

Joint Panel of SWEL'04 and EAW'04 Workshops

Panel Notes

A number of questions were raised at the start of the discussion and played a role throughout the discussion. The basic question was:

How do the three main concepts of *Semantic Web*, *Adaptive Web* and *Educational Scenarios* relate?

As a consequence of trying to answer this question, a number of other questions were raised:

- *What are the key enabling factors for adaptivity in the Web in general, and in educational settings in particular?*
- *How can the Semantic Web be used to improve reusability and exchangeability of (learning) resources?*
- *What is needed to achieve a quick and easy information exchange (sharing) and interoperation between educational Adaptive Hypermedia Systems?*
- *How can current issues in standards for the Semantic Web be exploited to support its use in the Adaptive Web and in educational settings?*

It is clear that in this theme the notion of *ontology* plays an important role, and that it is useful to have a *proper definition* of this shared within the community.

In relation to this, it was observed that we can exploit *architectures* to enable *sophisticated reasoning*, but we have to make sure that in pursuing this reasoning capability the *efficiency* is not jeopardized.

In terms of semantics, it is important to realize *whose semantics* it is. Maybe the key to dealing with the semantics information is to identify the different perceptions from the different people involved.

At the same it shows that the people involved, e.g. learners, can be expected to reason soundly, so that issues like *tractability* might not match the reality of reasoning.

This also surfaced in the opinion that reasoning might be easier than in software engineering in general: a complete solution might not be needed, and a partial solution would be sufficient.

Since there is a lot of *implicit knowledge* available/useful outside of the reasoning process, modeling and deciding on the appropriate knowledge might be more of an issue than advanced reasoning techniques. Some argued that the *metadata* is primarily there to guide and control the information logistics in the application.

Since a lot relates to *standards* and everybody points to different standards, it appears strange that most of us as researchers are busy with extending standards in our projects. So, are these standards maybe not so standard or applicable?

Moreover, it is observed that sticking to standards often does not lead to development and innovation.

A characteristic and important factor in these scenarios is *context modeling*: we observe different approaches to model the context of learning. Note that this goes from determining the context by looking back to trying to predict what the user wants or aims for. Also, it includes a number of aspects that people distinguish as relevant parts of the context of the learner and the learning process.

Crucial in providing better adaptation is to *integrate the human and the machine better*: it is wise not to rely on machine intelligence alone, but to include the human in the process achieving a good balance between the decisions "taken" by the machine intelligence and those based on the human's common sense.

In the applications, the facility should be there so that when the machines fail, the humans can come to the rescue by substituting the machines.

Coming to the basic question in this discussion, the point was raised *for what question the Semantic Web would be the answer*. It was noted that the typical nature of Adaptive Hypermedia is to *adapt*, that the typical nature of Semantic Web is to *find*, and that the typical nature of e-learning is to *reuse*. Therefore, one could conclude that these goals are quite different, and we might need to clarify the purpose of combining them. If for example we want to discuss adaptive e-learning on the Semantic Web, the main objective should be reuse (and therefore legitimates the choice for the Semantic Web). So, let us determine *who are the stakeholders in our use of the Semantic Web*.

When discussing *adaptation and the Semantic Web*, referring to the Adaptive Web, one could argue that e-learning is not going to be the key enabler. It is already difficult enough to put adaptation and Semantic Web together nicely, a challenge not to be underestimated. It is uncertain whether good solutions for e-learning are good for the general situation: the e-learning solutions might contain so many specific elements, that it might not contribute to general adaptation in the Semantic Web.

Moreover, we should realize that *e-learning is only an application area, which does not provide technologies by itself*.

Similarly, we should not just focus on functionality (and demonstrate only that we can engineer very advanced functionality), but we should also take into consideration the issue of *performance* (e.g. large scale performance). Take for example the information retrieval community and their effort to balance the benefits for functionality and performance. In this respect we spend as a community much more time on building standards, instead of concentrating on performance (and getting the standards to "work" in real life).

In terms of *user modeling*, it is clear that there are different aspects and perspectives. Note that in the business world the user model is used for control, for performance measuring, etc. So, a still relevant question is what to model of the user:

- what do we trace of the user,
- what do we store from this,
- how do we apply it?

Also, this touches the question:

- to what extent the user owns that model and is capable of changing it?

It would be relevant to build an interface (for monitoring the user and hence gathering user model data) which allows the user to control the monitoring, meaning that the user allows what can and cannot be monitored.

A related issue is the role of *contexts* in the *user modeling*. A lot of user modeling is in fact *context modeling*, and a major part of adaptation is context-based.

Another issue in combining adaptation and semantics is the *complexity for the engineer/designer*. We should see to it that we do not ask too much from the system designers in terms of the complexity that they need to conquer. For example, both learner and teacher (in an educational setting) are not knowledge engineers, and this should be reflected in the role of knowledge engineering in the process.

In terms of research we should realize what we are after, to determine the right use of the different complex technologies that we are considering. Take for example Google as a nice illustration of success combined with simplicity. What are our simple but nice applications?

The scale of the Semantic Web is also such that it is difficult to get a good assessment of quality. After all, we do not just need to find objects, but we want to find high quality ones. This applies not just to (learning) resources, but to techniques and mechanisms as well.

In connection to the term *reuse*, we have to realize that there are different meanings:

- What do we want to reuse?
- How do we want to reuse?
- Behind reuse are different services and different functionalities.

We can distinguish *reuse* and *exchange* of different things (and we might in fact pushing them in the community):

- reuse of learning resources
- reuse of user models
- reuse of systems
- reuse of adaptive functionality;
- in other words, reuse has different dimensions (next to all interpretations of reuse from the software engineering community).

In fact this also shows nicely why standards are not enough. *More is needed than standards to be possible to share and reuse in a large scale.*

On the contrary, standards allow us to use tools, for example to create knowledge, to reason, and to visualize, so there is usability.

It was concluded that the discussion between the different communities has started, and it would be good to develop systems and see what we can do with them. Some argues that reusability and sharing should be our aim in this endeavour, and that trust is an essential issue in this process. Another (unresolved) issue is the control user has over the different user-related aspects.