

Research Reports

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Do General Education Courses Help Students Improve Their Scores on a Test of General Academic Knowledge and Skills?

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It has been difficult to document whether (or not) taking general education courses is related to increased student learning. While students receive grades in the individual classes they take, these grades indicate the degree to which they met the class requirements and may differ even from one section of the same course to another. Course grades do not provide any overall evidence on the amount of student learning taking place across courses or on the extent that the students remember the material over time.

When the Northwest Commission on Colleges and Universities conducted an accreditation review in 1999, one recommendation was that more assessment of student learning be conducted, especially in the general education area. In response to the recommendation, the Core Curriculum Committee chose to test 623 new fall 2001 freshmen on the Academic Profile, a 50-minute test of general academic knowledge and skills. The test included material usually covered in courses taken during the first two years of college—the “core curriculum.” The test measures college-level reading, critical thinking, writing and mathematics through questions from three academic areas: humanities, social sciences, and natural sciences. (For details, see RR 2002-03.) These scores were designated as “pre-core” scores.

In the spring of 2004, after students had ample opportunity to take a variety of core classes, all 411 students who were still enrolled at Boise State and took the Academic Profile were contacted and asked to come in for re-testing. A variety of times were offered to students; they also were given \$25 for their cooperation. Despite this, only 91 students chose to complete the re-test. This fact indicates that we may have some selection bias in the group who was retested. On the positive side, the re-testers did not differ significantly on their pre-core scores compared to the original group ($t=1.26$, $df=588$, ns), thereby alleviating some of the difficulties in interpretation. Students who retested had taken more core courses ($t=6.27$, $df=588$, $p<.0001$) and they had earned higher grades in those courses ($t=4.92$, $df=588$, $p<.0001$). See Table 1 for means and standard deviations.

The purpose of re-testing students on the Academic Profile was to discover if students had increased their scores over time as they took more of their required general education courses. Another purpose was to determine if the number of core course credits accumulated and the grades obtained in those courses helped in predicting post-core scores on the Academic Profile, after accounting for pre-core scores.

Results

Students who took the Academic Profile as freshmen in fall 2001 and who took it again in spring of 2004 showed a significant increase in their scores ($t=6.05$, $df=90$, $p<.0001$). The mean difference of 8.65 points between pre-core and post-core scores translated into an effect size¹ of 0.63, which is typically interpreted as a moderate effect size.

As shown in Table 2, the relationship was strongest between post-core score and pre-core score, though a significant relationship still existed between post-core performance and core GPA and credits earned. About 40% of the variability in post-core scores could be explained by how they performed on the earlier version. Core GPA by itself explained 16% of the variability in post-core scores, while number of core credits alone explained 8%.

After accounting for the effects of how students originally scored on the test, adding information on core GPA and number of core credits earned to the pre-core scores improved the prediction significantly ($R^2=.4485$, $F=3.81$, $df=2,86$, $p=.05$). However, when both of these variables were added to the prediction of post-core performance (and each variable was considered after accounting for the effects of any others), pre-core score and GPA were statistically significant but number of credits earned in core courses was not (see Table 3). Thus, the skills students had when they arrived at college made the most difference, but performance in core courses during college was important, too.

Discussion

Results indicate that taking core courses helped students improve in their general academic knowledge and skills. Students' performance in those courses (as indicated by their core GPA) helped to improve scores more than simply taking more courses.

The group that retook the test was similar to those who did not in terms of their freshman performance. The fact that the re-testers had more core credits and performed better in those courses compared to those who did not re-take the test probably is a sign that those who re-tested were more likely to remain enrolled at the university. In fact, all re-testers were still enrolled at Boise State while only about half of the remaining students were still enrolled. However, despite the fact that re-testers seem fairly representative of the freshman test-takers, it is still worrisome that so few students took the re-test. Exploration of additional approaches that overcome low participation may provide some alternatives to measuring learning in general education.

¹ Effect size is calculated by finding the difference between means and dividing by the standard deviation.

Table 1. Means and Standard Deviations for Study Variables²

Variable	Mean	Standard Deviation	Standard Error
Pre-core score:			
Non-retesters	439.53	16.711	0.7481
Re-testers	441.89	14.58	1.5284
Post-core score:			
Non-retesters	N/A	N/A	N/A
Re-testers	450.54	16.868	1.7683
Core GPA:			
Non-retesters	2.0789	1.0301	0.0461
Re-testers	2.632	1.6924	0.0726
Core Credits:			
Non-retesters	22.665	13.714	0.6139
Re-testers	32.198	10.968	1.1497

Table 2. Correlations Among Variables for Re-testers (N=92)

	<i>Post-core score</i>	<i>Pre-core score</i>	<i>Core GPA</i>	<i>Core Credits</i>
Post-core score	1.00	0.64 (p<.0001)	0.40 (p<.0001)	0.28 (p=.0062)
Pre-core score		1.00	0.30 (p=.0033)	0.19 (p=.0755)
Core GPA			1.00	0.39 (p=.0001)
Core Credits				1.00

Table 3. Regression Equation to Predict Post-core score on Academic Profile

Variable	Parameter Estimate	Standard Error	t-value	Pr> t
Intercept	145.52	41.30	3.52	0.0007
Pre-core score	0.65	0.10	6.77	<.0001
Core Credits	0.15	0.13	1.17	0.2435
Core GPA	4.39	2.11	2.08	0.0406

² Data were obtained for 91 students who took the Academic Profile on both occasions (designated as re-testers). Another 499 students who did not retest were used for comparison; they were designated as non-retesters.