Authoring of Adaptive Educational Hypermedia

Alexandra Cristea
Department of Computer Science, The University of Warwick, Coventry CV4 7AL, UK
acristea@dcs.warwick.ac.uk

Abstract

The creation of the components for a specific type of technology always seems less significant than the actual technology itself. This is not so in the case of adaptive educational hypermedia and the authoring thereof. In fact, much of current research, including ours, has shown that the authoring process is the real bottleneck, inhibiting widespread use of adaptive educational hypermedia. As long as this problem is not solved, the acceptance of adaptive educational hypermedia in learning communities will be low.

1. Introduction

There is a vast diversity of learners in the world; each person has their own learning preference, aims and objectives. Every learner has the right to demand a high quality, personal learning experience. However as current web-based learning environments offer a 'one size fits all' approach to the delivery of learning materials (every learner is given the same set of resources), the personalised approach to education is sadly lacking from most online systems. Adaptive Educational Hypermedia (AEH) seeks to address this lack. It aims to create new opportunities for learners, whilst also enhancing existing approaches – delivering lessons and courses adapted to the requirements of each learner.

Therefore, Adaptive Hypermedia (AH) [1] can be considered the solution to the problems arising from the “one-size-fits-all” approach to information delivery prevalent throughout the WWW today.

The way Adaptive Educational Hypermedia [1] usually caters to the needs of each individual student is to adapt to their goals; knowledge level [5]; background; interests; preferences [9]; stereotypes; cognitive preferences and learning styles.

Today there are a few such AEH systems, many of which are as yet experimental (e.g., Interbook, AHA!, TANGOW, WHURLE). Their focus is on the learner’s requirements: they adapt their educational content to different dimensions of each learner, as previously mentioned, as well as tasks, educational context (e.g., are learners at school, university, or learning from home?), and more recently learning styles (e.g., LSAS).

Summarizing, we can say that adaptive educational hypermedia is the answer to the need of personalization in learning environments, the tool to fight against uniformity and indifference to individual needs and variations. However, just by studying how to better implement and render adaptive hypermedia, we only look at solving half of the equation, as the following section discusses.

2. The Problem

Until very recently (e.g., the AHAM framework [5], the LAOS framework [2], MOT) little attention has been given to the complex and often confusing task of authoring materials for AEH systems. An author faces a multitude of problems. In order to create a personalized, rich learning experience for each user, not only the actual content of the lesson has to be prepared, but much more. Catering for different user needs means creating different (labelled) alternatives of the same content, this in turn leads to multiple paths through that content. This content organization is often called, in the Adaptive Hypermedia literature, the creation of the Domain Model. Adaptive dynamics design also embraces the specification concerning the kind of user expected, given the content alternatives. Often, this is done in the form of user attributes that are specified in what is usually called a User Model. Moreover, in the educational field there is a serious need for a separate Pedagogical Model, which establishes adaptation and interaction types for the different kinds of learner, according to pedagogic strategies. Therefore, authoring of personalized courseware can be a difficult and costly process.

Thus, it is highly relevant to focus research efforts into understanding the requirements and needs of the authoring process, as well as finding the best models, and implementation patterns for the authoring paradigm.
3. Towards the Solution

There are different ways of striving towards alleviating what can be called the ‘authoring problem’, amongst which the most important are:

- To consider the difficulty of the first-time authoring process unavoidable and to concentrate on improving reuse capabilities. In this way, the cost could be reduced by reuse of previously created material. Therefore, research is necessary into how to encourage the efficient reuse of the different components of the authoring process: this encompasses both static and dynamic materials.

- To lighten the authoring burden, by moving away from the platform dependent authoring style, common especially in adaptive hypermedia, towards platform independent authoring, thus allowing authors to use the platform of their choice.

Both issues on reuse and platform independence lead to the necessity for research into the creation and implementation of a semantically enhanced intermediate platform specification.

- Another important line of research goes in the direction of automatic authoring, thus leaving a smaller proportion of the material needed to be created (or linked) by hand.

Current research focuses on these three aspects from both a theoretical and implementation point of view.

4. Conclusions

Although there is already a gathering momentum for research into authoring of adaptive (educational) hypermedia, there is room for more. Current research has laid the groundwork in terms of models. These are being evaluated via implementations. In their turn, implementations are evaluated via actual use. Same as in authoring of simple, non-adaptive hypermedia, evaluating of an authoring system is a two step process:

- Evaluating the authoring process itself (e.g., with the help of experts, or authors, or teachers)
- Evaluating the outcome of the authoring process (e.g., with learners).

Obviously, they are both necessary, as it is useful to know not only if authors found a given system satisfactory, but also, if the output created with that system is of any use to learners.

This cycle, theory, implementation, evaluation, theory, etc. has to be repeated in order to obtain valuable products. Various stakeholders, learners, teachers, implementers, but also managers of educational material, etc., have to be involved at the different stages of this process to guarantee that personalization, is indeed, within the reach of everyone, everywhere.

5. References


