Kazimierz Choroś, Ph.D., D.Sc.
Wrocław University of Science and Technology
Faculty of Computer Science and Management
Department of Information Systems
Wyb. Wyspiańskiego 27, 50-370 Wrocław, Poland
http://www.zsi.pwr.wroc.pl/~choros/

Wrocław, January 02, 2017

REVIEW REPORT
on the Ph.D. Thesis of Aneta Bartůšková entitled

"Smart Web User Interfaces for Course-based and Repository-based Systems"

(supervisor: doc. Ing. Ondřej Krejcar, Ph.D.)
prepared on the invitation letter dated November 23, 2016,
from Prof. RNDr. Josef Hynek, MBA, Ph.D.,
the Dean of the Faculty of Informatics and Management
of University of Hradec Králové

General description

The Thesis consists of nine chapters, list of tables, list of figures, list of references, list of Author's publications, and finally three attachments. The Thesis is written on 119 pages all together. The conclusion of the Thesis the Author formulated in Chapter 9.

The structure of the Thesis conforms to principles and requests to the structure of scientific dissertations. The structure of the Thesis is correct, although, the Chapter 9 (Conclusion) is too short and a little bit without content. I think it should be joined with the Chapter 8 (Discussion).

The Author has studied and used many bibliography sources. They are quoted in the Thesis. It is the evidence of the deep theoretical knowledge and very good orientation in the problem discussed in the Thesis

But on the other hand it results in a great number of references – 200 references. Furthermore, there are the additional list of 15 Author's scientific publications from the years 2013–2016. Such a number (200+15 references) for a Ph.D. Thesis is rather very large. It is even greater than the number of references in many specialized review papers in scientific journals of computer science.

In general the Thesis fulfils the formal requests.

Goal of the Thesis

At the beginning (Introduction, Page 1) the Author states that "Research in this dissertation is focused on smart design of web-based user interfaces, especially their organization and navigation. Proposed approaches are applied specifically on educational systems".

Whereas at the first paragraph of Chapter 5 we can find that: "The author's contribution in theory is presented in this chapter, which is divided into two separate sections. The first section is devoted to the framework of design requirements, which has also quite a useful application in

practice. The second section extends the existing theory about organization schemes". And then: "this framework is considered as one of the main contributions of this dissertation."

Furthermore, in Chapter 9 (Conclusion) the Author wrote that "The primary objective of this dissertation thesis was defined as the enhancement of web-based interfaces regarding their organization and navigation."

So, what is the main goal of the Thesis: smart design of web-based user interface (it is consistent with the title of the Thesis) or a framework of design requirements or may be the enhancement of web-based interfaces regarding their organization and navigation?

Some comments

Chapter 3 presents the state of the art on many different aspects of user interfaces, interface evaluation, human-computer interaction, e-learning systems, etc. This Chapter is clearly written, very well structured, and is a very valuable part of the Thesis. The Author proved at the same time that she knows a huge variety of different research on Web user interfaces.

Whereas, in Chapter 2 the Author has explained that the initial "goal was however too broad and abstract to accomplish in this work, therefore delimitation was needed first to specify the objective". If so, the state of the art presented in Chapter 3 is far too broad and exceeds the range specified by the main goal of the Thesis. It resulted in a great number of references. It would be reasonable to limit the state of art to e-learning systems.

This very broad scope of the state of art also results in the lack of Author's opinions and comments on the ideas, methods, techniques, solutions mentioned in this Chapter. This is the reason I would like to ask what the opinion of the Author is on some problems signalled in the state of art.

Page 5
"Aesthetic qualities … remain relatively stable".

My disagreement. Websites more and more visited becomes more and more nicer, more aesthetic. The website frequently visited for a long time becomes more familiar and in consequence more and more easier to navigate, and also more aesthetic, its visual appearance becomes also more attractive. We don't like changes in well-known websites even if these changes improve for example navigation on these websites.

Furthermore, we should take into account two kinds of experiences: general experience of a user in visiting different websites and his facility and good intuition mainly in the website navigation but also the habits gained during frequent visits on a given website. The second kind of experience is crucial in our perception and our evaluation of e-learning systems.
Such a idea we find on the page 39 of the Thesis when discussing the research of Lidwell et al., 2010 and Weinschenk, 2011.

Another aspect is the frequency of visits a website. I think the strategy for interface designing should be different for website visited occasionally and for the websites visited often and regularly.

And then, also Page 5
"Classical design was rated as more attractive than expressive, according to the author because of the informative character of the website used in the experiment."
Classical design was rated more attractive because classical design was simply well-known!

Page 11
"It was proven that student and faculty engagement and satisfaction are the same in face-to-face classes as they are in e-learning courses (Liebowitz & Frank, 2010)."

My remark is as follows. I have designed e-learning systems, including for example video consultations for students of my University and I am using such kinds of systems for many years. However, despite these experiences or may be more due to these experiences I think that never any artificial, electronic, video, or virtual means will fully and effectively replace face-to-face classes, direct contact of disciple/student and teacher/professor. So, I do not believe that e-learning courses bring the same satisfaction for disciples as face-to-face classes.

The most important is that the Web creates new opportunities for learning and it should be treated as a supplement to the traditional process.

What is your vision of the education process in the future?

Page 12

"Adaptive learning is substantially connected with personalisation, recommendation-based learning, and inquire-based learning (Kurilovas et al., 2014)."

Customization and personalization is poorly taken into account even though in Chapter 6 a smart interface for hybrid systems with personalization support will be presented.

In the first part of the state of art the aspect of personalization and recommendation is not included. It is slightly mentioned only in the context of e-learning systems in Chapter 3.4 and then in Chapter 3.5.

Chapter 4 discusses "limitations of commonly used approaches". Unfortunately, these are also the observations of many other authors expressed in their papers. Unfortunately, these observations are reported but are not commented by the Author of this Thesis. And therefore, this Chapter 4 became the continuation of the state of art presented in the Chapter 3.

It results also in the repetition of some ideas, for example the research of Morville and Rosenfeld (2006) is presented on the page 10 (Chapter 3.3) and then repeated on the page 23 (Chapter 4.1.2).

Such an Author's analysis starts to some extent but only in Chapters 4.2 and 4.3. However, the Author continue the state of the art and unfortunately sometimes discusses very old and outdated results, for example: "A comparative analysis of LORs was made by Neven and Duval in 2002" (Chapter 4.3.2). And as the Author verified most of them are not longer working (Table 5).

Also a huge part of Chapter 5 which should present new proposals could be perceived as a following part of the state of arts, these are Chapters from 5.1.1 to 5.1.5.

Only the Chapter 5.1.6 can be treated as a really new proposal. However, the Table 12 should contain not only the list of features but also the design requirements and design recommendations for these features basing on the deep analyses of the results and conclusions already formulated by different researchers. Then it would be interesting to compare with data presented in the Table 13.

Page 39

Colours are very important in designing websites which have mainly commercial, marketing, or advertising character. In the case of e-learning systems aggressive colours – very useful in advertising – can be tiring and trying for students. In general all interfaces of the systems which are used for a long part of the day are quiet in colours. We observe such a strategy in the case of all business systems (finances, banking, ERP) but also programming environments, DTP tools, graphic software, etc. It seems to me that also educational systems should use colours to a limited extent.

Page 40

"Reading on a computer screen is harder than reading paper (Weinschenk, 2011)."

It is a very controversial statement. I prefer, I do prefer to read screen than paper. I am doing it now, reading your Thesis.

Moreover, readability is a problem both for the screen option as well as for papers. Although, I agree that the rules to ensure the legibility of the information are not the same for these two forms of presentations.

Language spelling errors / language mistakes / language suggestions

My general, detailed, and editorial remarks are as follows.

- Generally the Thesis is written in a very good English.

But the British English is sometimes mixed with the American English language.
For example 'color' and 'colour'.

- The most frequent error is observed in using commas (lacks of commas).
- The next remark is on an inadequate use of dash instead of half rest.
- And finally the most important remark, not only linguistic remark.

web --> Web
internet --> Internet
In the Thesis "Web" and "Internet" are written most frequently in lowercase.
Although, in the Chapter 3.4.3, Page 14
'the Internet" but also "the internet" are found in the same paragraph.
However, I suggest to use the form "Internet" with an initial capital letter because nowadays it is a proper noun in the English language.
see: https://en.wikipedia.org/wiki/Capitalization_of_%22Internet%22

- Detailed corrections:

Page 10: The following table [Table 2] summarizes --> Table 2 summarizes …

Page 17: the following table [Table 3] --> Table 3 resumes …

Page 17
As we can see from the table,
Which table? Table are numbered to make easy the references to the tables, so:
As we can see from Table 3,

Page 15: many learning activies --> many learning activ**it**ies

Page 18: In system proposed by … --> In **the** system proposed by

Page 19: 3) domain modeling --> **1**) domain modeling

Page 34: the main contributions of this disseration --> the main contributions of this disser**t**ation

Page 50:
the framework presented in this disseration --> the framework presented in this disser**t**ation

Page 53:
In this section is proposed yet another approach to arrangement and classification of organization schemes.
--> In this section another approach to arrangement and classification of organization schemes is yet proposed.
or
--> In this section another approach is yet proposed to arrangement and classification of organization schemes.

Page 61:
High information density of tags with be then --> High information density of tags **will** be then (??)

Page 64: this technique can is similar to --> this technique can **be** (or **is**) similar to

Page 77: Amswer --> A**n**swer

Page 101:
In this section will be suggested use cases of --> In this section use cases will be suggested of

Page 102: score being 78,46 --> score being 78**.**46

- Editorial remarks:

Table 7 (Page 38) and similarly Table 8 (Page 41), Table 9 (Page 43), Table 10 (Page 46), Table 11 (Page 48) are not easy to analyze if the meanings of Letters are in the Table 6 (Page 35).

Page 52
Table 14 with only one row looks a little bit strange.

Achievements of the Thesis

The main achievements of the Thesis are as follows.

1) Very comprehensive analysis of research in the field of interface designing, including user-related concept, usability, aesthetics, content, and then organization structures and schemes, and finally Web-based education systems.
2) Analyses of organization of information or knowledge, and of navigation in the Web, and also of limitations of course-based as well as repository-based systems.
3) Proposals of interfaces for course-based and repository-based systems as well as for hybrid educational system.
4) Partial implementation of the interface.
5) Testing of usability of the proposed interfaces using special sheets for testing and involving 13 users.

Critical comments

My critical comments are as follows.

1) Although the Author analyzed comprehensively and in depth results of research of many other researchers I feel the lack of Author's opinions on the research discussed.
2) It would be very useful to make the recapitulation of the state of arts.
3) Testing seems to be more an illustration of the testing process than a real testing. Although the Author explained and justified the scale of the test (page 81).
4) It seems to me that many requirements, improvements, enhancements, suggestions on the interface designing strongly depend on the specificity of the system, characteristics of the user, as well as kinds of system uses or website visits.

Additional questions

There are many remarks which occurred to me and I propose to explain some of them in details.

1. The proposals of the interfaces are mainly based on the analyses and design guidelines presented in the cited and examined references. Have you enrich the assumptions of the interface proposal by your own leads?
2. How the specificity of the system, characteristics of the user, as well as kinds of system uses or website visits, experience of users, habits of users, etc. influence the usability of the website and the perception of interfaces?
3. Could you try to formulate 10 main requirements for the very efficient interface of the educational Web system? Which of them mainly lead to the smart user interface?

General conclusion

To sum up, the Thesis represents high level scientific work. It seems to be an interesting topic for scientists working on user interfaces and human-computer interaction. All experiments are well described and techniques are correctly applied. It is generally well presented and very interesting to read. It is noteworthy that the results described in the Thesis have been presented at the high-level scientific conferences (13 conference papers) and in Czech journal (2 papers), including 5 publications indexed in Web of Science. In the Scopus database 14 publications are indexed and one of them has been cited 4 times.

The Thesis also shows a important practical application of conducted studies.

Not without significance is that the Author has a business experience in designing and implementing websites. It can be observed in the Web.

In my opinion, the reviewed Thesis of Aneta Bartůšková fulfills the requirements posed on theses aimed for obtaining Ph.D. degree. This Thesis can be defended orally, in front of respective committee.

Kazimierz Choroś