

Research Considerations: Familiarity with Technology

Article 1

Educational Testing Service (ETS), National Center for Education Statistics. (2003), Sandene, Brent., Bennett, Randy., Kaplan, Bruce., and Braswell, James. *Online Assessment in Writing*.

The Writing Online study addressed measurement, equity, efficiency, and operational issues associated with conducting a NAEP writing assessment on computer. Data were collected from samples of eighth grade students in approximately 160 schools throughout the United States. The primary measurement question was whether students taking paper-and-pencil tests performed differently than those taking computer-based writing tests. Performance was measured in terms of essay score, essay length, and the frequency of valid responses. Results revealed no measurable differences between the two delivery modes in essay score or essay length. However, for the second of the two essays, delivery mode significantly predicted the rate of valid responses. Approximately 1 percent more students responded to the second essay when it was delivered on paper rather than on computer.

With respect to equity, the study addressed three issues. The first equity issue concerned the impact of assessment mode on the performance of NAEP reporting groups. Performance on paper vs. computer versions of the same test was evaluated separately for gender, race/ethnicity, parents' education level, school location, eligibility for free/reduced-price school lunch, and school type. For all but one of the reporting-group categories examined, there were no significant differences between the scores of students who wrote their essays on paper and those who composed on computer. The singular exception was students from urban fringe/large town school locations, who scored higher on paper than on computer tests by about 0.15 standard deviation units. In addition to its impact on scores, the effect of delivery mode on performance was evaluated for gender groups in terms of response length and frequency of valid responses. For the second essay, males wrote significantly fewer words on paper than on computer. Also for that second essay, a significantly higher percentage of females responded on paper than on computer. The difference was about 2 percent. The second equity issue was whether assignment to a NAEP laptop versus a school computer had an effect on performance. This question is important because some students may be more comfortable with the school computers they normally work on and would perform better on them than on NAEP laptops. To address this question, a small experiment was conducted in which students were randomly assigned to take the WOL test on NAEP laptops or on school computers. In addition, analyses were done in the larger WOL sample, contrasting the performance of students who had been nonrandomly assigned to the two computer types but controlling for performance on the paper main NAEP writing assessment. Results from the two analyses were not completely consistent. In the experimental substudy, students scored lower on laptop than desktop but for only one of the two essays. In the quasi-experimental analysis, however, only female students performed lower on the NAEP laptops, but this group did so for both essays. In any case, the results do suggest that students may sometimes obtain different scores on writing tests administered on laptop versus school computers. The last equity question concerned the impact of computer familiarity on online test performance. Students' responses to background questions suggest that the overwhelming majority had access to computers at home (91 percent) and used a computer to write at least to some degree (93 percent), although there was considerable variation on the extent of this type of computer use. To determine if this variation in computer familiarity affected WOL performance, self-reported computer experience and hands-on measures of keyboarding skill were used to predict online writing performance after controlling for paper writing score. This analysis showed that hands-on skill was significantly related to online writing assessment performance, so that students with greater hands-on skill achieved higher WOL scores, even when holding constant their performance on a paper writing test. Computer familiarity added about 11 percentage points over paper writing score to the prediction of WOL performance.