

Chapter 9

Competency–Driven Scenarios and Actor Modeling

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ABSTRACT

- Competency Gaps and Domain Modeling
 - Performance Indicators for a Competency
 - Competency Gap to Guide Knowledge Modeling
 - Target Competency and Knowledge Model Type
 - Competency Gaps for Actors
- Competency-Driven Scenario Modeling
 - Selection of a Generic Skill's Process
 - Transform the Generic Skill's Model to an Activity Scenario.
 - From Generic Skill's Principles to Assistance in a Scenario
- Competency-based Actor's Roles and Resources
 - Actor's Roles and Generic Skills
 - Coordinating Role Scenarios
- Knowledge and Competency Actors Models
 - A Competency-Based Learner Model
 - A Learner Model That Evolves in Time
 - A Learner Model Having Multiple-Viewpoints
 - A Multi-Viewpoints Evolving Learner Model in Action
 - Initializing the Learner Model for a Learning Process
 - Scenario Adaptation Using the Learner Model

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In this chapter, we will present further applications of the notions of generic skill and competency developed in the previous chapters. The first of these applications is to define the concept of “competency gap” that extends the notion of “knowledge gap” introduced in Chapter 4 to guide the domain modeling process. Then, we show how we can use a model of the generic skill involved in a competency definition, to form the skeleton of an activity scenario. Afterwards, we use competencies to help define the roles and the resources needed by different actors in a virtual learning or knowledge management environment. Finally we use different viewpoints on a user’s competencies at the center of a user model that can help personalize or adapt a Web-based environment.

9.1 COMPETENCY GAPS AND DOMAIN MODELING

We present here a more elaborated method to guide the modeling of a knowledge domain than the one presented at the end of Chapter 4 (section 4.4). For this, we will use the concept of performance to define the notion of a *competency gap*, an important concept to guide the knowledge modeling process (Paquette 2003).

Performance Indicators for a Competency

The scale values and the words “awareness”, “familiarity”, “mastery” and “expertise” that describe levels of knowledge mastery need a more precise definition because the “gap” now applies to competencies (skill + knowledge) instead of just the knowledge part. The general meaning of the levels in the competency scale depends on the level of performance that an actor can demonstrate when he applies the generic skill to the knowledge part of the competency.

A way to evaluate such a performance level is to add to the generic skill part of the competencies, values of performance indicators such as frequency, scope, autonomy, complexity and/or context of use. For example, a competency like “diagnose the source of malfunction of a car engine” could be made more precise by adding performance values at the end of the statement such as:

- *Frequency*: “in all cases (always)” or “in the majority of cases (sometimes)” ;
- *Scope*: “for part of the causes (partially)” or “for all causes (totally)”;
- *Autonomy*: “without help” or “with assistance”;
- *Complexity*: “for high, middle-range or complexity situations”; or
- *Context of use*: “in familiar or unfamiliar cases”.

The usefulness of such indicators is to help built ways to assess the performance level for a competency, using for example questionnaires, interviews or performance observation plans.

Alternative and simpler performance indicators are obtained by linking the broad categories such as “awareness”, “familiarity”, “productivity” or “expertise” to the performance indicators. One way to combine performance indicators or criteria is shown on Table 1.

Applying this table, we have the following definitions replacing those in section 4.4:

- *Awareness*. At this level, the actor can apply the generic skill to knowledge sometimes, only partially, with assistance, in low complexity and familiar situations.
- *Familiarity*. At this level, the actor can perform the generic skill on the knowledge always, but only partially, with assistance, in low complexity and familiar situations.

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