

Computer Science: Experts vs. Novices

Syntactic Knowledge: Knowledge of language units and rules for combining language units (e.g INPUT) ...

- Experts have syntactic processing automated. This frees up more capacity for focusing on content and meaning of programming.
- More automation of lower level programming skills in experts than novices.

Semantic Knowledge: Mental model of major locations, objects, actions in computer system (e.g. DATA STACK)

...

- Novices tend to have misconceptions about memory spaces. Experts do not.
- Novices lack semantic knowledge and don't know what basic instructions refer to.

Schematic Knowledge: Categories of routines (e.g. LOOPING) ...

- Experts more sensitive to typical configurations of routines and programs.
- Experts classify programs by functional vs. surface characteristics.
- Experts classify according to lines executing task versus lines using same syntax.
- Experts use their past knowledge (schema) of programming to classify problems.

Strategic Knowledge: Tests for devising and monitoring plans. Includes breaking a problem into smaller/finer subparts ...

Top-down refinement approach:

Expert software designers break problem into parts/steps and more systematic.

Hook-crook approach:

Novice software designers break problems into parts/steps but fail to compose alternatives.

Unfocused approach:

Novices begin to solve problems before understanding the program.