Decision Support for Instructional Design Efforts
With Respect to the Evaluation of “Promising Practices”

Capsule: A method for rating instructional practices along dimensions pertinent to main constituencies in the university community is discussed. An example using “promising practices” is provided.

Summary: Froyd (2008) discusses eight promising instructional practices and evaluates them according to standards from the institution/faculty (implementation) and student (performance) points of view. The intention is to provide a method whose results can be used to support decisions as to which practices to implement in undergraduate STEM course and curriculum development and reform efforts. The assumption is that student-centered promising practices are usually, but may not always be, preferable to a status quo of faculty-centric practices. He acknowledges that the list is not an exhaustive one, but sufficient enough to make robust contributions to such efforts.

The practices are labeled “promising” due to their demonstrated ability to affect student performance positively and their ability to serve as positive alternatives to widespread, entrenched “traditional” practices; however, further research may be needed to ensure that outcomes remain positive and interventions can be generalized. Examples of traditional processes are briefly discussed within the context of a decision-based framework for instructional design activities. The eight decision categories (with a representative traditional practice parenthetically noted) are expectations (topically organized syllabi), student activity organization (faculty chosen; default is individual), content organization (faculty chosen set of topics based on priority criteria and organized by prerequisite chain), feedback decision (grades), gathering evidence for grading (assignments such as lab reports and homework), in-class learning activities (lecture), out-of-class learning activities (homework), and student-faculty interactions (initiated by students with issues/problems during predefined times) (pp. 3 – 4).

The implementation standards are based on Felder, et al. (2000). A practice is evaluated on the number of STEM courses to which it’s relevant, the amount of additional resources needed to implement it, and the degree to which implementation requires training or otherwise requires additional adjustments from the faculty. The ratings and associated rubrics are strong/high (high number, feasible without additional resources, and minimum adjustments, respectively), good (midlevel assessments for the three items), and fair/low (few courses, significant additional resources, and significant adjustments, respectively).

With respect to student performance standards, the degree to which a practice is effective in engaging students and resulting in positive learning outcomes is determined through a review of published research results. Studies in which performance is evaluated through comparison are preferable to application studies, which may tend towards the anecdotal report of an intervention. The number of available studies is also considered. The ratings and associated rubrics are strong/high (multiple high-quality comparison studies available), good (some high-quality comparison studies or multiple studies with conflicting findings available), and fair/low (mostly application studies available) (pp. 4 – 5).

The results of the evaluation process are summarized in the following table, which is based on a discussion of the practices (pp. 5 – 14) and Table 4 (p. 15; permission for use has been given by the author).

How decision makers should use this information is not directly addressed. Rating acceptability thresholds are typically institution- and situation-dependent. In general, though, a decision to adopt practices 2 and 6 based on the “strong” rankings in both evaluative dimensions would be supported. Recalling that “fair” ratings with respect to student performance are influenced by the paucity of appropriate, relevant studies, decisions to implement practices rated “strong/fair” or “strong/good” could also be supported.

Additional information on specific practice-based interventions can be found in the suite of CASEE products.
### Practice | Brief Description/Examples | Implementation | Student Performance |
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1. Prepare a set of learning outcomes | Student-oriented performance expectations (e.g., SMART or Mager format) | Strong | Good |
2. Organize students in small groups | Cooperative learning, peer instruction, and inquiry-based learning | Strong | Strong |
3. Organize students in learning communities | Group or associate like courses (e.g., calculus and physics) together | Fair | Fair to Good |
4. Scenario-based content organization | Case studies, PBL, *Chemistry in Context*, and *Physics by Inquiry* | Good to Strong | Good |
5. Providing students feedback through systematic formative assessment | Classroom response systems and minute papers | Strong | Good |
6. Designing in-class activities to engage students actively | Active learning strategies | Strong | Strong |
7. Providing undergraduate research experiences | Supplemental (summer or intersession) v. regular/integral | Strong (supplemental) or Fair (regular) | Fair |
8. Faculty-initiated student-faculty interactions | Faculty proactively connect with students through various channels | Strong | Fair |

**Implications for Engineering Education:** Instructional design activities, whether on the course or curriculum level, have a better chance of resulting in success if effective practices are included, faculty buy-in can be easily elicited, and resources are available and appropriately used. Administrators can lead by policy and example by encouraging the use of evaluative information developed with these factors in mind when making decisions. It is likely easier to champion development and reform efforts if a certain practice can be shown objectively to be both promising and effective. Such knowledge can be especially critical when calls for educational reform meet resource constraints.


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