Automatic Tutoring System

The knowledge and skills assessment session starts within the Domain Model, on a topic/subject that “matches” the User Model (profile). For example, the topic/subject is one that the performer indicated interest in, or where s/he feels he needs some exercises and assessments, and so on.

The questions on the left panel are assembled from the Domain Model (a Topic Map), by visiting all appropriate/relevant topics (see “matching” above), and gathering the Question, Equivalent Question, Answers, and Help topic nodes (see details below).
Initially, the topic/subject title is displayed (gathered from the Domain Model Topic Map), along with a question, matching the learner’s profile (mastery level, learning style, etc.)

Also, no help is provided, since the system is trying to establish what mastery level the learner has achieved.

The learner picks an answer from the drop-down list. This implementation assumes text-based Q&A, but the Domain Model contains and can support multiple modes, formats, and styles of knowledge/skills assessments (e.g. multimedia, simulation, synthesis, etc.)
Once the learner submits his/her answer, the system assesses its correctness, and displays the mastery level (ML).
If the ML is below the goal, the system looks for an Equivalent Question: one that is about the same topic, at about the same level of difficulty, style, etc. The system also displays a first help topic. Subsequently, more help is offered if the learner continues to perform below the goal.
The system also displays the performance in the “3D status” panel, reflecting status dimensions such as Subject, Mastery Level, and time.
Equivalent Q

Some help

Low ML
After each question is answered, the 3D status is updated, indicating how the learner is progressing, along the 3 axis (subject, mastery level, time). Depending on the mastery level indicated by the answer, the next appropriate question is selected and displayed.
The learner is doing well (goal ML achieved), and the system moves to the next subject, removes help, and indicates high ML on the 3D panel above.
On new subject, low ML again. System provides more help and moves to an equivalent question, not a new one, to give the learner another chance to master the topic.
After the low mastery, the student recovers, and the status indicates that.
The 3D status panel can be rotated around its Mastery axis, to show mastery level over time.

The 3D status panel can be rotated around its Mastery axis, to show mastery level across subjects, basically giving an indication of Domain Model coverage (how many topics/subjects have been mastered, regardless of the time it took).
The 3D status panel can be rotated around its Subject axis, to show subject coverage (Domain Model coverage) over time, where the mastery level is indicated by different colors.