Computer-Assisted Instruction (CAI) systems

Ancestors of ILE

- Computer-Assisted Instruction (CAI) systems

- Curriculum

- Present Problem

- Computer Answer

- Get Student Answer

- Remediation

- Compare Answers

- Present Feedback

- If correct

- If incorrect

CAI systems (cont.)

- Student’s solution process is not taken into account, only final answers

- The CAI author (instructor) must construct ahead of time all branching in the program by defining
  - All problem answers (correct and incorrect)
  - Sequencing of topics
  - Remediation actions

- Fine for drill-and-practice in simple domains, but unmanageable for more complex domains and learning strategies

Intelligent Learning Environments

- Rely on more sophisticated representations of the knowledge involved in the educational interaction to provide more adaptive, comprehensive computer-based support to

Knowledge in ILE

- Target domain (Domain or Expert Model)
  - concepts and principles
  - solutions to problems

- Student (Student Model)
  - knowledge (correct and incorrect)
  - goals
  - learning capabilities (meta-cognitive skills)
  - personality traits
  - emotional states

- Pedagogical Knowledge (Pedagogical or Tutoring Model)
  - teaching strategies
  - remediation strategies

- Communication Knowledge (Interface)
From CAI to Intelligent Learning Environments

- Linear CAI
- More complex branching CAI

Level of Flexibility/Adaptivity

- Of course, more complexity is not always worth the effort...

ILE behaving like an award-winning human tutor

Good Human Tutor

- Recognizes large variety of student’s answers.
- Diagnoses student’s understanding
- Tailors tutorial actions consequently

Basic ILE

Issues in ILE Evolution

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