Creating Quality In-House Math Placement Tests

Miami University Regionals
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The Problem and the Solution

The Problem: Up until the Covid shutdown in March of 2020, Accuplacer had provided Miami with placement scores for math courses. Testing remotely was cost prohibitive through Accuplacer and there was no time to really investigate alternatives. Suspending placement testing was not an option.

The solution: Using tools already built into Canvas, create an assessment that approximates the job Accuplacer was doing and at the same time, address some changes we would’ve liked to see in Accuplacer.
Considerations

- How many tests?
- Which questions?
- How many questions?
- Accessibility?
- Correlation to Previous Tests?
- Test Security?
How many different tests were necessary?

We decided to preserve the structure of having two tests - one leading into STA261 (Introductory Statistics) and the other leading toward the calculus sequence. These are two very distinct student subgroups with different needs. Between the two tests, students could enter either branch at any point.
What questions to include?

Deciding where the line is between “prepared” and “unprepared” for a particular gateway class was tough, but conversations with math faculty helped us narrow down what skills are necessary to do well upon entering a college-level course. Short of that, our concern was determining the line for who was ready for entry into a developmental course.

Striking a balance between having enough questions to provide meaningful and accurate placement, but not so many as to provide diminishing returns from students who begin to tune out was also a consideration. Fortunately, we had several “test students” who volunteered to take the test and provide feedback.
Could it be fully inclusive?

Accessibility was a major concern, as our student population contains some who may not have access to a desktop or laptop computer. Since on-campus testing wasn’t possible and libraries and computer labs were shut down, our placement test was designed to work well with the Canvas phone app if no other means were available. Test students were able to successfully navigate the entire test and answer all question formats using their phone.

We also worked extensively with eLearning to make sure we were in full accordance with ADA guidelines and fully functional with common software used by those needing visual accommodations.
How are the tests scored?

Canvas scores the tests automatically and provides a record of correct and incorrect answers. Canvas offers the capability to review incorrect answers and provides a variety of overall test statistics.

For scoring correlation, we simply calculated a concordance table of levels of readiness Miami had already defined between the Accuplacer scoring format and the number of correct answers scored on the Canvas course. This eliminated the need to retool new scoring designations for the backend (Banner) system.
How to balance test security and quality?

By far, the biggest concessions were made in balancing some degree of test security without sacrificing accessibility or quality. Requiring the use of a laptop or desktop that could utilize the Proctorio add-on would disenfranchise a certain cross-section of students. The compromise was to structure Canvas to pull variations of each question from a pool. This provides some prevention in sharing the exact questions that a new student will see on their test.

Multiple choice and fill-in question types were used to attempt to limit success by guessing. An “I don’t know” option was also included on all multiple choice questions with the explanation that choosing that option would provide more accurate placement than would a lucky guess.
What about practice resources?

Access to practice materials was key to ensuring good placement. Practice resources should serve two specific purposes:

- To activate the math schema
- To emulate the test experience

A similar “question pool” approach was used on the practice questions so that students could go through the practice material several times and receive new questions on each attempt. Each practice question also contains an embedded link to a Khan Academy video or YouTube demonstration of each concept or skill.
Miami Regionals’ writing specialists also devised an in-house Writing placement test which was approved by the English department and which is also working well. This test serves both native English speakers as well as our ELL students.

For more information regarding the writing placement test, please put your contact information in the chat box and we can send you information from our Writing Specialists.

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So how did we do?

Overall, math placement for our fall semester seemed to be accurate. Very few students reported feelings of over- or under-placement and of those few who have, they did not go through our in-house placement test.

Math faculty have also not reported any suspicions of incorrect placement.

Moving forward, we’ve separated the practice versions of the test and the actual placement tests into two distinct Canvas sites to alleviate confusion. Students had completed the required practice questions, then assumed they were done with placement and logged off.
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