest news, research, publication, university events) could be designed and published for every couple of months, it would help to enhance university brand.
- *Updating:* Regularly updating or modifying website's content gives you an edge over the competition. People will keep returning to your site if they notice something new to see, learn from or enjoy each time. We suggest frequent updating of content, at least once every few weeks, and more often, once a week or more.
- *Information Integrity*: Make much more of the Swedish information available in English, including the information directed to people working within Lund University, not just foreign students coming here. All information like programmes/courses introduction, job advertisements, contact information should be described as detailed as you can.

2) Web management

Research information are put on the site of each faculty within Lund University, we suggest building a research database that includes all project information of the university, it will help visitors know well about the status of the current research projects and finished ones. We could compare English research pages with other university websites (see, for example, http://researchprojects.kth.se), and research information should be updated in time.

5.2.3 Site Management

True site management guarantees the site's stability so that a server crash does not prevent users from accessing it. It also checks the site's function—ensuring, for example, that no broken links exist. Adaptive and perfective maintenance are also needed to ensure that the site uses up-to-date technology and tools. For Lund University, Site Management Training should be held to help staff manage site better. And it would be better to have periodic inspection of university web pages, the task is to find out which pages are adequate and improve them accordingly.

Chapter 6

Limitations and further study

This chapter is divided into two sub-chapters: limitations and development of evaluation model, and further study. Firstly we describe problems that occurred when we applied each method in this research, based on these discussions, we suggest some improvement in methods, and some additional approaches can be used in further study to improve the research quality. Then a revised model of website evaluation was released finally. Some suggestions are also given for further research within this field.

6.1 Limitations and development of evaluation model

Due to the time and theoretical limitations, we had a lot of difficulties in the methods during this study. Below we will discuss problems that existed in each method, and discuss what we shall do to improve study quality and some additional methods will be used in the further. Finally, we will modify the evaluation model (Figure 2.4) to make the evaluation of university website more comprehensively.

Heuristic analysis
Through heuristics, we have obtained feedback from a limited number of experts or users. Expert review brings an independent, outside perspective to website development. It provides a larger context for web developer and applies the cumulative learning and expertise about what works best in web design. (Wood et al., 2003) However, in further study, we hope new heuristics will be proposed and extend the range of evaluation from usability to more aspects of website success, such as HCI experts, software engineers, web designers. In addition, users could be invited to test the result from expert review. The reason why we should do this in future work is that different people hold different opinions when they access the website based on different background and perspectives.

User feedback
First, since time is limited, we only held one mixed group interview session, from which the usability problems we got were far from enough. We should hold more unmixed group interview sessions, such as web-developer-group interview, student-group interview, and researcher-group interview to get a broader and deeper understanding of user experience in using Lund University website.

Furthermore, we have collected a lot of data from web developers, students and researchers, but never heard the voice from information teams of the faculties. For example, as we mentioned, to present a uniform view, all the pages should follow the official Lund University layout. In fact, however, some departments don’t want to have the same layout as Lund University, instead they want their own color or structure to distinguish from other departments. Therefore, identifying departments’ need is also indispensable for university website success.

We developed an online questionnaire to get feedback from users all over the world. But in the questionnaire, users were not asked what is disadvantage of the university website or any bad experience while using the website. For future study, we still think online questionnaire is an efficient way to get users' feedback, especially when it is impossible to reach all users. Furthermore, more open questions such as listing disadvantages of websites or any bad experiences should be added for getting a better understanding from users' perspective.

Usage data

Two website-analysis-softwares were used in this study. This kind of evaluation provides a wide range of quantitative data on usage at a low cost. In future study, we recommend using more similar softwares to compare the results among them, and we suggest tracking overall usage trends over time, in that case we can compare these data with other sources of usage information.

Additional methods

In this study, we did not use usability lab testing. Actually, it is necessary for us to invite a small number of users to participate in structured testing of the Lund University website. The users will be asked to perform a series of tasks using the university website and their behavior will be recorded, then studied for better understanding how users try to find the information they want and navigate around the website. After the testing, researchers can ask users more suggestions such as website design, navigation, user friendliness etc. So usability lab testing is the method that we think useful to get a rigorous usability analysis from users' perspective.

Moreover, face to face interviews with users can be conducted. We did not hold face to face interviews with users in this study, we used group interview session instead.. Group interview is efficient, but some participants may be dominant in the whole session, and influence others' primary ideas, which thus may never come to our ears. So to compensate for that, we should hold individual interview to obtain individual attitudes, belief and feelings.

Figure 6.1 is the modified evaluation model. In this model, the bigger white and italic characters are the new methods we added in the model. We omitted the lower part – the evaluation aspects of two models (section 2.1 & 2.2), since we didn't change anything in this part.

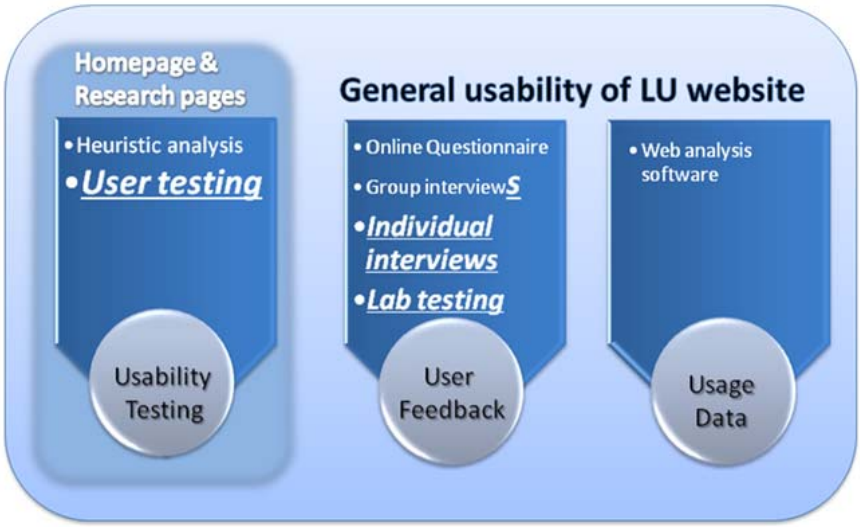


Figure 6. 1 Modified web evaluation model

6.2 Further study

We have discussed some common problems and recommendation to Lund University website, and we developed an evaluation model as well. Further research can address the application of the model to additional websites, as well as the development of the model.

Further study could involve more experts of web design; more group interviews consisted of different users, and more individual interviews. This would guarantee a better reliability and validity of the website evaluation. Now that this study has developed the evaluating model which based on user experience and website success. Theoretical connection between user experience and website success need to be examined. In this research we didn't do linear regression, so it is hard to find the relation between factors of User experience model and website success model. In further study, an online questionnaire for that regression analysis will be designed, to help to discover how factors influence each other and which factor user consider as the most important, thus we could evaluate university website with a more clear objective. This would further our understanding of the correlation between user experience and website success.

Our study is primarily devoted to Lund University website evaluation, an example for other university website evaluation. And the evaluation model we built is also only based on Lund University website. In further study, our model would be tested in other universities evaluation, to examine whether there will be big difference in the results in the context of different universities.

Appendix 1: The 20 website success features identified by DeLone and McLean (2003)

Quality:
Accessibility of the website (including accessibility to the poor, uneducated and disabled)
Reliability of the services provided
Reliability of the information provided
Ease of use of the information provided
Security of data
Quality of content (completeness, relevance and accuracy)

Appeal:
Appropriateness of the format of the information
Appropriateness of the level of detail of the information
Confidentiality of data
Visual appeal of the website
User friendliness of the website
Attractiveness of website's appearance

Efficiency:
Ease of navigation of the website
Ease of use of the website
Enjoyability in use of the website
Timeliness of information
Service and functionality of the website

Identification:
Sense of personalization created by the website
Sense of community created by the website
Reputation of the website

Appendix 2: Heuristic Form

Please visit English homepage and visit around the whole site (clink links as many as you can) Please give out score (1,2,3,4,5) and suggestions for each item, 1 means poor and 5 means excellent, thanks!

Items	Description	Score	Suggestions
Judicious use of color	Color use should be balanced and low saturation pastel colors should be used for backgrounds. Designs should not use more than 2-3 fully saturated intense colors.		
Symmetry and style	Visual layout should be symmetrical, e.g. bilateral, radial organization that can be folded over to show the symmetrical match. Uses of curved shapes convey an attractive visual style when contrasted with rectangles.		
Structured and consistent layout	The website has an exceptionally attractive and usable layout. It is easy to locate all important elements. White space, graphic elements and/or alignment are used effectively to organize material.		
Depth of field	Use of layers in an image stimulates interest and can be attractive by promoting a peaceful effect. Use of background image with low saturated color provides depth for foreground components.		
Choice of media to attract attention	Video, speech and audio all have an arousing effect and increase attention. Music can attract by setting the appropriate mood for a website.		
Design of unusual or challenging images	That stimulates the users' imagination and increase attraction: unusual images often disobey normal laws of form and perspective.		
Consistent visual style	This heuristic is on the borderline between the two sets. Visual style is generic in the sense that a website needs to be consistent in terms of layout and image, but the style also needs to reflect the corporate values.		
Visibility of identity and brand	The effectiveness of this heuristic depends on the strength of the brand image and corporate identity. The design principle just recommends making the identity visible in a consistent manner.		
Matching arousal to user's mood and motivation	This heuristic focuses on the match between the user model and website content. Variations to be expected are between age and gender.		
Essential Contact Information	Every Web page contains a statement of authorship, school name, and date of publication/date last edited.		
Selecting content to suit users' requirements.	This should result from a sound requirements analysis, but poor content display may confound a thorough requirements analysis. Content related to users' requirements should be clearly stated, in unambiguous language, with clear cues on how to find it.		

Appendix 3: Online Questionnaire

I would be very grateful if you could take a few minutes to fill this out – your answers will help improve our website. Thank you, John Wedderburn, Web Editor, Lund University.

Where are you working or studying?

- Select answer -
- Select answer -
Lund University
Elsewhere in Sweden
Elsewhere in Europe
Outside of Europe

Are you:

- Select answer -
- Select answer -
Undergraduate student
Postgraduate (Masters) student
PhD Student
Teaching staff/researcher
Administrative Staff
Other, please specify

Other, please specify:

Which subject do you work with/study most?

- Select answer -
- Select answer -
Natural Sciences
Medicine
Engineering/Computer Sciences
Social Sciences
Humanities
Business/Management
Other, please specify

Other, please specify:

How often do you use this website?

☐ Every Day.

- ☐ Once or twice a week
- ☐ Once or twice a month
- ☐ A few times a year
- ☐ This was my first visit

Which version of the website do you prefer to use?

- ☐ English
- ☐ Swedish

How do you evaluate/access the effectiveness, efficiency, navigation, design, satisfaction and content of the website?

	Agree	Neutral	Disagree
It is easy to find what you want on our website	☐	☐	☐
It was easy to use the site on your first visit	☐	☐	☐
It is easy to navigate through this website	☐	☐	☐
The design of this website is appropriate	☐	☐	☐
Clicking on links takes me to what I expect	☐	☐	☐
The text is clear and easy to read	☐	☐	☐

What are the most common things you are attempting to do on this website? Choose a maximum of 3:

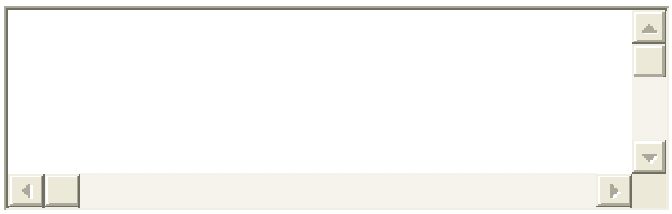
- ☐ Find out about scholarship opportunities
- ☐ Learn more about Lund University
- ☐ Find contact information
- ☐ Find research publications or reports
- ☐ Learn about research
- ☐ Make an application
- ☐ Find practical help about studying at Lund
- ☐ Find out about PhD opportunities

- [ ] Find under/post graduate courses or programmes
- [ ] Other, please specify

How often do you use other universities websites?

- Every Day.
- Once or twice a week
- Once or twice a month
- A few times a year
- Never

Please leave any comments regarding the WebPages of Lund University. What can we do better?



Appendix 4: Empirical data of Online Questionnaire

1. Where are you working or studying?

Alternatives	Percent	Value
Lund University	39.1%	43
Elsewhere in Sweden	8.2%	9
Elsewhere in Europe	15.5%)	17
Outside of Europe	37.3%	41
Total		**110**

2. What's your position?

Alternatives	Percent	Value
Undergraduates student	20.9%	23
Postgraduate (Master) student	42.7%	47
PhD student	6.4%	7
Teaching staff/researcher	4.5%	5
Administrative Staff	2.7%	3
Other	22.7%	25
Total		**110**

Other:

Software engineer
prospective graduate student (2)
Seeking PhD admission and scholarship
M.phil student
exchange student (2)
Analyst
Journalist
development worker
development worker
certificate
Merchant Seaman
Unemployed post-graduate
Applying for Masters admission at your University (2)
prospective student
President, meemsoft.com
Exchange student
Independent researcher

3. Which subject do you work with/study most

Alternatives	Percent	Value
Natural Sciences	12.7 %	14
Medicine	6.4 %	7
Engineering/Computer Sciences	16.4 %	18
Social Sciences	20.0 %	22
Humanities	4.5 %	5
Business/Management	20.9 %	23
Other	19.1%	21
Total		**110**

Other:

love, music
apply 4 study
NGO
Architecture
chemistry
biotechnology
Mathematics
Information Systems
Mass comunication
Toxicology/Molecular biology/Microbiology
Architecture
language
Civil Engineering
Hisotry
Combination of history and business
Sociale security

physical science
LLM

Administration, legal questions, personell matters
Architecture

4. How often do you use this website

Alternatives	Percent	Value
Everyday	27.3%	30
Once or twice a week	35.5%	39
Once or twice a month	18.2%	20
A few times a year	8.2%	9
This was my first visit	10.9%	12
Total		**110**

5. which version of the website do you prefer to use

Alternatives	Percent	Value
English	89.1%	98
Swedish	10.9%	12
Total		**110**

6. Do you agree with the following statements about this website

6.1 It is easy to find what you want

Alternatives	Percent	Value
Agree	55.2 %	58
Neutral	23.8 %	25
Disagree	21.0 %	22
Total		**105**

6.2 It was easy to use the site on your first visit

Alternatives	Percent	Value
Agree	50.9 %	55
Neutral	21.3 %	23
Disagree	27.8 %	30
Total		**108**

6.3 It is easy to navigate through this website

Alternatives	Percent	Value
Agree	56.1 %	60
Neutral	25.2 %	27
Disagree	18.7 %	20
Total		**107**

6.4 **The design of this website is appropriate**

Alternatives	Percent	Value
Agree	48.1 %	51
Neutral	39.6%	42
Disagree	14.2%	15
Total		**106**

6.5 Clicking on links takes me to what I expect

Alternatives	Percent	Value
Agree	58.5 %	62
Neutral	26.4 %	28
Disagree	15.1%	16
Total		**106**

6.6 The text is clear and easy to read

Alternatives	Percent	Value
Agree	72.6 %	77
Neutral	21.7%	23
Disagree	6.6 %	7
Total		**106**

7. What are the most common things you are

Alternatives	Percent	Value
Find contact information	31.2%	34
Learn about research	14.7%	16
Find research publications or reports	11.0%	12
Find out about PhD opportunities	15,6 %	17
Find under/post graduate courses or programmes	56,9 %	62
Make an application	29,4 %	32
Learn more about Lund University	42,2 %	46
Find practical help about studying at Lund	36,7 %	40
Find out about scholarship opportunities	22,0 %	24
Other	7,3 %	8
Total		**109**

Other:
e-mail, library and updating in courses
Find a research internship
library databases
info for employees
Get specific information about programs, courses, scholarships, etc.
Seeking news
find information, documents, policies, forms

8. How often do you use other universities websites

Alternatives	Percent	Value
Everyday	20,0 %	22
Once or twice a week	31,8 %	35
Once or twice a month	24,5 %	27
A few times a year	20,9 %	23
never	2,7 %	3
Total		**110**

9. Please leave any comments regarding the webpages of Lund University. What can we do better?

- Well, it is ok, but sometimes, i cannot find what I want. Some pages are in Swedish...really wield
- it is difficult to get very useful information such as on PhD positions which in most cases appears in Swedish

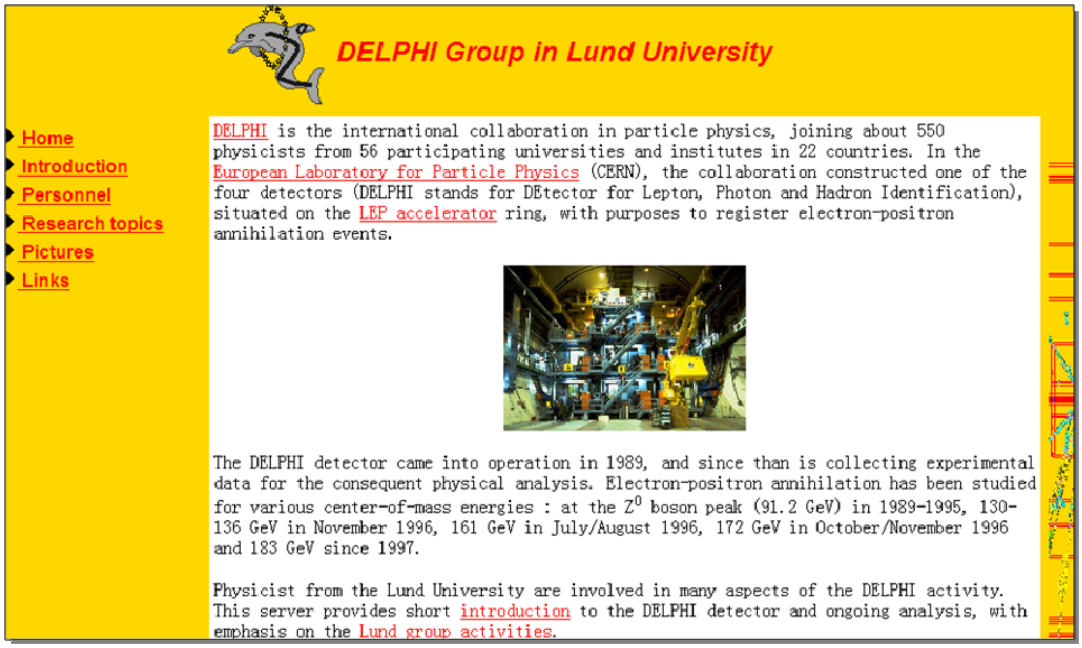
- love it. el ska dej min
- my name is umer hayat my qualification is fa 2007 so i m addmision ur college plz my help and addmission me i thankful to u. plz inform me thanks
- You can make this more attractive than this .hope ull do .
  Thanks & regards
  John
- I find that there is not always enough information in English sections.
- I am a undergraduate student outside of Europe, I came here want to find more about Lund University, I want understand more about Lund University, and help me decide to apply for study in Lund or not.
- At my first time visit this site, I found that it is concision and easy to find what I want, thank you. :-)
- The site is very good, I feel it is easy for any one to get the informations that he/she wants. But i suggest to make a figure showing to the visitors the Rout of the website.Thanks for giving us the chance for evaluation.Appreciate your concerns
- More pictures
- Please increase the information in English. Generally it is fine, but when it comes to research service offices or other administrative matters,amount of information in English is not sufficient.
- It should be more user friendly .
- the colors needs to be more attractive
- the look of the website is not fashionable , although most the users are young youth.
- the search for the info. should be easier
- I am short of ideas of any better thing you can do, because your website is crisp, smart and fast= easy to navigate and provide simply the expected information compare with some other universities's.
- I will interest to research in abroad in Sweden because help in your website.so this better in your website then this is website useful in new browser because this is best website
- it's good to me
- it is good but maybe the english news should be more for us to know, eg: some information about the seminar which will be held.
- please try to make more language versions
- if you can offer some resource on your website,it is better. thank u .
- please update English webpages of Lund University in time. If possible, please translate swedish webpages into english.
- It is good. I can find anything what I want to get. anyway, it is ok.
- Make it more attractive and also put the same information in english which is in Swedish because people feel that they are not part of university,who does not understand Swedish.
- list out the links to the homepages of different departments update in time
- Please removed words like "this page is not available in English", which implies a kind of discrimination.
- its well done.
- The design looks OK but it is hard to navigate and to find information.
- This is a good website but i think there are some inequalities in regard of information and appearance between the Swedish version and the English version. Now a days its easy to translate a website through various means. So people like me, who do not understand Swedish,sometimes feel that may be i am not getting some information.
- The program information is consistently incomplete and misguiding to students, especially the English pages.
- I would really like if you translated your news from Swedish to English. In that case it would be possible to use it in our electronic newsletter BioTechNews Sweden (www.biotechnews-sweden.com)
  Best regards

Michael Fahlgren

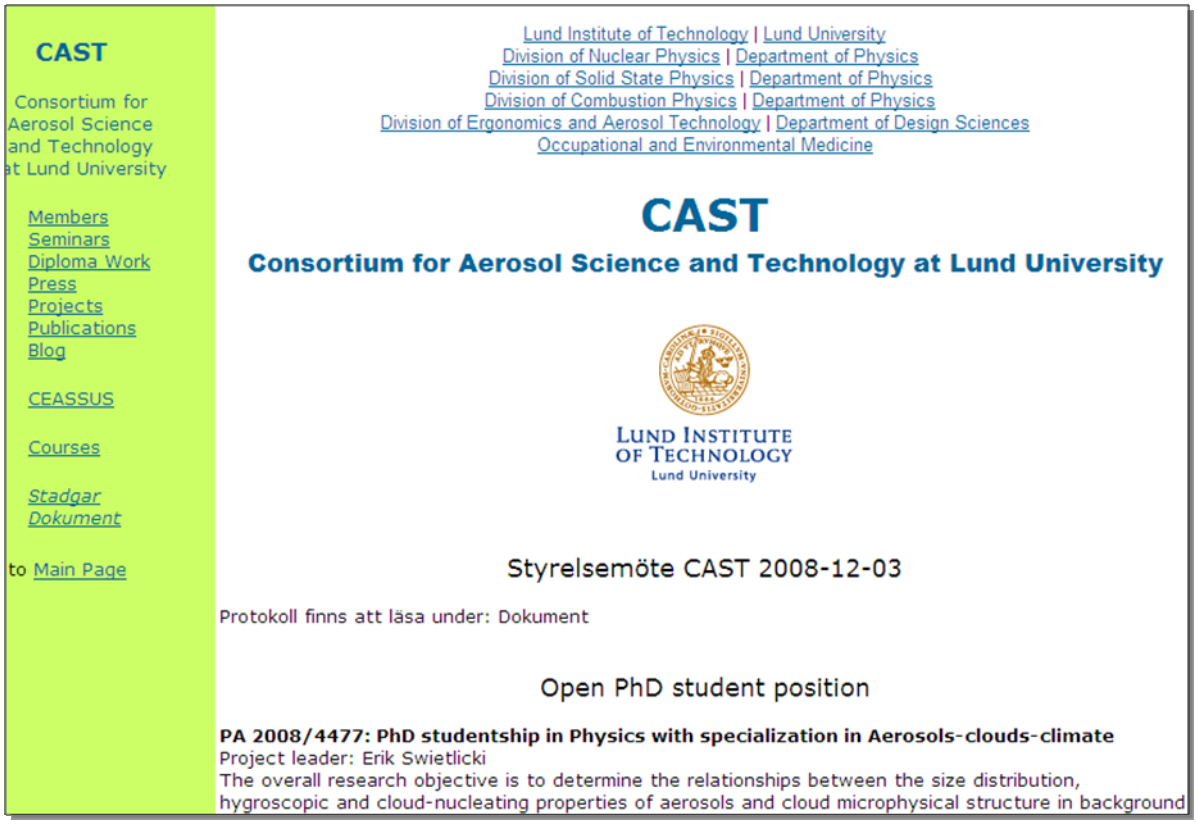
- great website!!
- please include pictures and videos of Lunds and the University of Lunds or links to the same on your website for us international students who wish to join the University so that we can be able to visualize where we are going to study. If possible, include as many pictures/links of Sweden as possible. This information is very scarce on the web.thanks.
- design, pictures etc
- i want to say that tell about next future admission timing and about next admission procedure. thank you so much! Need information regarding
  IJWDOJISDFLSDJFSDFJ SPAM
- make it a little easier 2 browse through.
- Search function that links only to the sites of the "main" webpages, such as course information and staff information, rather than always listing all PDFs with all research results ever made.
- Am from Tanzania i real like Lund University, it is my dream University in this world.
- I′ m trying to get contact with my old final examn teacher, Abelardo Gonzalez, and know more about the architecture school where i've developed my final degree exam. Also de architecture department and it′ s personal.
- I suggest, if you may, advertise more on Indian web pages.....
- Streamline the course selection page for exchange students hoping to study at the university. It could be easier to find a listing of appropriate courses taught in English.
- The web-pages of Lund University are the worst I have ever seen at any university, and a disaster compared to the professional style of many high-profile American Universities. It is not surprising that "RQ08" severely criticized this aspect of the university. The staff who make web-pages appear to be incompetent and totally out of touch with research. It is usually failed researchers who are hired as web-masters, rather than professional staff. Pages are seldom updated and there are no modern tools, like bloggs or links to social media (e. g.Facebook). In short: Lund University is a Third World-university when it comes to IT-policy.
- Studera.nu is not a good system... You should accept applications over Lund Website or you should improve studera because it is full of mistakes.
- There would be very nice if the application information would be more accessable. And there would be nice if there where a site that takes you through the application process from the application to applying for housing.
- Make much more of the Swedish information available in English, including the information directed to people working within LU, not just foreign students coming here.
- this website is very good and easy to use

Appendix 5: Examples of pages that are out of official layout or broken.

Appendix 5. 1 Example of page that is out of official layout

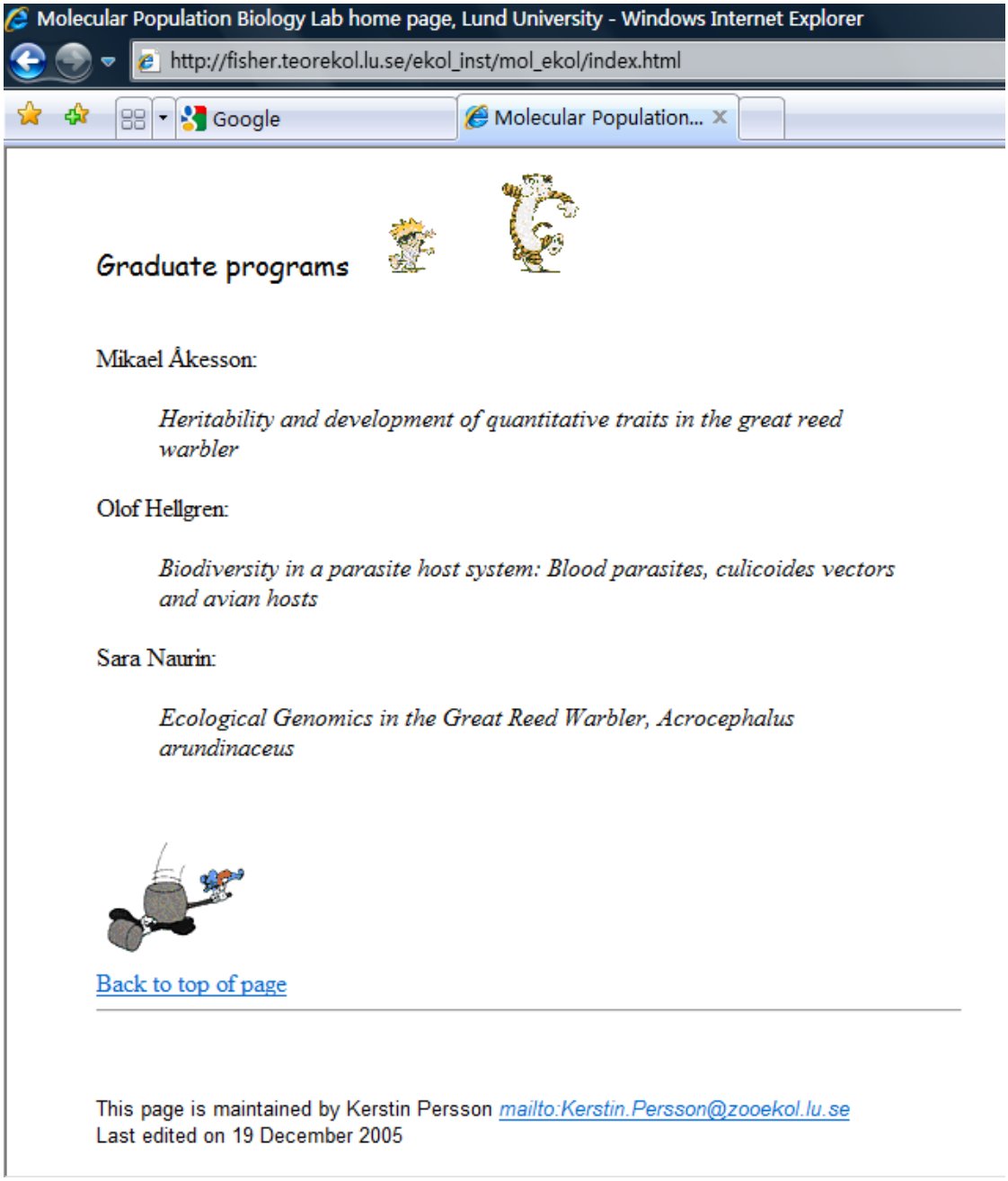


Appendix 5. 2 Example of page that is out of official layout



Appendix 5. 3 Example of page that is out of official layout

Appendix 5. 4 Example of link that is direct to broken page



Appendix 5. 5 An example of inappropriate web design. Flash animation used to decorate the page doesn't contribute to its usability.

Appendix 6: Transcription of Group interview session

Q1: How and when do you use university website?
1: I do not use university website so frequently, mostly I use it to apply for programmes which I want to join and find some contact information.
2: Well, I am looking for some administration information and some contact details,
3: I try to find telephone number on website, as well as student information, sometimes I seek for contact information of secretary because some professors have secretary.
4. I use the website a little bit, I search for contact information, e-learning resources, library and courses/programmes details.
5. I always check mailbox in my faculty, so I often go to faculty's homepage and try to find some useful information like PhD positions, news and school events.
6. All right, I will check some project information and their contacts, that's it.

Q2: Tell us about positive/negative experience while using university website.
1. Search engine is tough, for example, when I want to find a person by search engine, there are lots of irrelevant information shows up in the result, and most of them are outdated, so I give up finally and use Google instead. If I cannot find the information, I will ask someone. When I want to apply for some programmes, I don't know the position of teacher or whom to contact.
2. The structure of site of LTH is too specific, if you don't find some information in right way, you cannot find it, content should be rearranged, and some pages are really good. But Lund University website has a better structure. Search engine does not work well, Interface of Umea University Website is clean and you can find what you want. And, en, pictures on the websites are not changed frequently.
3. Sometimes I cannot find where am I, I got lost.
4. When I want to find some contact information by search engine, much irrelevant information is included in the result, and I have to check every link by myself, that's really annoying. About learning resource in ELIN@LUND is not enough, I have to contact library to get it. And it is inconvenient to search for other information, I have to return back the first page and do it again.
5. There is not enough useful information on the university website, and it is really disappointing when I cannot find what I want. The worst thing is search engine does not work well and the result always mixed with outdated, irrelative information, it is tough.
6. For me, it is okay, I can find information like contact, project description and so on. I think, it is nice website.

Q3: How important is the first impression of one website?
1: Design and Content is important for users' first visit to the university website, I mean, the website will be attractive if design is innovative and content is kept changing.
2: The website should be more modern, always updating.
3: I think, for university website, the content is important; people will have a good impression when the content is rich and updated in time.
5: Design, especially the homepage, if I do not have a good impression of the homepage, maybe I would not love to visit it again.
6. In U.S, top universities' websites adopt advanced technology for their websites and whole sites are designed with a dynamic style.

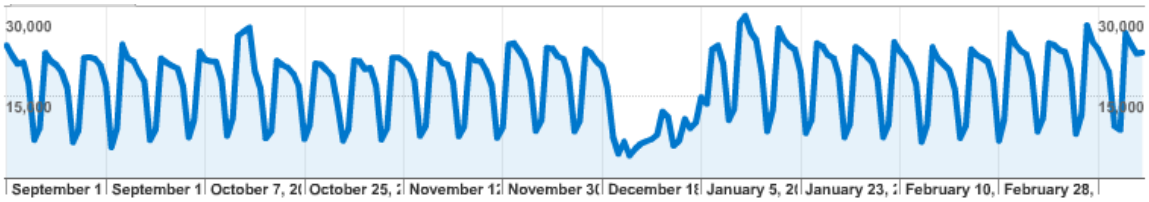
Q4: If you just improve one thing, what do you want to do?
2: The website should be more modern with different blogs/topics and news, I think that is the way to attract researchers and students.
3: Search is big thing; information structure of Microsoft is very good, you can have a look at the map site of Microsoft.
4: Better search engine, and promotion for homepage.
6: I would recommend using new technology, if the website doesn't update itself; finally it will go to a dead corner.

Q5: Any other suggestions?
1: Icons could be created for different institution, paper and contact information. Please remove away any outdated information in the search result. Personal profile should be as detailed as possible, and latest public information like publication; university events should be updated in time.

2: Make people feel it is a cool, modern university, keep moving in changing. Web pages should be dynamic, rather than static. What do student do and where they are after graduation? We have no idea about that, is that possible to provide much more student statistics of employment status?
3: Site for mobile phone should be developed in the future, then it will be accessible for people to visit the university website by cell phone. The university website should be more international, website is the window of university.
4: A platform of network community could be built to improve communication and information exchange. For example, blog system could be developed in the university website, it is wise to be open.
6: I hope you can always update the content, and have a look at American university website, maybe you will refresh yourself.

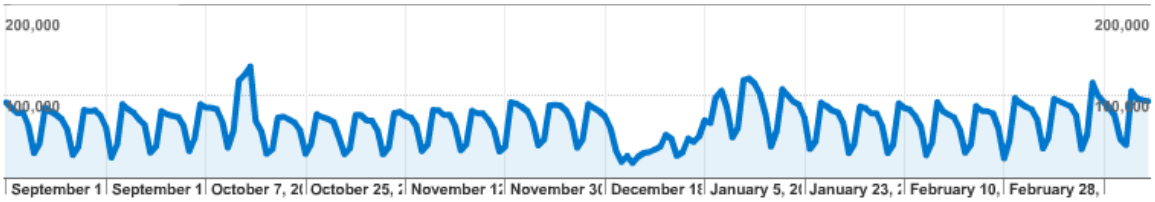
Appendix 7: SEO Report from Google Analytics

1. There are 3,584,797 Visits, and the number of Absolute Unique Visitors is 1,143,592, the average is 17,317.86Visits / Day.



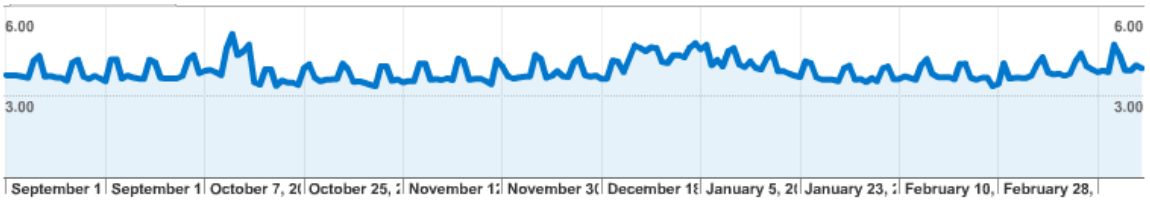
Appendix 7.1 Visits between Sep 1, 2008 and Mar 26, 2009

2. Pages on this site were viewed a total of 13,817,540 times



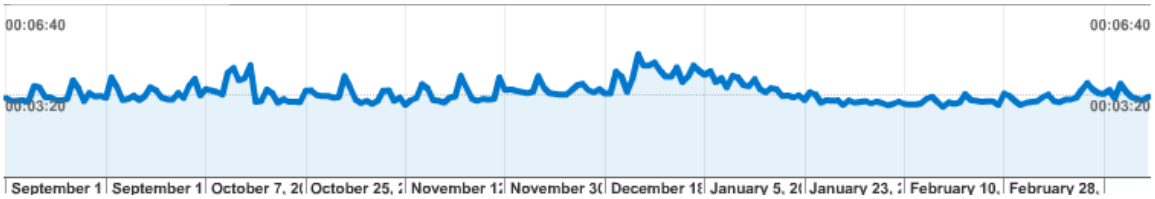
Appendix 7.2 Page views between Sep 1, 2008 and Mar 26, 2009

3. Average Page views for all visitors: 3.85Pages/Visit.



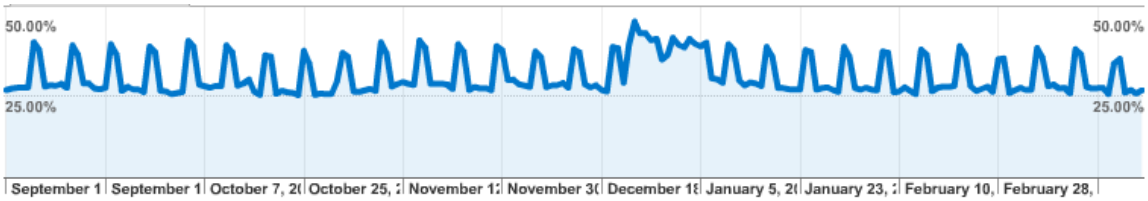
Appendix 7.3 Average Page views between Sep 1, 2008 and Mar 26, 200

4. Average Time on Site for all visitors is 00:03:21.



Appendix 7.4 Time on Site for all visitors between Sep 1, 2008 and Mar 26, 2009

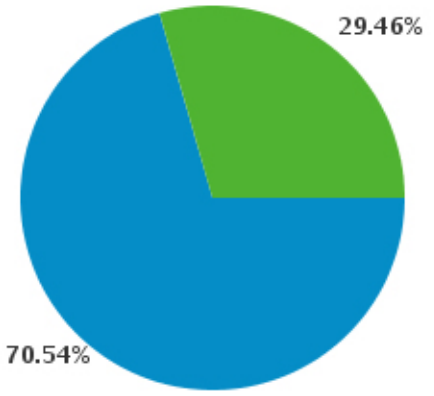
5. New Visits account for 29.46% among all visitors.



Appendix 7.5 Rate of New Visits between Sep 1, 2008 and Mar 26, 2009

	Visitor Type	Visits ↓	Visits
1.	Returning Visitor	2,528,835	70.54%
2.	New Visitor	1,055,962	29.46%

Visitor Type contribution to total: Visits

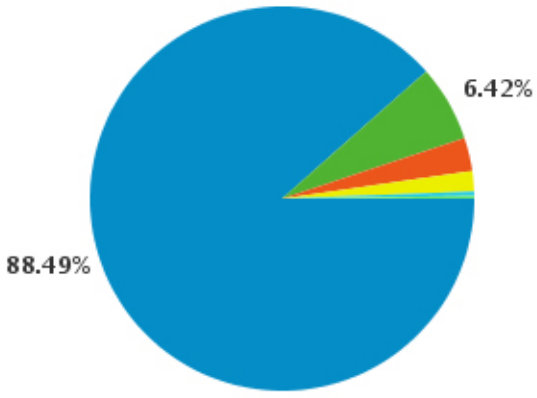


Appendix 7.6 New visitors vs. Returning visitors

6. Where do our visitors come from?

	Continent	Visits ↓	Visits
1.	Europe	3,172,187	88.49%
2.	Asia	230,190	6.42%
3.	Americas	99,978	2.79%
4.	Africa	60,922	1.70%
5.	Oceania	13,762	0.38%
6.	(not set)	7,758	0.22%

Continent contribution to total: Visits



Appendix 7.7 Users distribution

Appendix 8: SEO Report from Website Grader

Website Grader is a free SEO tool that measures the marketing effectiveness of a website. It provides a score that incorporates things like website traffic, SEO, social popularity and other technical factors. It also provides some basic advice on how the website can be improved from a marketing perspective.

HubSpot's Website Grader

Report *for* *www.lu.se*

January 02, 2009 at 9:00 AM

A website grade of **99.3/100** for **www.lu.se** means that of the hundreds of thousands of websites that have previously been evaluated, our algorithm has calculated that this site scores higher than 99.3% of them in terms of its marketing effectiveness. The algorithm uses a proprietary blend of over 50 different variables, including search engine data, website structure, approximate traffic, site performance, and others.

I. On-Page SEO

On-Page SEO is the process of placing your selected keywords in the right places on your web pages. On-page SEO involves changing page titles, headings, content, and URLs to improve search engine rankings.

A. Metadata

Metadata tags allow you to tell the search engines what your web page is about.

Page Title:	Lunds universitet
Meta Description:	Välkommen till Lunds universitet, den största enheten för forskning och högre utbildning i Sverige
Meta Keywords:	lunds universitet,universitet,utbildning,forskning,teknik,lunds,lund,teknis ka,högskola,naturvetenskap,medicin,juridik,samhällsvetenskap,ekonomihögskol a,ekonomi,humaniora,teologi,musik,teater,konst,studenter,grundutbildning,ut bildprogram,kurser,forskarutbildning,internationell,profil,forskningscentra ,uppdragsutbildning,forskningsprojekt,samverkan,student,studentliv,universi tetsstudier

High Number Of Meta Keywords
The web page has 34 keywords in its metadata.
We believe that though the search engines don't weigh keywords as heavily as they used to, they're still important to get right. By using a high number of keywords, it is possible that you are diluting the effect of your most important keywords. We would suggest keeping the keywords to 10 or less. Currently, this page has keywords in its metadata.

II. Off-Page SEO

Off-Page SEO includes all the things you do to promote your website outside the design of the website itself. Getting more inbound links to your site, registering with directories relevant to your industry, and getting more pages into the search engine indexes are all parts of Off-Page SEO.

A. Domain Info

Most experts agree that you should register your domain for a long time, because search engines factor domain "stability" when looking at your pages.

Domain Age:	N/A
Time To Expiration:	N/A

Permanent Redirect Not Found
Search engines may think **www.lu.se** and **lu.se** are two different sites.You should set up a permanent redirect (technically called a "301 redirect") between these sites. Once you do that, you will get full search engine credit for your work on these sites.
For example, www.lu.se seems to have 65,481 inbound links whereas lu.se has 506,013 inbound links. By correctly configuring a permanent 301 redirect, the search rankings might improve as all inbound links are correctly counted for the website.

B. Google PageRank: 8

"Google PageRank relies on the uniquely democratic nature of the web by using its vast link structure as an indicator of an individual page's value. In essence, Google interprets a link from page A to page B as a vote, by page A, for page B. But, Google looks at more than the sheer volume of votes, or links a page receives; it also analyzes the page that casts the vote. Votes cast by pages that are themselves important weigh more heavily and help to make other pages important." - From Google

C. Google Indexed Pages: 122,000

This number is the approximate number of pages on **www.lu.se** that have been stored in the Google index. The Google web crawler will visit the website periodically and look for new content for its index. Generally, the more pages your site has within the Google cache, the better.

D. Inbound Links: 65,481

One of the most important measures for a website is how many other sites link to it. The more links the better. Having links to your website from authoritative resources on the Internet helps you rank higher in search engines since these links are an indication that your website is trustworthy and contains good content.

E. DMOZ Directory: Found

www.lu.se is listed in DMOZ.
DMOZ, The Open Directory Project, is the largest and most comprehensive human-edited directory of the Web. It is constructed and maintained by a vast, global community of volunteer editors.

F. Yahoo! Directory: Found

www is listed in the Yahoo! Directory.
The Yahoo! Directory is a web directory which rivals the DMOZ Open Directory Project in size. We recommend that every business have a listing in the Yahoo! Directory.

III. Blogosphere

Blogging makes sense from a marketing perspective. A blog lets you meet your customers more directly than sending out brochures or an email campaign. It changes your website from a brochure that most people look at once to something that people interact with and come back to.

A. Blog Analysis

Blogging is a great way to reach your target audience with your thoughts, opinions, and offerings on relevant topics.

Blog Found

Blog URL:http://www.lu.se (Last Post: December 29, 2008)

B. Blog Ranking: Top 0.13 %

Technorati is a popular blog directory service. It measures the popularity of a given blog as compared to all other sites that have been submitted to its system.

This blog currently has a Technorati rank of **87,897**, which puts it in the top **0.13%** of blogs tracked by Technorati.

IV. Competitive Intelligence

WebsiteGrader doesn't stop at your website. You can also track competing websites and see how they're doing, including what they are doing better than you.

A. Keyword Grader

Keyword	Estimated Monthly Search Volume	www.lu.se rank	www.uu.se rank	www.su.se rank
universitet	408	9	3	N/A
utbildning	165	100+	N/A	N/A

B. Competing Websites

Site	Website Grade	Google Page Rank	Google Indexed Pages	Traffic Rank	Blog Rank	Inbound Links	del.icio.us Bookmarks
www.lu.se	99.3	8	123,000	10,724	87,897	65,481	26
www.uu.se	95.4	9	29,500	19,371	Not Ranked	120,866	38
www.su.se	98.4	8	11,800	21,273	1,655,777	39,493	28
www.kth.se	97.6	5	114,000	3,812	Not Ranked	133,260	37

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