

The Impact of API Sessions on the Pass Rate in Math 096

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Finding: This research demonstrates that first-semester Math 096 students who have earned fewer than six credits and who have a cumulative GPA coming into the semester lower than a 2.00 must use API services, and probably should be mandated to use these services at least three times during the semester.

Background

Math researchers sent IR&A the Academic Peer Instruction (API) usage information for Math 096 sections for Fall 2014, Session I. These records gave the number of times a Math 096 student worked with a peer tutor. There were 605 records from 22 sections, but only students with pass or fail grades could be included in the study, limiting the number of records to 549 of which 313 had worked with a peer tutor at least once. (INC grades were excluded.)

Results

The pass rate for those using API tutors was 48.6%, and the non-API pass rate was 35.2%. Although significant (Chi-square test at 95%), this test is suspicious because the API participation rate was low for those with the lowest previous cumulative GPAs and the lowest pre-Fall 2014 earned credit levels (Figures 1 and 2).

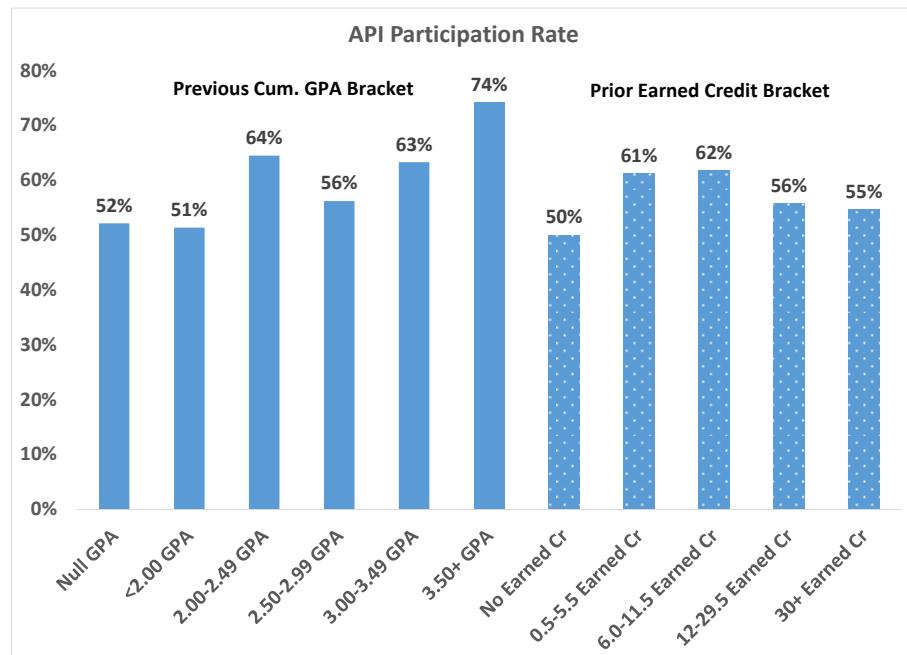


Figure 1

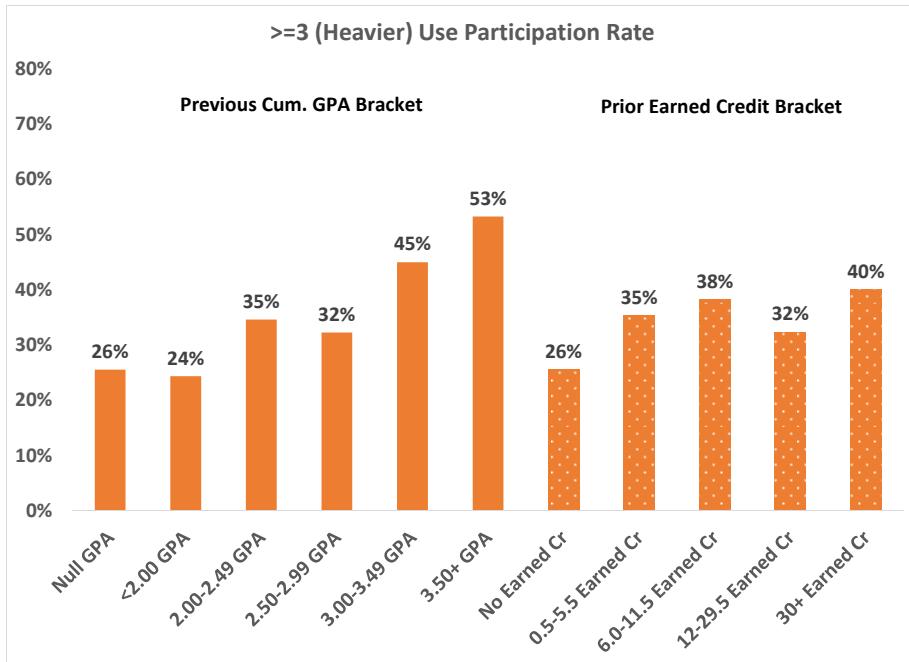


Figure 2

Controlling for the cumulative GPA and credits earned before Fall 2014, the API pass rate was 48.9% and the non-API pass rate was 41.2%, but the result was only borderline significant (Chi-square test passed at 90%). Four API cases had to be dropped because no matching non-API control cases could be found at their GPA and credits earned levels.

One further comparison was done, controlling for previous GPA, earned credits and section, but the number of cases had to be reduced so much that the result was not significant. (API pass rate: 39.2%, non-API pass rate: 29.8%; non-significant difference with 97 API cases and 105 matching, weighted non-API cases.)

The distribution of grades is given in Table 1.

GRADE	Non-API	Non-%	API	API %
INC	10	4.1%	45	12.6%
R	116	47.2%	149	41.6%
S	83	33.7%	152	42.5%
W	24	9.8%	10	2.8%
WU	13	5.3%	2	0.6%
	246		358	

Table 1

The percentage of API-using students who used API three or more times was 58.5%. The full distribution with pass rates is shown in Figures 3 and 4. Figure 4 shows that 236 students did not use API, 130 used it fewer than three times and 183 used it three or more times.

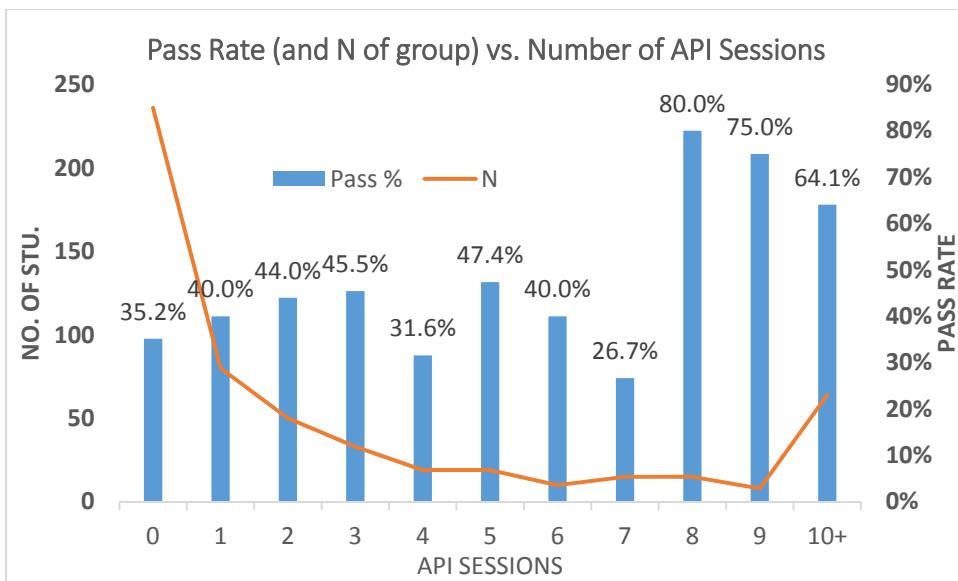


Figure 3 (“half use” rounded up)

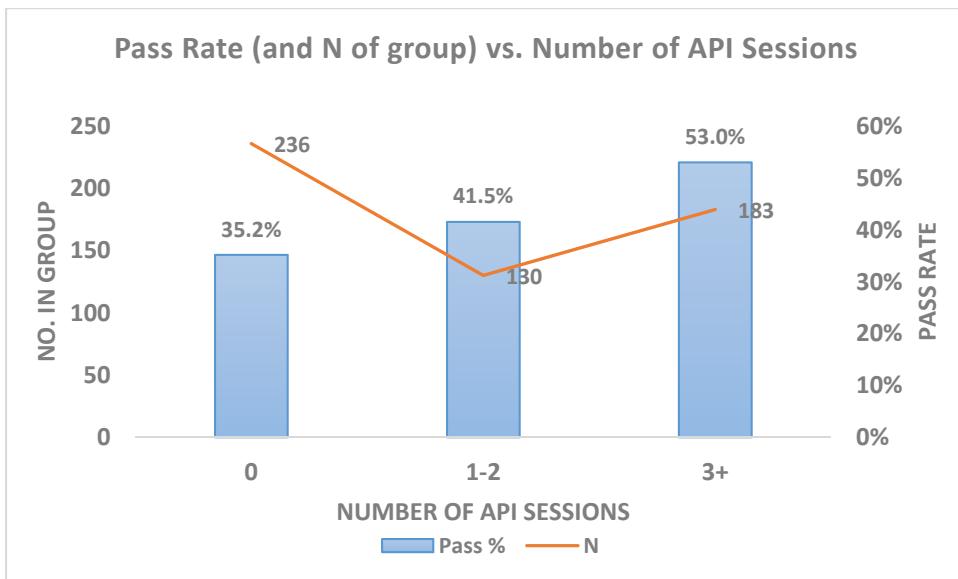


Figure 4

In Figures 1 and 2 we saw that the lowest participation rate among the prior earned credit group was associated with those students who had not earned any credits: new, first-time students, but in Figure 5 we see that these, along with those who have earned under six credits, are the ones who have the largest difference between the pass rate of those who use API and those who don't. More experienced students do not seem to benefit as much from API.

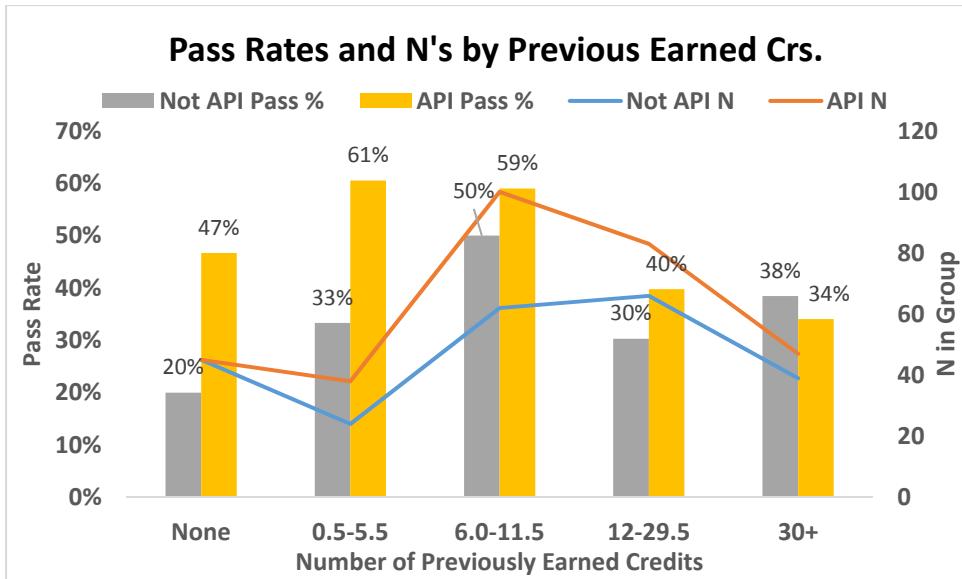


Figure 5

The same effect appears true with lower prior cumulative GPA students. Students with GPAs below 2.00 benefit from API much more than those with higher GPAs. (Note, students with no credits are the same as those students with null GPAs.)

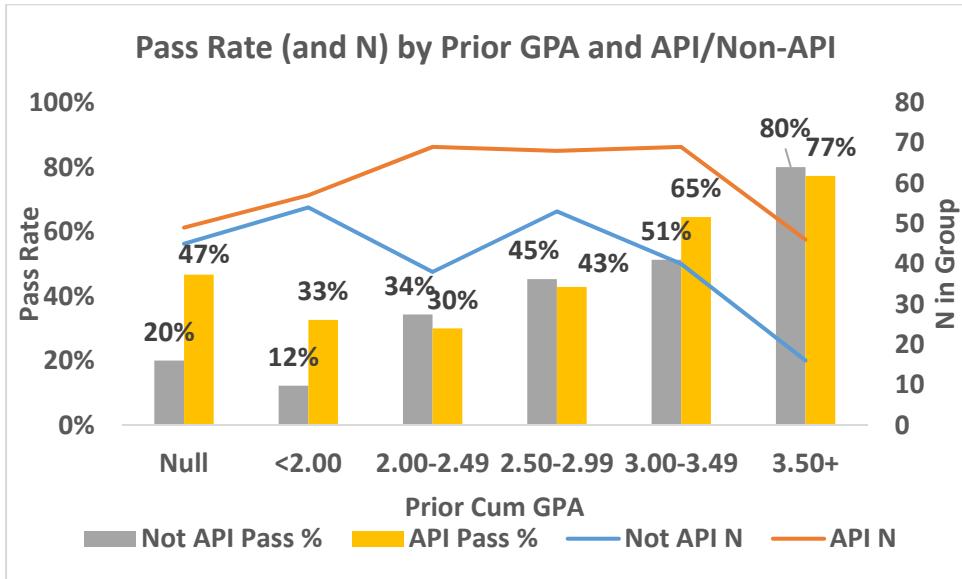


Figure 6

If we now only look at the 64 students who used API and who had either a prior cumulative GPA less than 2.00 or who had earned fewer than six credits and compare them with an appropriately weighted control group of (in this case 58) similar students in terms of GPA and credits earned, we find that the API students had a pass rate of 42% compared with a pass rate of 22% for the non-API using students. The difference is significant, even with the small N, at the 95% level.