

The WPU Project: Web Portal Usability

Janne Jul Jensen, Mikael B. Skov and Jan Stage

Department of Computer Science Aalborg University Selma Lagerlöfs Vej 300 DK-9220 Aalborg East, Denmark
{jjj,dubois,jans}@cs.aau.dk

ABSTRACT

The Web Portal Usability (WPU) project focuses on usability in the development of modern web portals. Web portals are a key part of software development. They are created to provide a group of users with access to a collection of internet services. State-of-the-art methods for usability engineering have only had very limited influence on development of web portals. The methods are costly to apply, they take a considerable amount of time, and they require a system that is nearly completed. This implies that the methods are rarely applied. When they are, usability problems are detected late in the course of the project, when there is neither time nor financial possibilities for solving the problems.

The objective of the WPU project is to develop new methods for usability engineering in the development of web portals and to test these methods in companies that develop modern web portals. The result is a catalogue of methods that support usability engineering in web portal development, combined with guidelines for use, training programmes and documented experience from deployment and use of the methods. The WPU project is a collaborative effort between researchers from Aalborg University, Department of Computer Science and two software organizations that develop web portals.

Keywords

Web portal, software development, usability evaluation

BACKGROUND

Usability evaluation and user interaction design are two key activities in the development of an interactive system. The two activities are mutually dependent, but in practice there is often too little or no fruitful interplay between them [8]. Considerable efforts have been devoted to improve the interplay between usability evaluation and software development. A substantial part of these efforts reflect two typical approaches.

The first approach focuses on better methods. The aim is to improve the products of usability evaluations through use of methods that provide better support to the evaluators that carry out usability evaluations. During the last 20 years, a whole range of methods have been developed within this approach. A prominent and influential example is Rubin [15] that covers all activities in a usability evaluation. There are many others that cover all or some selected evaluation activities.

The second approach focuses on better feedback. The aim is to improve the impact of usability evaluations on user interaction design. This is achieved in a variety of ways, typically by improving the format that is used to feed the results of usability evaluations back into user interaction design. The classical format for feedback is an extensive written report, but there have been numerous experiments with alternatives to the report; see Høegh et al. [9] for an overview.

Compared to both of these approaches, website development is particularly challenging. Websites exhibit a huge and unprecedented amount of information, services and purchasing possibilities, and the users of websites are a tremendously heterogeneous group that use websites for a multitude of purposes any time, any place. Due to this, website developers must accommodate a massive variety of user preferences and capabilities. Many contemporary websites suffer from problems with low usability, e.g. an investigation of content accessibility found that 29 of 50 popular websites were either inaccessible or only partly accessible [17]. This is in line with the suggestions that usability evaluations of websites should focus on the extent to which users can navigate the website and exploit the information and possibilities for interaction that are available [16].

INTRODUCTION

The challenges of developing web portals with a high level of usability originate from two major sources. First, projects that develop web portals usually have a very short duration. This pace makes it particularly difficult to include any type of activity that makes the development deviate from a direct course towards the end product. Second, the users of most web portals are exceedingly diverse. Many web portals have users with any kind of background both in technology in general and the subject area of the portal. Simple examples of this are portals for public administration or on-line banking services.

Usability is “The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use” [10]. The purpose of conducting usability evaluations is to facilitate a feedback loop where the results of a usability evaluation are fed back into the software development activities that create and shape the product in order to enhance usability [8]. Leading producers of software products have demonstrated how systematic work with usability in software development can create a competitive advantage (e.g. the user interface in the first generations of Nokia mobile telephones). Moreover, many user organizations are beginning to state specific demands for usability in their software requirements specifications.

State-of-the-art usability engineering methods have only had very limited influence on web portal development, because they provide very few solutions to the main challenges. A core area in usability engineering is usability evaluation which is conducted to systematically assess the usability of a software product [6][14]. The conventional methods for usability evaluation (e.g. [4][15]) are very resource demanding [1]. An evaluation with one of these methods can easily require 100-150 person-hours and last about a month. Moreover, the conventional methods are based on products that are executable at least to some extent. This implies that usability evaluations are often conducted towards the end of a project, at a time when substantial changes are impossible and modifications are most expensive [12]. Finally, the conventional methods need to be carried out by experts in usability engineering. There have been some successful attempts to create methods that reduce the demand for time, e.g. inspection methods [5][13]. Unfortunately, these methods require even more usability expertise, which is a bottleneck in the software industry. Thus the need for involvement of experts who are also outsiders to a project makes it impracticable to conduct usability evaluation in web portal development. The reliability of the early inspection methods have also been questioned (most notably by [11]).

The obstacles against deployment of usability engineering methods in web development are unpleasantly apparent from the low level of usability on many web portals. There is a large array of research documenting that users have serious problems when they use web services, they waste large amounts of time, and they often give up before they are anywhere near completion of what they came for.

The WPU project is based on the following hypotheses:

1.
The usability of web portals can be improved considerably through application of relevant usability engineering methods.

It is possible to develop usability engineering methods that are directly relevant to web portal development and reduce the demands for resources and expertise to a level where they can be integrated in web portal projects.

The aim of the WPU project is to develop and experimentally test usability engineering methods that confirm these hypotheses.

OBJECTIVE OF THE PROJECT

The scientific objective of the WPU project is to develop and test new methods for usability engineering that are considerably faster than existing methods and can be used by typical software developers instead of usability experts. The new usability engineering methods are directed towards web portals which is both a key area for software development and a particularly challenging area. The methods will be tested through full-scale use in web development organizations.

The societal objective of the WPU project is to contribute to creation of web portals with a significantly higher level of usability. Usability problems are a major obstacle against efficient provision of web-based services directly to citizens and enterprises. New methods for usability engineering that are directed toward web portal development will contribute to alleviate these problems and thereby improve digital public administration and efficient service provision.

The commercial objective of the WPU project is to provide web development companies with new methods for increasing the usability of their products, with practical guidance on the use of these methods as well as training programmes for developers in the application of the methods. The methods, guidance and training will be based on documented cases from deployment of these elements in the web portal industry.

MAIN RESULTS OF THE PROJECT

The WPU project will produce the following results:

A set of new methods for usability engineering in web portal development

A set of guidelines for selection and application of the methods

A training programme for web portal developers

Research training for 2 PhDs and a post-doc

The set of new methods will form a catalogue with usability engineering methods that can help developers solve specific usability problems in web portal development. An example is a method that a developer can use in order to inspect the usability of a web page.

When developers face a usability problem, they need to select a method in the catalogue that is useful for solving the problem. To facilitate this selection, there will be guidelines to support the selection of methods for solving specific usability problems.

The objective is that the new methods can be applied by typical software developers who are working in web portal development. To accomplish that, the project will create and refine a training programme that can be used by an HCI expert for training developers in using the new usability engineering methods.

Finally, a main result of the project will be research training of two PhDs and one post-doc.

THE PROJECT'S METHODOLOGY AND RESULTS

The WPU Project will be based on a combination of state-of-the-art survey, method creation, method training and experimental assessment.

The state-of-the-art survey will collect experiences with usability issues in web portal development that are documented in the literature. The focus will be on the usability engineering activities that have been conducted, the problems that were faced and the solutions applied. We will also compile a list of method fragments that have been used to handle usability issues in web portal development.

The method creation will build the catalogue of methods that will be a key result of the project. This will include the experiences and the list of fragments of usability engineering methods that is compiled in the state-of-the-art survey. However, the main effort will focus on adaptation of existing methods and creation of new methods specifically directed towards web portal usability.

The method training will involve design of training programmes on the methods that are created in the project and use of these programmes in a participating company. The aim is to enable the developers in the company to apply the usability engineering methods in their development projects. The experiences with the training programmes will be documented and made available for others.

The experimental assessment will collect experience with the new methods for usability engineering in web portal development. The qualities of the methods will be assessed through a series of experiments, conducted in a participating software company and a laboratory setting. The assessments will be used to enhance the methods and provide guidelines for their use. The experiences with the methods and guidelines will be documented and made available for others.

The experimental assessment will involve three types of activities: laboratory experiments, action case studies and action research studies (cf. [2][3]). Laboratory experiments will be used to assess the qualities of specific methods created in the project. These experiments will be carried out in the Usability Laboratory at Department of Computer Science, AAU. The action case studies will be short-term assessments of individual methods when used in development projects in a participating company. The action research studies will be long-term assessments of a full series of iterative feedback cycles in a project in a participating company.

ACKNOWLEDGMENTS

The project is supported in part by the Danish Research Councils under grant number 2106-08-0011. In addition, it is supported by Aalborg University and the two participating companies.

REFERENCES

1.
Bias, R. G and Mayhew, D. J. (ed). Cost-Justifying Usability. Academic Press. 1994.
- Braa, K. and Vidgen, R. (1995) Action case: exploring the middle kingdom in is research methods. *Proceedings of Computers in Context: Joining Forces in Design*. Aarhus, Denmark.
- Braa, K. and Vidgen, R. (1997) An information systems research framework for the Organizational Laboratory. in Kyng, M. and Mathiassen, L. eds. *Computers and Design in Context*. Cambridge, Massachusetts: MIT Press.
- Dumas, J. S. and Redish, J. C. (1999) A Practical Guide to Usability Testing, 2nd. ed. Intellect.
- Frøkjær, E. and Hornbæk, K. (2007) Metaphors of Human Thinking for Usability Inspection and Design. *Transactions on Computer-Human Interaction*, 2007.
- Holzinger, A. (2005) Usability Engineering for Software Developers. *Communications of the ACM*, 48(1):71-74.
- Hornbæk, K., Høegh, R. T., Pedersen, M. B. and Stage, J. (2007) Use Case Evaluation (UCE): A Method for Early Usability Evaluation in Software Development. *Proceedings of the 11th IFIP TC13 International Conference on Human Computer Interaction (Interact 2007)*. Berlin: Springer-Verlag.
- Hornbæk, K. and Stage, J. (2006) The Interplay Between Usability Evaluation and User Interaction Design. *International Journal of Human-Computer Interaction*, 21(2):117-124.
- Høegh, R. T., Nielsen, C. M., Overgaard, M., Pedersen, M. B. and Stage, J. (2006) The Impact of Usability Reports and User Test Observations on Developers' Understanding of Usability Data: An Exploratory Study. *International Journal of Human-Computer Interaction*, 21(2):173-196.
- ISO (1998) ISO Standard 9241-11. Guidance on Usability. International Organization for Standardization.

Karat, C.-M., Campbell, R. L., and Fiegel, T. (1992) Comparison of Empirical Testing and Walkthrough Methods in User Interface Evaluation. *Proceedings of CHI 92*, 397-404. New York, NY: ACM.

Mantei, M. M., and Teorey, T. J. (1988) Cost/Benefit Analysis for Incorporating Human Factors in the Software Lifecycle. *Communications of the ACM*, 31(4):428-439.

13.

Molich R and Nielsen J. (1990) Improving a Human-Computer Dialogue. *Communications of the ACM* 33(3):338-348.

14.

Nielsen, J. (1993) Usability Engineering. Boston, MA: AP Professional.

15.

Rubin, J. (1994). Handbook of Usability Testing: How to Plan, Design, and Conduct Effective Tests. New York, NY: John Wiley & Sons.

16.

Spool, J. M., Scanlon, T., Schroeder, W., Snyder, C., and DeAngelo, T., 1999. Website usability. A designer's guide. Morgan Kaufmann Publishers.

17.

Sullivan, T. and Matson, R., 2000. Barriers to use: usability and content accessibility on the web's most popular sites. *Proceedings of Conference on Universal Usability*. New York: ACM Press, 139-144.