Table 6

Comparison of Approaches for Presenting Problems to Students

Approach	Methodology to Create and Solve Problems	Ability of Instructor to Give Partial Credit
All at once	Effectively all or nothing. Overwhelming, requires constant modification, results in a single point of failure.	Very difficult to give partial credit. (What do students know versus where did they get lost?) Fails to account for error propagation.
Incremental	Each piece builds on the previous piece, resulting in a single statement. Requires considerable preplanning by the student (nontrivial), and can result in a cascading failure.	Difficult to give partial credit. (Where did the student start and which step was constructed incorrectly?) Fails to account for error propagation.
Piecewise incremental	A piecewise approach with incremental substeps. Some problems are fully dependent on prior pieces. The pieces are nontrivially constructed by the instructor based on desired learning objectives. Point distribution determined by substep complexity.	Instructor determines the pieces, which makes it easier to give partial credit. Accounts for error propagation as long as the incremental substeps are easy to dissect.
Piecewise combination	Disjointed pieces with combination. The pieces are nontrivially constructed by the instructor based on desired learning objectives. Point distribution favors construction rather than combination.	Instructor determines the pieces, which makes it easy to give partial credit. Accounts for error propagation.