Evaluation of BPM-Tools in terms of IT-Usability and IT-Accessibility

Paul Bossauer, Daryoush Vaziri

Bonn-Rhein-Sieg University of Applied Sciences
Grantham-Allee 20, 53757 Sankt Augustin
{paul.bossauer, daryoush.vaziri}@h-brs.de

Abstract. People are getting older because of the demographic changes and the rate of disabled people is also going up. This article shows the challenge for BPM-Tool developer due to these circumstances. It illustrates how these changes impact the usage of BPM-Tools based on an Evaluation of an exemplary BPM-Tool (Cooper & Patterson, 2007) in terms of IT-Usability and IT-Accessibility. This evaluation was conducted in a research laboratory at the university.

1 Introduction

Currently around 10 per cent of the total world's population, that means about 650 million people, are disabled (Disabled World, 2013). At the same time people are ageing. According to forecasts the mean age will increase from about 29.2 years (in 2010) to 36.1 years (in 2050) in the World (United Nations Department of Economic and Social Affairs/Population Devision, 2013). Due to this fact the interaction with BPM Tools will also change because of the altered user capabilities. It is essential to perceive the Information while modelling processes by visual or auditory instructions. Also it is important to be able to interact by using input devices and understand the language of the BPM Tool. Disabled people or elderly should not be excluded from job opportunities in higher management levels. These people already have difficulties to get a job, so it should be possible to work in higher strategic management and make business process models.

There are different groups of relevant users: People who are disabled for a long time, people getting disabled suddenly by accident or older people who are losing specific capabilities by aging. All this contributes to the change of the user behaviour and capabilities over the next decades. Therefore it is important to verify if the actual BPM-Tools can meet the requirements of upcoming changes in user capabilities. Following hypothesis was constructed by the authors for this investigation:

> *Hypothesis: Interaction with BPM tools is not influenced by user capabilities, which are altered due to age, physical or cognitive restrictions*

The purpose of this article is to examine if and how the usage of BPM tools is influenced by restricted capabilities through disability or ageing. Next chapter describes the research methodology the authors chose for this research.

2 Research methodology

First of all it is important to differentiate between usability and accessibility. Usability describes 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 (ISO 9241 -11: 1998). Accessibility on the other hand means that people with disabilities are able to use the product. The World Wide Web Consortium (W3C) for example, started a Web Accessibility Initiative (WAI) to promote Accessibility in the World Wide Web. The WAI says people with disabilities can use the Web. More specifically, Web accessibility means that disabled people can perceive, understand, navigate and interact with the Web-, and that they can contribute to the web. But other people benefit also, e.g. older people with changing abilities due to aging (World Wide Web Consortium (W3C), 2005). The same applies to software, not just the web. These definitions provide the basis for the research methodology of Usability and Accessibility.

The authors started with the evaluation of Usability using ARIS Business Architect 7.2 as exemplary BPM Tool (Software AG, 2013). The evaluation of Usability based on the Usability Guidelines from the "Deutsche Akkreditierungsstelle GmbH"

(German accreditation agendy) (Deutsche Akkreditierungsstelle, 2010). Following figure shows the procedure of the evaluation:
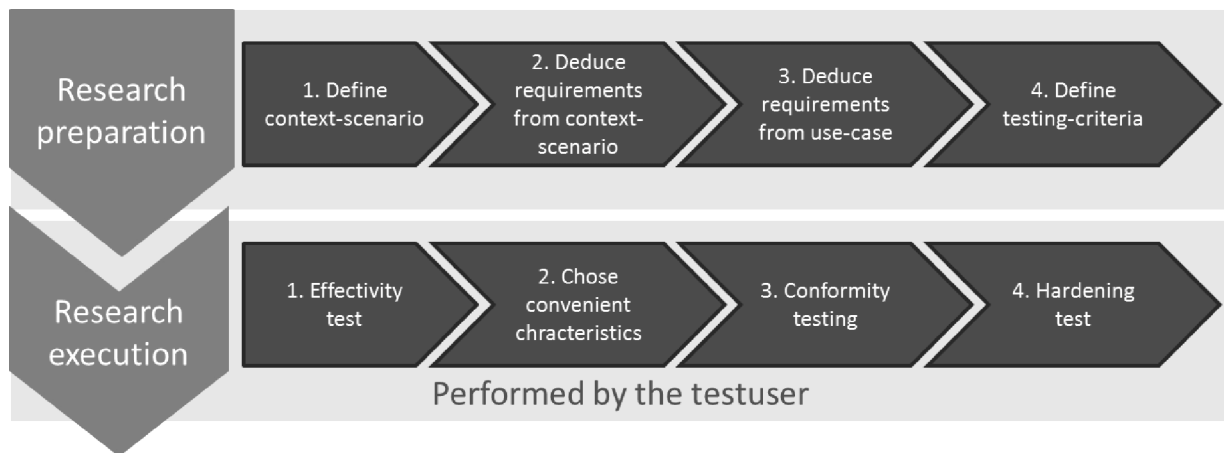

Figure 1: Procedure of Usability Evaluation

In the beginning it is important to define a context-scenario and a use-case. Afterwards the context-scenario and use-case have to be analysed and deduced into requirements up to testing-criteria. Once all testing-criteria are done, the research execution can begin.

Within the scope of this research the authors chose student assistants for the usability tests. These assistants work at the Bonn-Rhein-Sieg University in the Servicepoint, a helpdesk for student concerns, and they have to model business process models, because of the high fluctuation within the Servicepoint, that means the test-user had already experience with ARIS Business Architect 7.2. After a short discussion they had been connected to an eye-tracking system and had to accomplish the provided use-case while they had been tracked with the eye-tracking system. A short interview followed after this procedure and comprised some qualitative Information about the BPM Tool. The Use-Case comprised the modelling of a typical process in ARIS Business Architect 7.2. Results are going to be discussed in the next chapter.

The accessibility test was based on the guidelines of Web Content Accessibility Guidelines (WCAG) 2.0 (World Wide Web Consortium (W3C), 2008). In the first

place it is important to choose the relevant criteria for the evaluation of the BPM Tool. Once all relevant criteria are chosen the list of criteria can be prepared. The following figure shows the list of criteria used for this research. This list is fundamental for the evaluation, based on it the user go through every criterion and indicate if this criterion is fulfilled, partly fulfilled or unfulfilled by testing it in the research laboratory. The results of the accessibility evaluation are also shown in the next chapter.

	Criterion	Description
Perceivable	C 1	Provide text alternatives for any non-text content
	C 2	Content can be presented in different ways without losing information or structure
	C 3	Color is not used as the only visual means of conveying information, indicating an action, prompting a response, or distinguishing a visual element
	C 4	The visual presentation of text and images of text has a contrast ratio of at least 4.5:1, large-scale text and images of large-scale text have a contrast ratio of at least 3:1
	C 5	Except for captions and images of text, text can be resized without assistive technology up to 200 percent without loss of content or functionality.
Operable	C 6	All functionality of the content is operable through a keyboard interface without requiring specific timings for individual keystrokes.
	C 7	Software do not contain anything that flashes more than three times in any one second period.
	C 8	Software provide ways to help users navigate, find content, and determine where they are.
	C 9	If it can be navigated sequentially and the navigation sequences affect meaning or operation, focusable components receive focus in an order that preserves meaning and operability.
	C 10	The purpose of each link can be determinded from the link text alone or from the link text together with ist programmatically determined link context.
Understandable	C 11	The default human language can be programmatically determinded
	C 12	Applications appear and operate in predictable ways.
	C 13	If an input error is automatically detected, the item that is in error is identified and the error is described to the user in text.
	C 14	Labels or instructions are provided when content requires user input.
Robust	C 15	Compatibility with current and future user agents.
	C 16	BPM Tool is compatible with assistive technologies like screen reader, magnifier or voice input

Figure 2: List of criteria for the Evaluation of Accessibility

3 Results

In Hindsight on the Evaluation the results may be summarised as follows:

Usability

The purpose was to model a process in ARIS Business Architect 7.2. This purpose was fulfilled without any considerable issues. This BPM Tool met all the requirements the authors and test user deduced in the beginning related to usability, so effectiveness can be confirmed.

Since no interruptions occurred while executing the Use-Case could be found in the recording from the Eye-Tracker and no questions occurred, efficiency can also be confirmed.

Signs of discontent weren't also noticeable at the discussion after executing the Use-Case, therefore satisfaction is also confirmed.

Altogether the Evaluation of ARIS Business Architect 7.2 in relation to Usability was very positive, considering that it was tested by an experienced user.

Accessibility

Just 6 of the 16 criterions were fulfilled, 5 of the 16 criterions were partly fulfilled and the rest was unfulfilled, thus are only 37.5 percent of the criterions fulfilled. Deficits are seen especially in the categories perceivable, usable and robust. Only the results in the category understandable were surprisingly good.

In summary it can be said under reserve of representativeness that ARIS Business Architect 7.2 performed well regarding to Usability, but in terms of accessibility many deficiencies were noted.

4 Discussion

In conclusion usability and accessibility is an important point in the future. Especially in the software industry. As said in the introduction the number of disabled and elderly is going up, so it is important to consider these changes in the software development.

Due to the small circumference this study is not representative. In the context of this article it wasn't possible to get a representative number of disabled and old people for this research because of temporal restrictions. The evaluation of usability was executed with a small user group. For a better representativeness it is essential to get a large random sample with different user groups. For example people without experience in modelling with BPM Tools, as well as people who did it long time ago. Furthermore it is important to involve disabled people in the evaluation of accessibility, for example while creating the list of criteria for the evaluation. Altogether the purpose of this article was not to get representative results, but to show a possible evaluation method for usability and accessibility and give an impact for further studies in this area.

Despite the lack of representativeness these results show that especially accessibility is not adequately treated in ARIS Business Architect 7.2. Probably other BPM Tools will show similar results. Concluded it can be said that the interaction with BPM Tools is highly influenced by user capabilities. People with visual impairments can't work properly with BPM Tools, because they can't perceive all information. So we can reject the hypothesis of this article.

This is just the beginning of researches in this area. The Bonn-Rhein-Sieg University of Applied Sciences is planning representative studies in this topic area in cooperation with disabled and old people.

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