

Paper/pencil versus Online Comparability Study – Data Collection

The purpose of this brief communication is to describe a strategy for collecting data to address paper/pencil versus online comparability. This note does not address the actual analyses (e.g., IRT procedures or possible covariates) that will be performed once the data are collected. While this document is more specific than our proposal, it probably still represents a starting point for determining more specific details about the study.

As stated in our proposal, “For each course area, and with the support of DESE, we propose to select two matched samples of schools, consisting of approximately 1,500 tested students apiece. These samples would be carefully selected to be as representative of the state as possible and to be matched on the basis of demographics, SES, and particularly past performance on MAP high school tests. One sample would be administered one form of the selected test online, and the other sample would be administered the same form of the tests in paper format. While we would need to do this for each of course, it would seem most manageable if the schools in the study could administer all of their field tests in their assigned condition (e.g., paper/pencil or computer).”

The table below provides more detail regarding the number of students, and the approximate number of classrooms, required to successfully complete the comparability study. Past experience suggests that high schools will prefer to administer the online assessment to “intact” classrooms, such as homeroom, rather than to create alternative schedules for students. Because homeroom classrooms, for example, are many times assigned to students alphabetically, it will not be possible to administer the assessment to samples of students *individually* matched on specific criteria (e.g., GPA or past test scores). For this reason, great care must be taken in matching samples of schools.

	Number of Students		Approx. Number of Classes	
	Paper/pencil	Online	Paper/pencil	Online
Algebra I	500	500	25	25
English II	500	500	25	25
Biology	500	500	25	25

During the launch meeting, DESE suggested targeting districts and schools capable of completing the online testing. This strategy is reasonable given that different schools have computers of different power, ages, and operating systems. In targeting schools, DESE should confirm or verify that the schools selected for online testing do in fact meet system requirements (see the last page of this document), and have an acceptable number of available computers, to complete testing. Once the “online” schools are established and their demographic information is known, a matched sample of “paper/pencil” schools can be determined. As noted above, we recommend that schools be matched on the basis of demographics, SES, and past performance on the MAP high school tests. The list below provides some specific matching criteria that can be used to select schools.

Matching Criteria:

- Region
- School Size
- Grade
- Percentage White
- Percentage African-American
- Percentage Hispanic
- Percentage SES
- Map High School Test Scores

The matched set of schools to be administered paper/pencil tests should be obtained by entering the matching criteria into a computer algorithm designed to select schools from a **school level database** containing values on the matching criteria. Parameters for the actual matching of schools should specify ranges (e.g., plus or minus 3 percentage points) for an acceptable match. In practice, the exact parameters used for determining successful matches usually evolve through an iterative process. For example, if initial rules for matching are too strict – matching within a percentage point – very few schools may be found to meet the criteria. Through an iterative process, the balance between acceptable matching criteria, and the goal of matching as many schools as possible, can be found.

It should be noted that the addition of counter balancing to the comparability study would make the study stronger in that each student would essentially serve as his/her own control. Counter balancing of course requires that students be doubled tested, once with the paper/pencil version of the test and once with the online version. More specifically, one-half of the students would be administered the paper/pencil test first and the online test second, while the other half would be administered the online first and the paper/pencil second.

Several other issues to note include:

- Because we can expect some number of schools to dropout of the online condition, we should over sample classrooms (perhaps by 5) assigned to take the test online.
- It may not be possible to test all students simultaneously, given the current limitations of technology implementation in some schools.
- It is hoped that students participating in the online condition can be given the opportunity to take a practice test online, including practice with any online tools.
- Observers should be stationed in some of the schools to view how logistical issues unfold during online testing.

Support from DESE is needed for the following:

- Targeting districts and schools capable of completing the online testing.
- Confirming or verifying that the schools selected for online testing do in fact meet system requirements, and have an acceptable number of available computers, to complete testing.
- Provide approval for the matching criteria to be used in the study.
- Provide to RPC a school level database containing values on the matching criteria.
- Provide approval for the exact parameters used for determining successful matches.
- Approval for counter balancing (i.e., double testing) to be added to the study.

System Requirements

	PC Minimum	PC Optimal
Operating Systems	Windows® 2000*, XP	Windows® NT 4.x, 2000, XP
Browsers	IE 6.0, Netscape 7.2+, Firefox 1.x	IE 6.0, Netscape 7.2+, Firefox 1.x
Processor	133 Mhz Pentium®	233 Mhz Pentium® IV compatible CPU
Memory	128 MB RAM	256 MB RAM
Screen Resolution	VGA monitor 1024 x 768	VGA monitor 1024 x 768
	Macintosh® Minimum	Macintosh® Optimal
Operating Systems	OS 10 with IE,* Safari 1.x, 2.x, and Firefox 1.x	OS 10 with IE,* Safari 1.x, 2.x, and Firefox 1.x
Browsers	Safari 1.x and 2.x, Firefox 1.x	Safari 1.x and 2.x, Firefox 1.x
Screen Resolution	VGA monitor 1024 x 768	VGA monitor 1024 x 768
Additional Requirements		
Minimum bandwidth requirement to access web content is 56Kbps.		
Acrobat Reader: 6.0 (to view reports and directions for administration)		
Cookies: Optional for optimal performance		
Adobe Flash Player 8		
Mouse or compatible pointing device: For use in answering test		
Browsers supporting Java Script		

*Windows 2000 is no longer supported by Microsoft. Any issues encountered with Windows 2000 (e.g., its inability to support IE 7.0) cannot be addressed by Riverside Publishing.

** Internet Explorer 5.23 on Macintosh is no longer supported due to Microsoft's retirement of Mac-related IE support.