



INNOVATION ABSTRACTS

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On-Line Testing

On-line testing is the computer administration of an exam through either a network system, telecommunications, or personal computer. During the 1996-97 school year, we tested our computer classes via the Course Test Manager (CTM) software from a network server. [The CTM software is supplemental material to the New Perspectives Computer Concepts text by Parsons/Oja (ISBN 0-7600-34397).]

There are three types of computer-based testing. *Adaptive testing* hones in on an examinee's ability level in order to test at that level. An algorithm selects questions that are appropriate to an individual's ability—i.e., the test software uses an individual's performance on one question to determine which question will be asked next. Different test-takers answer different questions, and questions will become more difficult as test-takers answer questions correctly. Conversely, as test-takers answer questions incorrectly, subsequent questions will be easier. This type is frequently used for standardized testing purposes and is based on algorithms that have been refined and tested for more than 20 years.

Mastery testing is a variation of adaptive testing. It is used to determine whether the test-taker has attained a specific level of knowledge or mastery of a subject. Testing ends when the test-taker's ability has been precisely determined—i.e., when either a passing or failing grade is earned. This type of testing, most frequently used for certification purposes, is the next wave of testing.

Linear testing presents all test-takers with the same set of questions and is the subject of this article.

Deciding to Test On-Line

It is important to investigate the software before deciding to administer on-line exams. Ignore flashy packaging and any advisory that the software is user-friendly—exploring a software package is the only way to determine if it is user-friendly. Try a test-run yourself, and have someone else perform a test-run, as well. Finally, have your students take an on-line practice test before giving the real on-line exam.

Drawbacks of Testing On-Line

On-line testing presents some unique problems. For

example, we spent time getting our students ready for the idea of on-line testing: they watched us take an on-line test, and they practiced an on-line exam as a class. [A test-run exam meant making lab reservations, a reminder that on-line testing requires planning.]

Since we tested by way of a network server, we had to contact our network administrator and explain what we needed so that the testing software could be loaded onto the network server. Network administrators are very popular, busy people.

Another unique drawback of on-line testing is the "down time" that occurs when a student:

- cannot access the software,
- is stuck and cannot move at all, a momentary freeze,
- is kicked out of the software, or
- takes the exam but does not see the earned score.

Students were instructed to call on us if they experienced any of these problems. In the first scenario, students are not able to access the software if there are not enough authorized users for simultaneous use. During the practice on-line midterm exam, this problem was solved by contacting the network administrator who provided additional authorizations for simultaneous use.

In the second scenario, more often than not the student is a "clicker," clicking several times before giving the software time to execute the instruction. In this case, we explain patience to the "clicker"—that the machine is not as fast as we want it to be and that it needs time to follow instructions. This explanation usually works.

In the third scenario, the network coughs, and a student is booted out at random. If it is at the beginning or the middle of the exam, the student can log in again and start over. If it is at the end of an exam, the student has the option of logging in again and starting over or taking the exam on paper. This means accessing a hard copy of the exam and circling the answers to the questions already answered on the computer.

In the fourth scenario, the student takes the exam without a hitch until the very end when no dialog box opens to indicate a score. In this case, the software has usually not recorded a score for any of the questions. Hard copy is again necessary for recording the answers.



The traditional pencil-and-paper test complaints are also heard about on-line testing. Some students will complain that the exam was too hard, others will think it is fair, but the majority do not say anything unless asked to comment.

Other concerns about pencil-and-paper tests haunt on-line testing, too—e.g., wandering eyes and the proverbial cheat sheets. Scrambling the questions on the exam helps control the problem of wandering eyes; any testing software worth its salt will have a scrambling option. Cheat sheets are a different matter; providing a clear definition and describing the consequences of dishonesty will be helpful.

How to Test On-Line

We wanted to understand testing on-line and know what was out there, so we researched helpful sites. Frequently Asked Questions (FAQ) about Computer Adaptive Testing (CAT) by the University of Minnesota was especially helpful. This FAQ document is thorough and informative with links to helpful sites.

We consulted with available local sources. For example, a colleague who used instructional technology suggested that we determine if adequate on-line testing facilities were available. We were counseled to gauge the receptivity factors within our division and the cooperation factors outside our division. The facilities factor was met—there is an electronic classroom on campus with enough seats for a medium-size class. The receptivity factors were met through the chair of the department, and the cooperation factors were met through the director of academic computing.

Benefits of Testing On-Line

Surprisingly, grade distributions for on-line tests have been remarkably similar to those for paper-and-pencil exams. However, the student benefits from testing on-line are significant, including instant gratification, practice for quizzes, and enhanced computer skills. Students appreciate knowing their grade before leaving the examination room, as well as obtaining a raw score and a percentage score.

The software includes chapter quizzes that students take at their leisure in the open lab. Students can retake a twenty-question chapter quiz as many times as they like, but every retake presents a different combination of chapter questions from a huge data bank. Many have learned that by taking multiple chapter quizzes, in combination with other learning activities, they can improve their final grade.

As instructors, we can monitor quiz-taking and quiz-scoring through the "Practice Summary" screen. The

"Practice Summary" screen details a student's performance, the number of practice sessions performed, the chapters covered, and the number of correct practice responses. This feature of the software is particularly useful in evaluating students who have borderline grades.

One of the major benefits of testing on-line is moving one step closer to a paperless classroom; we can avoid making literally hundreds of exam copies. We are able to access and view results of on-line tests and practice tests at a computer monitor. For example, the report that we access after an exam is the "Posted Test Results Screen." This screen is a listing by student name and social security number, and raw and percentage scores achieved by all of the students taking the exam. Another is the "Answer Summary Screen" which identifies the answers selected by each student for each question on the exam. This screen also summarizes the raw and percentage scores.

Finally, testing on-line allows students to complete tests as late as the day grades are due. All in all, testing on-line has some important benefits that make it a useful learning tool. By the end of the semester, students have used the computer to engage in almost every curriculum and instruction activity—from preparing assignments on the computer, to sending results via e-mail, to taking on-line exams.

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