Identifying Technology to Support Differentiation

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Educational technology is compelling, largely because of its promising capability in enabling differentiated instruction. In a classroom of 30 students with diverse abilities, technology can allow teachers to more effectively instruct students within this wide range. However, the promise of using technology for differentiation relies on a range of high-quality information used to (1) diagnose students' learning needs, (2) map those learning needs onto the program's objectives, and (3) evaluate the evidence for the program.

Diagnosis of Learning Needs

First, appropriate differentiation requires valid and reliable sources of data on student learning. This is more than a simple measure of percent correct; specific items that a student answered correctly or incorrectly and their attributes offer information important in diagnosing a student's learning needs. The question is not only *whether* students struggled with particular items, but also *why* they experienced difficulty. One student who struggles might need more practice in the target skill. Another student might be struggling because of a lack of prerequisite background knowledge or lack of fluency in a component important to the target skill. For example, are students struggling with word problems because they aren't fluent in math facts, need to learn how to classify the problem type, haven't mastered translating the problem into an equation, or lack an overall strategy for solving problems of this type?

Mapping Program Objectives to Learning Needs

Answering the *why* question allows you to specify the necessary focus of an intervention. But deciding on an appropriate intervention also requires a detailed analysis of how a program's objectives map onto the student's learning needs. Students who struggle with story problems because they have trouble identifying the problem structure may benefit more from targeted practice in identifying the structure than from more practice with story problems in general. To offer targeted practice and ensure a match to students' learning needs, information about a particular program's objectives is necessary.

Evidence for the Intervention

The final piece of information for differentiation, and arguably the most difficult to obtain, is evidence for

the chosen intervention: Has the intervention shown promise in helping students similar to yours? For example, have students who have used a math fact program increased their mastery of math facts? Has their fluency increased? What were the characteristics of these students? Were they similar to your students?

Eight Questions to Ask

These pieces of information lead to a number of questions educators should ask when evaluating a technology program for use within a differentiated classroom environment.

1. What are the program's objectives? Are the objectives clear enough that you would be able to assess whether or not students have successfully achieved them?
2. Do the program's objectives match your students' learning needs?
3. What prerequisite skills are assumed necessary to be successful in the program? Do your students already have these prerequisite skills?
4. Are assessments aligned with learning goals and objectives?
5. Do assessments adequately diagnose the *reason why* students are struggling in a way that's useful for suggesting targeted instruction and practice?
6. Is there evidence that the program is effective? That is, is there evidence that students who use the program meet the program's learning goals and objectives?
7. In which contexts or conditions has the program been effective?
8. What are the characteristics of students who have been successful in the program? Do those characteristics match those of your students?

Answering all of these questions for every program may not be feasible, but the more questions that can be answered, the more certain you can be that a program will match students' needs and characteristics and will be effective in helping students develop targeted skills and abilities. Requesting answers to these questions can also help place pressure on program developers to provide this critical information. Greater information about programs can ultimately help to assist teachers in offering differentiated learning environments focused on individual student needs and success.

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