

## Chapter 2.29

# Bridging the Gap with MAID: A Method for Adaptive Instructional Design

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### ABSTRACT

This chapter presents MAID, a complete design method for adaptive courseware tailored for non-technical people. Adaptive hypermedia systems represent a great potential for e-learning. Nevertheless, instructors and designers find it difficult to develop adaptive applications in real educational environments, mainly because no structured design method is available. The main principle upon which the method relies is that the basis for the exploitation of adaptive features in education is the definition and implementation of an instructional strategy. The MAID approach provides guidelines and tools that foster and enhance the communication between the technical staff in charge of managing the hypermedia system and the instructor by adopting her/his instructional strategy as the pivotal point for the communication.

### INTRODUCTION

The creation of adaptive courseware started with expert systems and CAI (computer assisted instruction) and produced milestone applications as ISIS-TUTOR (Brusilovsky & Pesin, 1994) or SKILL (Neumann & Zirvas, 1998) and TANGOW (Carro, Pulido, & Rodríguez, 2001). These projects developed self-learning courses with adaptive tutoring, and traced a route by which, some years later, adaptive platforms could be developed, such as AHA! (De Bra & Calvi, 1998; De Bra, Aerts, Smits, & Stash, 2002a) or KBS Hyperbook (Henze & Nejd, 1999). Adaptive platforms are general-purpose systems that allow the production of courseware for any content. It can be surely stated that the last decades of research in the field of adaptive hypermedia systems (AHS) produced a wide leap forward in terms of technical solutions and systems. Nevertheless, “just a handful of these

systems are used for teaching real courses, typically in a class lead by one of the authors of the adaptive system” (Brusilovsky, 2004, p. 1), and also few institutions or companies systematically exploit adaptive components in their e-learning programs.

We claim that this gap between the maturity of technical developments and their use in the educational practice is also due to a lack of methodological support in the design of adaptive courseware, that is, of expertise in using adaptive components and systems in order to implement and enhance a course as conceived by a non-technical instructor.

The major concern of this chapter is MAID, a method for the design of adaptive educational application, suitable to a situation in which an instructional designer, familiar with some adaptive platform, is producing a course with an instructor or a subject matter expert (SME). A second concern of this chapter is a call to all AHS developers for defining not only tools, but also methods that may make the tools actually usable to educators.

This chapter first presents an overview of the literature, with particular emphasis on the instructional strategies, claiming that the definition of a specific strategy is the basis for the sound development of adaptive applications. The MAID method is then presented in detail by a case study. The following section recaps the method, and provides generalization insights and guidelines for designers. Finally, the results of the work are discussed and some outlook is provided.

## **LITERATURE REVIEW**

### **About Instructional Strategies**

When an instructor or SME thinks of a course, s/he thinks about it in a unitary way, and conceives an instructional strategy, that is, a method for having the students achieve the course goals.

The design of instructional events indeed, supported by any kind of technology, from WebCT to virtual reality, requires a strategy (Bates, 1999; Bates & Poole, 2003). Smith and Ragan (1999), building on the foundations by Reigeluth (1983), define a strategy as a plan for action including three main dimensions:

1. **Organization:** the structure and clustering of content;
2. **Delivery:** the media involved in the delivery; and
3. **Management:** the organization of the learning activity into a unitary schedule.

To our concerns, the definition of organizational strategy is the most relevant. Smith and Ragan (1999) write that “organizational strategy characteristics refer to how instruction will be sequenced, what particular content will be presented, and how this content will be presented” (p. 113). In particular, they name a set of activities that should be considered as part of the definition of an organizational strategy, namely:

1. Content selection
2. Content clustering
3. Content sequencing
4. Definition of generative (active) or supplantive (passive) approach
5. Definition of instructional events

When talking of instructional strategy, we will refer to this definition; a clear assessment of these issues paves the road for an integrated and effective exploitation of adaptive hypermedia techniques into a course.

A strategy could be synthetically expressed with a statement such as “this course is problem-driven and learners work in groups” or “this course follows constructivist principles and provides learners with resources they are free to use as they like, provided that they reach the negotiated goals”. The definition or selection of a strategy

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