

Evaluating the Usability of OWL-VisMod: a Modelling Tool for OWL Ontologies

Juan García¹, Francisco J. García² and Roberto Therón¹

¹ Computer Science Department, University of Salamanca, Spain

² Computer Science Department, University of Salamanca, Science Education Research Institute (IUCE), GRIAL Research Group, Spain
{ganajuan, fgarcia, theron}@usal.es

Abstract. Usability is generally regarded as ensuring that interactive products are easy to learn, effective and efficient to use from the user's perspective. These aspects that ensure the usability of a software product should be assessed during the different phases in its life cycle. This paper is targeted to evaluate the usability of OWL-VisMod, a modelling tool for creating, editing and visualising OWL ontologies. OWL-VisMod is evaluated using a user-centered evaluation approach. The results are analysed, discussed and presented in this paper.

Keywords: OWL ontologies, modelling, OWL-VisMod.

1 Introduction

The International Organization for Standardization (ISO) defines Usability of a product as *the extent to which the product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use*. Usability can be summarised in five main attributes: learnability, efficiency, memorability, errors, and user satisfaction [2]. Depending on the type of application one attribute might be more critical than another. Usability is generally regarded as ensuring that interactive products are easy to learn, effective to use, and enjoyable from the user's perspective. It involves optimizing the interactions people have with interactive products to enable them to carry out their activities at work, school, and in their everyday life. Usability goals are typically operationalized as questions. The purpose is to provide the interaction designer with a concrete means of assessing various aspects of an interactive product and the user experience [3]. Through answering the questions, designers can be alerted very early on in the design process to potential design problems and conflicts that they might not be considered. This paper starts with a brief introduction; then we describe the evaluation method we applied with our tool; then in the third section we analyse the results, to finally conclude in the fourth section with the conclusions.

2 User-Centered Evaluation of OWL-VisMod

OWL-VisMod is a visual modelling tool for creating, editing and visualising OWL ontologies. It is targeted to those users that need to perform ontological engineering activities. At this point of the tool development, we need to evaluate the usability of our proposal, by testing the tool with those users that will be using it. We are essentially focused on the effectiveness and the user satisfaction in general, due to our proposal does not require critical security or efficiency requirements. To evaluate the usability of OWL-VisMod¹, we have decided to apply a user-centered evaluation. User-centered evaluations are accomplished by identifying representative users, representative tasks, and developing a procedure for capturing the problems that users have in trying to apply a particular software product in accomplishing these tasks.

To test and evaluate the tool, ten students from a course were selected, most of them with any knowledge about OWL ontologies. They were provided with a brief introduction about Semantic Web, Ontologies and the tool itself. The second aspect to be considered was the definition of the representative tasks to be developed by the users, in order to firstly, evaluate the effectiveness and secondly, the user satisfaction with the visualisations and the interaction with them. The user-centered evaluation was divided into two parts: the first part was intended to evaluate the effectiveness of the tool. This means to get users evaluation about the visualisations and the steps for modelling the ontology. The goals to be achieved were to identify whether or not the visualisations satisfy all the purposes they were implemented for. The evaluation started evaluating each of the visualisations isolated and then a global evaluation of the whole tool. The first visualisations to be evaluated were the treemap, proposed and described in [1] and the hierarchical tree. These features define the basic schema of an ontology, and represent the main aspect to consider when users are creating or updating an ontology. The first task developed by the users, was the creation of an ontology and its hierarchy, by creating each one of the classes according to a UML class diagram they were given. After that, users were asked to create each one of the properties indicated in the same diagram. They were free to modify some aspects of the proposed ontological model, or even more to add new concepts, relations, individuals etc.

3 Data analysis and interpretation of the results

To analyse the data, we clearly identify two sets of data: quantitative data are those related with the close-ended questions, while qualitative data are those obtained from the open-ended questions, that are treated individually. Quantitative data have been analysed based on the mean, commonly understood as the average.

To evaluate the closed-ended questions, we used a scale from one to five, where one means the less or poorest value and five means the most or richest value. Except

¹ <http://www.analiticavisual.com/juan/OWL-VisMod.html>

for the last question in each group, that is an open-ended question about extra comments the user would like to add, the rest of questions are closed-ended, that were formulated in the manner that the best or the positive result is the highest, meaning that the best possible and a perfect result would be that all the questions would be rated with a value of five.

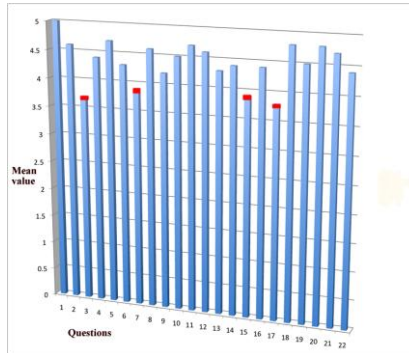


Fig. 1. The mean value for each of the questions in the questionnaire. It depicts that the general evaluation of users is good, some values lower than 4.0 but higher than 3.5.

The first analysed question is the third one in the histogram, related with the hierarchy. According to the responses, at the first time with the tool they got confused in the manner to start creating and modelling ontologies, basically they argued that if they had been without anyone explaining how to create the ontology, they would have spent time to recognise the modelling process. Nevertheless all of them said that this would not represent a serious problem to effectively use the tool. The second question to be analysed in detail is related to the semantic zoom visualization, and it evaluates the easiness and understandability of the navigation model. Some users suggested some improvements to the semantic zoom technique, specially the representation of the internal elements in a property. The use of histograms should be just for numerical data, qualitative values should be represented using spheres or another mechanism, due to the histograms get the users confused. The third question that was evaluated with a low value, was the labeled with the number fifteen, and asked about the intuitiveness of the user interaction. In general, some users mentioned that certain parts of the tool are not intuitively enough. Specially those options related to the semantic zoom visualisations; it results not intuitively enough how to close these visualisations to return to the main views. And the drag and drop interaction results not clearly enough, for the first time with the tool. Users suggested to add a small close button to clearly indicate how to close the semantic zoom visualization returning to the main views.

The last group of questions, is related with the global evaluation of the tool. In this final group, the first question is related with the coherency and the correctness of the navigation flow among visualisations. Some users commented that at first time using the tool, could not be very intuitive the navigation flow, and they argued that learning it requires a previously explanation. We consider that to learn how to use almost any

software, a certain explanation is required. We consider this comment as a logical and a natural result of learning how to use a software tool for the first time.

The open-ended questions are intended to be a directly evaluation of those aspects the user would like to be modified, replaced or added. These questions provided with a full and direct feedback of those aspects that users would like to be implemented or improved in OWL-VisMod. The first interesting aspect that users mentioned involves the semantic zoom visualisation to navigate the internal elements of a class. Some of them mentioned that the representation using histograms for non-numeric data values is unclear and can be confused, because all the elements have the same height because there is no a real comparison among the elements. They suggested to change this representation by using spheres to represent these elements.

4 Conclusions

OWL-VisMod is a visual modelling tool that is currently at the last point on its development process. At this stage it is crucial to evaluate it in a real scenario and with the users that will be using it. This user-centered evaluation process has been useful and has enriched our feedback of OWL-VisMod; it has let us know what do the users think about our proposals, as well as what new improvements would be desirable to be added to our tool, furthermore, it has also let us to discover some bugs that need to be fixed. The evaluation process was divided into two parts: the first one based on a quantitative analysis based on closed-ended questions, and a second qualitative analysis based on open-ended questions. The quantitative data analysis shown in general an evaluation of diverse aspects of the tool, and it let us know which aspects would represent the weakest points of it. On the other hand, the analysis of the qualitative data provided us with detailed information about specific aspects in the tool, that users would prefer to be fixed or even changed.

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